

Ayurvedic Pharmacopoeial Plant Drugs

Expanded Therapeutics



C. P. Khare



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The expanded therapeutics presented in *Ayurvedic Pharmacopoeial Plant Drugs* are in no way reflections on the sanctity or legal status of the Ayurvedic Pharmacopoeia of India. The additional information

is intended to provide scientific information and updates based on standard reference works, which might broaden the area of the classical Ayurvedic medicinal system in contemporary set-ups.

Dedicated to the pioneers of scientific herbal health care.

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Introductory Note

THE KNOTTY ISSUES IN AYURVEDA

The scientific mind is not satisfied by mere statements, no matter from what source they originate, unless corroborated by clinical and experimental evidence...

Much more could be done in furthering the cause of indigenous medicine than by wholesale revival of the old system under vastly changed environments.

The active and useful drugs should be separated from those which are inactive.

—Col. Sir Ram Nath Chopra
(*Indigenous Drugs of India*, 1933)

The argument that plants still used today have stood the test of time, needs to be examined carefully.

A plant which was therapeutically effective (2000–3000 years ago) may have undergone mutation and become ineffective due to ecological or environmental factors.

—Dr Ranjit Roy Chaudhury
(WHO, SEARO Publication No. 20)

Traditional Medicine implies origin in the remote past, and herbal drugs used therein has thus a long history of use, which adds much credibility to their therapeutic value. However, maintaining the tradition should not imply that these traditional medicines are to be produced and practiced in the same manner as in the “remote past.”

—Dr Nitya Anand
Scientist Emeritus; Chairman,
Ranbaxy Science Foundation
(*Herbal Drugs and Traditional Medicine;
Perspectives in the New Millennium*, 2006)

The disease pattern and healthcare needs of the country have changed significantly and the priorities were different when the texts of traditional systems of medicine were created.

—Dr B.N. Dhavan
Former Director, Central Drug Research
Institute, Lucknow

Revaluation of claims of the past is necessary even for quality drugs ... despite the claims made in ancient Ayurvedic literature.

—Dr R.C. Saxena
Former Director & Head, Pharmacology, King
George Medical University, Lucknow

In many areas [of India] localized methods and formulations [of Ayurvedic medicine] have developed.

In addition to northern (Varanasi) and southern (Kerala) styles, the states of Maharashtra and Gujarat in Western India have a style of their own, as does Eastern India. There is no overall arbiter to determine which of these systems is “valid” or “more valid.”

—Robert E. Svoboda and Bhaswati Bhattacharya
(*Complementary and Alternative
Medicine Secrets*)

The country [India] cannot afford to miss the technological advances sweeping the world, although it could not cope up to the pace of world’s industrial revolution. The ambitions, expectations and demands of youth for 20–40 years to come has got to be looked into by the planners of the renaissance

of Ayurveda. We are now precisely at the cross roads to do a technical appraisal.

—Dr V.N. Pandey

Former Director, Central Council for Research
in Ayurveda and Siddha

(Preface, *Pharmacological Investigations
of Certain Medicinal Plants and Compound
Formulations used in Ayurveda and Siddha*, 1996)

There are innumerable ethical, technical, logistic hindrances and bias involved in the conduct of many clinical trials. A number of the reported clinical trials are scientifically unacceptable primarily because of lack of adequate training in the conduct of scientific clinical trials, and lack of commitment to the scientific drill. In most of the cases a biostatistician has not been involved at any stage of the trial.

In spite of the limitations, all clinical reports have been included in the monographs (*Reviews on Indian Medicinal Plants*, Indian Council of Medical Research, New Delhi) because of the fact that the clinical reports might not be scientifically tenable but to give an “indication,” which may encourage a subsequent proper scientific clinical study.*

—Dr Neeraj Tandon
Editor

A WELL-GUIDED INITIATIVE

The Ayurvedic Pharmacopoeia of India (API) was planned as a logical step to provide textual information on Ayurvedic drugs and their classical attributes and uses, with additional inputs from contemporary scientific literature, which were never a part of classical texts and traditions, for the rationalization and standardization of Ayurvedic medicine.

When the first Ayurvedic Pharmacopoeia committee was established in 1962, Col. Sir Ram Nath Chopra was appointed as its chairman. Col. Chopra's views did not reflect in the structure of monographs, as the basic aim of the editors of the API was to globalize classical Ayurveda through its ancient concepts and terminologies. Various pharmacopoeias, including the United States Pharmacopoeia, the British Pharmacopoeia and the Indian Pharmacopoeia,

have included herbal monographs using standard methodologies acceptable to modern community. To fill this gap, the expanded therapeutics of the plant drugs presented in the API, Part I, Volumes I–VI, elaborate on their classical attributes, classical compounds, textual references, controversial botanical sources, chemical constituents and therapeutic applications for further research in a global perspective.

THE RATIONALE

After the period of Charaka and Sushruta, soil, seasons, weather, air and environment have become more complex. Contemporary scientists find it difficult to accept the theory that the therapeutic activity and efficacy of herbs and their compounds, even after 2000 years, cannot be challenged. Keeping this in mind and for moving towards modernization, the editors of the API resorted to chemical constituents of the herb. However, in most cases, the quoted constituents are neither chemical markers nor do they represent the major biological activities of the plant drug. This created one more problem. The traditionally attributed properties of the herbs could not be correlated with the findings based on active principles.

The compound formulations quoted in the API were also caught in the gap between the classical and modern periods, as a number of plant parts are no longer available. *The Ayurvedic Formulary of India* (AFI) revised the classical text and introduced changes in all such cases. The AFI, Part I, first edition, *Dashmulaarishta* contained all of the “Ten Roots”; in the revised edition of 2003, five (*brihad*, bigger) roots were replaced with stem bark and five (*laghu*, smaller) roots were replaced with the whole plant. Now, scientific validation of all such changes will be required. Possibly, all such compound drugs will have to be screened again.

While reviewing polyherbal compounds, we have tried to identify the main drugs of the compound. Additional drugs have been addressed as “supporting herbs” and “supplementary herbs.” Real scientific validation will happen when active herbs are identified and “supporting” or “supplementary” herbs are screened for their roles and so their presence in the formulation.

In the AFI and API, classical plants and compound drugs are recommended therapeutically for a long list of ailments of divergent etiologies. Only an expert's committee can review them and

* Indian Council of Medical Research has raised this issue as it follows stringent research procedures. Its research on Guggulu, Kshaar Sutra and Vijaysaar are landmarks in the history of the modern period of Ayurveda.

rationalize them. There was no option for us but to ignore indication pluralism and to quote only prevalent uses.

Nothing could be done about Ayurvedic terminology for a number of diseases (e.g. of the abdomen, abdominal lumps, diseases of the head, heart diseases, burning syndrome and gynecological disorders: *udararoga*, *gulma*, *shiroroga*, *hrdroga*, *daha* and *yonidosha*).

The classical compounds quoted in the monographs in most cases do not represent the specific medicinal values of the single Ayurvedic herb. Sanskrit *shlokas*, composed by contemporary Ayurvedic scholars, should have been avoided, as they look like adulterants to classical *shlokas*. Multiple names and sources of the same herb in classical texts, as well as in North and South India, have been elaborated. Attention also has been drawn to the Sanskritized names of non-classical herbal drugs.

Asiatic diacritical marks, used for Sanskrit synonyms, are missing in Volume IV.

It was not easy to convert Sanskrit terminology into English equivalents based on the AFI and the review of botanical names assigned to Ayurvedic herbs.

Sources of chemical constituents have not been quoted in the API. Without proper references, the researcher will find it difficult to undertake further work. We tried our best to search the sources and expanded chemical constituents, therapeutic uses and doses on the basis of the contemporary scientific literature.

It has not been disclosed how doses of single plant drugs have been determined. Absence of a standardization basis marker compound has led to a precarious situation. A renowned herbal pharmaceutical company is quoting doses of extract-based single Ayurvedic drugs on the basis of illegible “BPN” (*Bhaavaprakasha Nighantu*, sixteenth century).

We hope that the expanded part, in spite of our limitations, will be more legible to those who are not conversant with Sanskrit. The sole aim of this academic exercise is to make the therapeutic sections of the API contemporary and industry oriented, and to facilitate their proper implementation.

PROTECTING THE SANCTITY OF AYURVEDA

Unscrupulous elements exist in the form of Ayurvedic “holy healers” throughout India. They

command a vast clientele and run a parallel Ayurvedic industry. These elements do not allow for the growth of a research-based system advocated by The Ayurvedic Pharmacopoeia of India, and exploit the consumer by quoting *shlokas* from Ayurvedic texts. Research and implementation of pharmacopoeial norms are the only scientifically sound methods for the practice of Ayurveda.

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Before moving ahead, a few words of gratitude.

Dr V.K. Agarwal PhD (medicinal chemistry), former head, Department of Chemistry, The Wealth of India Division, NISCAIR (CSIR), and Dr Gian Singh PhD, former editor, *Medicinal and Aromatic Plants Abstracts (MAPA)*, NISCAIR (CSIR), reviewed the entire text. Without Dr V.K. Agarwal’s active participation, this reference work, covering six volumes of a scholarly treatise, would not have been possible.

Dr Prem Kishore, former director, Central Council for Research in Ayurveda and Siddha, Dr Deepika Gunawant, medical director, Integrated Medicine at Max Ventures, Dr Sunita Garg, chief scientist, NISCAIR (CSIR), and a close associate of “The Modern Ayurveda” project (name withheld) were frequently contacted on a number of issues.

Rajeev Prakash Khare helped me with organizing and cross-checking the information collected from various sources. Priyadarshi Khare searched the relevant literature in the United States Philip Jojoy shared the burden of data entry.

Thirteen volumes of *Reviews on Indian Medicinal Plants*, the only exhaustive standard reference work on Indian medicinal plants after the closure of *The Wealth of India* series in 2009, were made available to me, courtesy of Dr Neeraj Tandon, Head, Medicinal Plants Unit, Indian Council of Medical Research, New Delhi (see Reference 20). This was the latest source of active principles and experimental and clinical findings.

I maintained this project as an independent venture throughout.

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Drug Variants of the Ayurvedic Pharmacopoeia of India

AASAVA AND ARISHTA

These are medicinal preparations made by soaking the drugs, either in powder form or in the form of a decoction, in a solution of either sugar or jaggery for a specific period of time, during which it undergoes a process of fermentation, generating alcohol, thus facilitating the extraction of the active principles contained in the drugs. The alcohol, so generated, also serves as a preservative.

In Indian medicine, inoculum of yeast comes from the flowers of *Woodfordia fruticosa* Kurz. (*Dhaataki*). These are nectariferous and highly tanniferous and serve the same purpose as do hops (*Humulus lupulus* L.) in brewing. In some preparations, *Madhuca indica* (*Madhuuka*) flowers, honey or resins are used for initiating the process of fermentation.

The Aasavas are prepared from the juices of fresh plants or water-soaked dry herbs, whereas the Arishtas are prepared from the decoction of the herbs.

At the final stage, the prepared medicine is moderately alcoholic (up to 12% by volume) and is taken mixed with an equal volume of water (10–30 mL twice or thrice daily). The Aasavas can be kept for any length of time in well-sealed bottles.

ARKA

The herbs are crushed coarsely and soaked in water overnight and transferred along with the water into the still for distillation. The final form of Arka is the distilled essence, which contains the volatile constituents of the herbs used in the preparation.

It is equivalent to the “aquae” or “waters” of the Western Pharmacopoeia.

Arka is given internally mixed with an equal volume of water (15–30 mL once or thrice a day).

AVALEHA AND PAAKA

Equivalent to confections, electuaries and conserves of the British Pharmacopoeia. Generally, the quantity of jaggery, sugar, sugar candy or honey is kept at two to three times the weight of all the drugs. Avaleha is given at 5–10 g twice or thrice a day. It should be used within 1 year.

CHURNA

The herbs are cleaned, dried and finely powdered. The powder should be of at least an 80-mesh sieve.

Churna is often taken with some vehicle such as honey, purified butter, milk or buttermilk, depending upon the formulation and indication (3–6 g daily).

Generally, powders should be used within 2 months (*Pharmacopoeial Standards of Ayurvedic Formulations*, CCRAS, 1987). If kept in tight containers, they retain potency for 1 year (AFI, second revised edition, 2003).

KVAATHA CHURNA

Compounded coarse powders are used whenever a particular type of decoction is required. 60 g of the Kvaatha Churna is boiled four times (if the drug is soft), eight times (if the drug is moderately hard) or

sixteen times (if the drug is very hard) in water until the decoction is reduced to one fourth, in the case of soft drugs, or one eighth, in the case of moderately hard and hard drugs, in volume. The decoction should be used within 24 hours after it has cooled down (30–60 mL twice or thrice a day).

GHRITA

For preparing medicated Ghrita, purified butter is boiled with the prescribed decoction and a fine paste of herbs. Generally, if the paste of herbs is one part by weight, purified butter should be four parts and the decoction/liquids should be sixteen parts. The mixture is boiled in a mild fire until the liquids evaporate. The Ghrita is taken after warming, generally with warm milk or water (5–10 g twice daily), and retains its potency for about 16 months.

GUGGULU

Preparations of the purified (detoxified) exudate of *Commiphora mukul* are known as Guggula. Kaishore Guggulu is prescribed for gout, Kanchnaar Guggulu for tumors and enlargement of cervical glands, Triphalaa Guggulu for piles, fistulae and other inflammatory conditions, and Yogaraaj Guggulu (the largest selling over-the-counter Guggulu) for rheumatic affections. Twelve polyherbal formulations containing Guggulu have been included in the AFI, Part I.

GUTIKAA AND VATI

These are pills or tablets of contemporary medicine. Pills made of plant drugs, when kept in air-tight containers, can be used for 2 years; if minerals are also used, then these are viable for a much longer period.

LAVANA KSHAARA

These are alkaline substances obtained from the ash of herbs. Pieces of the herb are put in an earthen pot and burnt to ashes.

LEPA

Herbs in the form of a paste, used for external application. Water, *ghee*, oil, and cow's urine are some of the media for mixing.

TAILA

The oil is boiled on a mild fire with prescribed decoctions and the paste of the herbs. The process ensures absorption of the therapeutic properties of the ingredients into the oil.

BHASMA, PARPATI, PISHTI, MANDURA, RASAYOGA, LAUHA AND SINDURA

Bhasma is the powder of a metal or mineral obtained by calcination. Parpati contains Kajjali (purified mercury and sulfur) and other prescribed herbs. Pishti is a mineral preparation obtained by triturating the drug in specified liquids and exposing the same to the sun or moonlight. Mandura consists of the slag refuse obtained in smelting iron in kilns and hearths. It contains elemental iron and various amounts of iron oxides and carbon. It is made into a calx and used in Indian medicine for anemia and related ailments. Rasayogas contain mineral drugs as their main ingredients. They are mixed and triturated together. Lauha is calcined iron and is added as a main ingredient to other drugs. Sindura are medicines containing mercury in the form of red sulfide (known as Rasa Sindura in Ayurvedic medicine). Kupipakwa Rasa of Ayurvedic medicine consists of mercurial preparations prepared through the process of sublimation. After prescribed processing, Sindura is recovered and used at a dose of 62.5–125 mg.

Summary of classical procedures, based on the following reference works:

1. *The Ayurvedic Formulary of India*, Part I, Second Revised Edn, Ministry of Health and Family Welfare, Govt of India, New Delhi, 2003.
2. *Pharmacopoeial Standards of Ayurvedic Formulations*, CCRAS, New Delhi, 1987.
3. *Formulary of Ayurvedic Medicines*, The Indian Medical Practitioners Cooperative Pharmacy and Stores Ltd, Chennai, 2004.

Ayurvedic Classical Concepts and Contemporary Terminology

The API assesses the “properties and actions” of an herb on the basis of *Rasa* (taste), *Guna* (physical property), *Veerya* (potency), *Vipaaka* (again, taste, indicating the herb’s action after ingestion) and *Karma* (therapeutic effect of the herb).

Sweet (*Madhura*), sour (*Amla*), salty (*Lavana*), pungent (*Katu*), bitter (*Tikta*) and astringent (*Kasaaya*) are the six tastes (*Rasas*).

The physical properties (*Guna*) of herbs have been divided into 20 categories: light, heavy, cold, hot, unctuous, dry, dull, sharp, immobile, mobile, soft, hard, clear, slim, smooth, rough, minute, bulk, solid and fluid.

Potency of the herb (*Veerya*) has been divided into cold and hot.

The herb is selected for medicinal use after assessing the imbalance or disharmony due to *Doshas* (morbidities)—*Vaata*, *Pitta* and *Kapha*, known as *Tridoshas* when grouped together. The entire cosmos of Ayurvedic medicine revolves around the theory of *Tridosha*.

Once the *Dosha* (moridity) has been identified, the first component of the herb, *Rasa* (taste), is selected. *Rasa* is considered an important marker that initially indicates the right choice of the herb.

Sweet taste pacifies *Vaata* and *Pitta*, but aggravates *Kapha*.

Sour taste pacifies *Vaata*, but aggravates *Pitta* and *Kapha*.

Salty taste pacifies *Vaata*, but aggravates *Pitta* and *Kapha*.

Pungent taste pacifies *Kapha*, but aggravates *Vaata* and *Pitta*.

Bitter taste pacifies *Pitta* and *Kapha*, but aggravates *Vaata*.

Astringent taste pacifies *Pitta* and *Kapha*, but aggravates *Vaata*.¹

In the API, *Tridosha* is the first component of *Karma* in the monograph, followed by important therapeutic applications. Herbs that correct all three *Doshas* have also been identified and documented. The following explanation was given in Volume I (1989): “Since the effort is to compile pharmacopoeial monographs of Ayurvedic drugs, the accent on classical attributes of respective drugs according to the doctrine of *Rasa*, *Guna*, *Veerya*, *Vipaaka* and *Karma* has not been lost sight of, though some of them appear to be abstract and subjective in the absence of an established experimental method to qualify them” (the same explanation has been used in subsequent volumes).

In the West, *Vaata* is equated with breath, *Pitta* with fire and *Kapha* with mucus.² To counteract this type of mistranslation, an effort has recently been made to “reinterpret” the theory of *Rasas* and *Tridosha* by scholars of Ayurvedic medicine.

Arvind Chopra and Vijai V. Doiphode opined that, to a certain degree, modern analytical chemistry has been used to assign properties of each of the tastes (*Rasas*). The sour, sweet, pungent and astringent tastes are determined by acids, starches and sugars, aromatics and tannins. Bitter taste is due to chemicals such as berberine. Salty taste, uncommon in plants, is found in minerals. All three *Doshas* (*Vaata*, *Pitta* and *Kapha*) should be treated as primary dynamic physiologic forces.³

The Ayurvedic philosophy describes a unifying hypothesis linking the universe with all living and non-living matter. Humans and plants in the hierarchy of cosmic evolution consist of the same basic matter—*Panchbhootas* (earth, water, air, fire and ether). *Vaata* (material = air + ether), the most powerful force, governs motion and controls cell division, arrangement and differentiation, impulse transmission (including the cardiorespiratory system and all of the higher functions in the brain); movement of bodily fluids and excreta, parturition and, above all, the mind; it is most relevant to the nervous and musculoskeletal system. *Pitta* (material = fire) governs metabolism and the formation of tissues and waste products; it is most relevant to the digestive and endocrine systems. *Kapha* (material = earth + water) increases cell mass, promotes the bonding of tissues, prevents the destruction of tissues, maintains strength and immunity and determines body growth. The six tastes (*Rasas*) transmit the properties of *Panchbhootas*; each taste has a *Dosha*-related attribute, and drugs in Ayurveda have been classified according to their effects on *Dosha*. The *Doshic Prakriti* (functional constitution) of the patient is diagnosed and treated by an Ayurvedic physician.

Each *Dosha* has its own characteristic, physiological and psychological expressions. *Vaata* is dry, cold, light and clear. *Pitta* is hot, light, fluid and clear. *Kapha* is cold, wet, heavy, cloudy and static. Although *Vaata*, *Pitta* and *Kapha* often colonize in the intestines, stomach and chest, they are ubiquitous.³

Bhagwan Dash, Mahadihassan, Udupa, Asima Chatterjee and Satyesh Chandra Pakrashi also tried to validate the *Tridosha* hypothesis.

According to Bhagwan Dash, *Vaayu* is responsible for all movements and sensations, including motor actions inside the body. *Pitta* is responsible for all physico-chemical activities of the body in the form of metabolism and production of heat and energy, and *Kapha* is the substance that maintains the compactness or cohesiveness of the body by providing the fluid matrix to it.⁴

According to Mahadihassan and Udupa, the three morbidities can be easily estimated by biochemical studies. These authors have equated *Vaata* with acetylcholine liberated by the cerebral cortex and the peripheral and parasympathetic nerve endings, *Pitta* with catecholamines liberated by the hypothalamus, sympathetic nerve endings and adrenal medulla and *Kapha* with histamine

secreted by the brain stem. The drugs, when administered, act by promoting or destroying the respective neurohumours or their precursors.⁵

According to Asima Chatterjee and Satyesh Chandra Pakrashi, the entire biological living organism is governed by *Tridosha*. *Vaayu* (*Vaata*) indicates all of the biological phenomena that are controlled by the functions of the central autonomic system.

The malfunction of *Vaayu*, either by itself or coupled with other functional disorders due to *Pitta* and *Kapha*, is the major factor in developing diseases. *Pitta* is the manifestation of energy in the living organism. It helps digestion, assimilation, tissue building, heat production, blood pigmentation, activities of the endocrine glands and so on. Many of these processes are thermogenic and metabolic. *Kapha* implies the functions of thermotaxis or heat regulation and also the formation of various preservative fluids, mucous, synovia, etc. The main functions of *Kapha* are to provide nutrition to the body tissues and to bring about coordination of the body system and regulation of all biological processes.¹

These “modified interpretations” indicate that a concerted effort is being made to reestablish the significance of the theory of *Tridosha* and *Rasa*, *Guna*, *Veerya* and *Vipaaka*. As a drug is to be produced for millions of people whose *Doshic Prakriti* (functional constitution) will be impossible to identify, the survival of the theory of *Tridosha* depends upon its acceptance by the younger generation of Ayurvedic physicians who are trained in modern physiology, bacteriology, pathology and radiology, but still prefer to treat patients through individually tailored treatments.

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Ayurvedic Polyherbal and Herbomineral Formulations: A Problem for Researchers and Drug Developers

Col. Ram Nath Chopra raised this issue in 1933 when he suggested that attempts must be made to separate the good herbs from the useless ones, and for this, a systematic investigation of these drugs must be undertaken.¹

Prof. (Dr) A.J. Baxi (Gujarat Ayurved University, Jamnagar) wrote in 1986:

Dashamuula Kwaath Churna and Dashamuulaarishta contain powders of the roots of ten different plants. These plants belong to different families and some of them contain chemical compounds which under favorable conditions may interact or undergo enzymatic reactions causing oxidation of the hydroxyl group or reduction of keto group or breaking up of double bonds, etc., forming altogether different compounds in the final product. To study this possibility it is necessary to plan an elaborate scheme. We may take each plant separately one by one and process it under similar experimental conditions and study the changes in chemical constituents at every stage. Then permutations and combinations will have to be carried out by mixing plant 1 and 2; 1 and 3; 1 and 4; 2 and 3; 2 and 4; 2 and 5; 1,2 and 3; 1,2,3 and 4; and like that as many combinations as possible will be required to be studied. Such an elaborate study would indicate

as to what were the intermediate products and what is the final constitution. An instrumental study at every stage will be more helpful and would give us the information about the genuineness and quality of each drug and final product.²

Dashamuulaarishta is the largest selling tonic for women in India (followed by Ashokaarishta, Drakshaasava, Arjunaarishta, Lohaasava, Kumaryaasava and Saaraswataarishta).

The AFI, Part I, first edition, 1978, included the roots of all ten of the following plants in the compound: *Aegle marmelos*, *Oroxylum indicum*, *Gmelina arborea*, *Stereospermum suaveolens*, *Premna integerifolia*, *Desmodium gangeticum*, *Uraria picta*, *Solanum indicum*, *Solanum xanthocarpum* and *Tribulus terrestris*. In its second revised edition of 2003, an option has been provided to use either the root or stem bark of the first five herbs and the aboveground parts of the remaining herbs. (In classical Ayurvedic medicine, plant parts like the root, bark, flower, seed, fruit, and leaves are used for their specific therapeutic activities. Improper parts of the plant may affect the treatment and may even lead to harmful effects.³)

Dashamuulaarishta was originally formulated for neurological disorders, but due to the unavailability of proper plant parts, its profile changed with the passage of time. The AFI recommended it for the following important therapeutic uses in 1978: emesis, malabsorption syndrome, abdominal

lump, cough, asthma, tissue wasting, neurological afflictions, and piles. This was expanded in its second edition of 2003 to fistula-in-ano, anemia, jaundice, diseases of the skin, excessive flow of urine, digestive impairments, diseases of the abdomen, gravel in urine, calculus, dysuria, infertility, emaciation, deficiency of semen, and debility. (This expansion is obviously arbitrary.)

Dabur recommends Dashamuulaarishta as a general tonic and restorative for women, Baidyanath Ayurved Bhavan as a bitter tonic and alterative for nervous diseases, anemia, cough, piles and as a general tonic, Zandu Pharmaceutical for cough, piles, anorexia, alcoholism, asthma, vomiting and as a stimulant, alterative and bitter tonic and Indian Medical Practitioner's Cooperative Pharmacy, Chennai, as a restorative, digestive, cardiac and nervine tonic.

Dashamuula Kwaath extract produced central nervous system-depressant effects in albino mice. It reduced spontaneous motor activity, potentiated pentobarbitone hypnosis and antagonized amphetamine-induced hyperactivity. It also exhibited a tranquilo-sedative activity like a major tranquilizer and blocked the conditioned avoidance response in rats.⁴ Another study indicated that Dashamuula Kwaath extract effectively produced aspirin-like analgesic, antipyretic and anti-inflammatory effects in mice.⁵ Dey et al. (1968) reported that *Solanum indicum* induced drowsiness, reduced the motor activity, alertness in mice and significantly potentiated barbiturate hypnosis in mice.⁶

Dhawan et al. (1977) reported that the entire plant extract of *Uraria picta* exhibited CNS depressant activity.⁷ Marmin, a coumarin, isolated from the root of *Aegle marmelos*, showed anti-inflammatory effects against carrageenan-induced inflammation in rats. The methanolic extract of the rootbark inhibited the beating rate of cultured mouse myocardial cells. Among the isolated constituents, aurapten has been found to be a potent inhibitor comparable with verapamil.⁸ The root of *Desmodium gangeticum* gave gangetin, one of the pterocarpanes isolated from hexane extract of the root. It showed significant anti-inflammatory activity in rats.⁹ Alcoholic extracts of the stem bark of *Gmelina arborea* showed anti-inflammatory activity comparable to phenylbutazone.¹⁰

Thus, if we scan the published literature, on the basis of leads already available, the number of herbs can be reduced (Dashmuulaarishta contains not

only the "ten roots," but also 60 additional herbs) and the efficacy of the drugs can be improved.

Now, we give an example of a contemporary polyherbal formulation of "Abana" (Himalaya Drug Company). It contains the "ten roots" of Dashamuula along with most of the tonic herbs, including *Terminalia arjuna*, *Nepeta hindostana*, *Convolvulus pluricaulis*, *Nardostachys jatamansi* and *Centella asiatica* (47 herbs and 10 mineral drugs). The tonic has been recommended in hypertension and as an adjuvant in the therapy of angina in patients with cardiac risk factors and cardiovascular and cerebrovascular conditions requiring the inhibition of platelet aggregation.

"Abana" is recommended as a well-researched tonic,¹⁴ but there are some studies with single herbs or, at most, two to five herbs that have shown equally encouraging results in the same area.

A clinical trial with four single drugs—*Commiphora mukul* oleoresin, *Acorus calamus*, *Inula racemosa* and *Terminalia arjuna*—against placebo, may provide sufficient leads for pruning complicated cardioprotective formulations.¹¹ All the four drug-treated groups showed mild-to-moderate improvements in symptoms of chest pain and dyspnea. The *Commiphora mukul* oleoresin and *Inula racemosa* groups showed significant reductions in body weight as well as corrections of the lipid profile. However, restoration of high density lipoproteins was significant only in the *Terminalia arjuna* group. Favorable electrocardiographic changes of a mild-to-moderate degree were noted in all four groups. Improvements in the Total Lipid Atherogenicity Index was significant in the *Inula racemosa* group: *Commiphora mukul* oleoresin +, *Acorus calamus* –, *Inula racemosa* ++, *Terminalia arjuna* +.

In an earlier clinical trial, dried and powdered roots of *Inula racemosa* and purified oleoresin of *Commiphora mukul* in a 1:1 (w/w) proportion were prescribed (6–8 g/day in divided doses) for 6 months, and gave encouraging results in hyperlipidemia.¹²

A Sri Lankan compound formulation, Karvi Panchakadasha Kashaaya, contained 50 herbs. This was reduced to five herbs—*Carum carvi*, *Inula racemosa*, *Ricinus communis*, *Bacopa monnieri* and *Boerhaavia diffusa*—and was prescribed in the form of a decoction (made by boiling 50 g crude drug in 400 mL water, reducing to one-eighth volume) to 80 randomly selected patients with essential hypertension as an adjuvant to modern

hypertensive drugs, as well as an independent drug. At the end of 28 days, both groups showed significant symptomatic improvements and reductions in systolic and diastolic blood pressure.¹³

Now that a good number of single herbs are exhibiting outstanding results in experimental and clinical trials, a concerted effort should be made to review and restructure the complicated compound formulations of Indian medicine. With this in mind, while discussing the classical compounds referred to in the API, I have tried to divide them into three groups: main herbs, supporting herbs and supplementary herbs. This may help researchers in restructuring the archaic compound drugs to some extent.

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Author



C.P. Khare (Chandrama Prasad Khare) was born on March 10, 1932, and has been an herbalist, herbal drug consultant and herbal historian for more than 60 years. He was born into a family of traditional herbal physicians. He studied the original Ayurvedic texts in Sanskrit and Unani in Urdu and acquired first-hand knowledge of the cultivation and processing of herbs and their usage even before going to college. In 1952, he took up journalism and remained as the working director of the

largest magazine publishing group of India for more than 40 years. Khare is the founder of the Society for New Age Herbals (New Delhi). His reference works find a prominent place in prestigious universities, teaching institutions and libraries across the world.

WORKS BY C.P. KHARE

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The Ayurvedic Pharmacopoeia of India:

Original text in grey.

Expanded therapeutics:

Additional information in black.

BOTANICAL SOURCE(S)

Abies webbiana Lindl.

(Fam. Fabaceae)

Abies spectabilis (D. Don) Spach., syn. *A. webbiana* Lindl. grows in small areas of the eastern Himalayas only and has a limited availability. More commonly employed in West Bengal and Assam.

Leaves of *Taxus wallichiana* Zucc. syn. *T. baccata* Linn., on the other hand, are freely available and used more commonly.³⁶

In Unani medicine, Taalispattar (Zarnab) is equated with *Flacourtia cataphracta* Roxb. Its powdered dried leaves are employed to relieve bronchitis and cough in Indian folk medicine.⁴⁷

PHARMACOPOEIAL AYURVEDIC DRUG

Tālīśa (Leaves).

API, Part I, Vol. IV.

Taalisha still remains a drug of disputed source.

In addition to *Abies webbiana* and *Taxus wallichiana*, leaves of *Rhododendron anthopogon* D. Don., *R. campanulatum* D. Don. and *R. lepidotum* Wall. are also used.³⁰

Flacourtia cataphracta is known in Arabic as Taalisfir or Zarnab.⁴⁷

National Formulary of Unani Medicine equated Zarnab (Taalispattar) with *Flacourtia cataphracta*, as well as with *Cinnamomum tamala* Nees.³⁷

Svarna-taali (yellow-flowered spp. of *Rhododendron*?) was used as a substitute of Taalisapatra during sixteenth century.³

AYURVEDIC SYNONYMS

Patradhyam.

Abies webbiana: Taalisapatra, Dhaatripatra, Dhaatripatarni, Shukodaraa.^{16(b)}

Throughout Ayurvedic classical texts, Charaka is spelt as Caraka. C = Ch, is used in all the monographs of the Ayurvedic Pharmacopoeia of India and in Ayurvedic pharmacopoeial names. We have not corrected them for their historical authenticity.

Taxus wallichiana: Thuner, Sthauneya, Sthauneyaka, Shukapushpa, Dhaatri-patra, Vikarna.⁷

Rhododendron anthopogon: Taalisri (Punjab), Taalish (Tibet), Taalis-faz (Kashmir).^{2(a)}

R. campanulatum: Taalis-far.

R. lepidotum: Taalisfur (Punjab), Taghisha (Garwal).^{2(a)}

Flacourtia cataphracta: Taalisapatra (Gujarat).^{2(a)}

Cinnamomum tamala: Taalishappattri (Tamil, Telugu).^{2(a)}

HABITAT

The Himalayas at an altitude of 2800–10000 m.

Taxus wallichiana: temperate Himalayas at altitudes between 1800 and 3300 m, and in hills of Meghalaya and Manipur at an altitude of 1500 m.

Rhododendron anthopogon: the temperate Himalayas from Himachal Pradesh to Bhutan, from 3000 to 5000 m.

R. campanulatum: throughout the Himalayas at altitudes of 2400–5200 m.

R. lepidotum: Himalayas at altitudes of 2400–5000 m.

Flacourtia cataphracta: Commonly cultivated throughout Southeast Asia, eastern Malaya, the Philippines and Fiji, and native to North Bengal, East Bengal and Chittagong.

REGIONAL LANGUAGE NAMES

Eng: Himalayan siver;

Assam: Talish;

Beng: Talish pala, Taleesh patra;

Guj: Talish patra;

Hindi: Talish patra;

Kan: Tales patra, Talisapathra, Shukodara;

Mal: Talisapatram, Taleesapattri;

Mar: Laghu taleespatra;

Ori: Talis;

Tam: Talispatra, Taleesapattri;

Tel: Taleesapattri;

Urdu: Zarnab.

Eng: Indian Silver-Fir, East Himalayan Fir, West Himalayan Fir.

Mal: Taalisapatram.

Punj: Chilrow.

Flacourtia cataphracta is known in Arabic as Taalisfir or Zarnab.⁴⁷

Zarnab (Taalispattar) is equated with *Flacourtia cataphracta*, as well as with *Cinnamomum tamala*.³⁷

Cinnamomum tamala:

Tamil: Taalishappattri;

Telugu: Taalisapatri.^{2(a)}

CONSTITUENTS

Essential oil and Alkaloid.

Essential oil: 0.5%. Two samples of needles and twigs from two different locations of central Nepal gave alpha-pinene 3.0, 10.3; camphane 3.5, 9.3; beta-pinene 5.1, 3.3; limonene 6.1, 2.3; bornyl acetate 4.2, 15.5; and carvone 5.8, 0.75%, respectively.^{2(c)}

Leaves gave a bioflavonoid, abiesin; two glycosides, methylbetuloside and betuloside; *n*-tri-acontanol and beta-sitosterol. A new alkaloid, 1-(4' methoxyphenyl)-azirdine was isolated from the leaf obtained from the Sikkim-Himalayan region.³⁸

Rhododendron anthopogon leaves: a sample from Pindari (at an altitude of 4500 m) contained quercetin, myricetin, taxifolin, kaempferol, kaempferol-4' methyl ether, kaempferol-3-0-beta-D-glucopyranoside and quercetin 3-0-alpha-L-rhamnopyranoside.^{2(c)}

Flacourtia cataphracta leaf extracts: beta-amyrin, alpha-amyrin, a mixture of beta-sitosterol and stigmasterol (from both leaves and stem bark); beta-sitosterol-3-0-beta-D-glucoside and 5-0-caffeoylquinic acid (from leaves).⁴⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Swasa, Kasa, Gulma, Agnimandya, Amadosa, Ksaya, Hikka, Chardi, Krmi, Mukharoga, Aruci

Dyspnea, cough, obstructive jaundice, loss of appetite, diseases due to digestive toxins, emaciation, hiccough, emesis, worm infestation, diseases of the mouth, anorexia (therapeutic uses based on classical texts, 1000 BC to 1837 AD).

In practice, used mainly for respiratory disorders and anorexia. Aqueous extract of *Taxus wallichiana* showed not only bronchodilating activity, but also inhibited the release of histamine-like mediators from the mast cells by stabilizing it.³⁹

IMPORTANT FORMULATION/ APPLICATIONS

Tālisādi Churna (Shārangadhara Samhitā, thirteenth century), contains 7 herbs with sugar in double quantity.

Prescribed with honey for dry cough and fever due to throat or chest infection.

Bhāskara Lavan Churna (Shārangadhara Samhitā) contains 14 digestive herbs and 4 salts (40%).

Prescribed as a digestive, carminative and appetizer.

Jātiphalādi Churna (Shārangadhara Samhita) contains *Cannabis sativa* leaf as the main drug with 20 supporting herbs. Tālisha is a minor component. Prescribed for diarrhea and dysentery.

Pūga Khanda (Bhaishajya Ratnāvali, seventeenth century) does not contain Tālisha (AFI).

Drākshādi Churna contains 24 plant drugs in equal proportions, including Tālisa leaves. Prescribed for loss of appetite and anorexia.

Prāndā Gutikā and Tālīsādi Modaka are obsolete drugs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–3 g of the drug in powder form.

Tālīsādi Churna: 3–6 g (1/2 to 1 teaspoonful twice a day with honey).

Jātiphalādi Churna: 1–2 g twice daily with honey, buttermilk or water, as a carminative in diarrhea and dysentery. For cough and common colds, take with honey. Five to ten drops of the fresh leaf juice in water or mother's milk is prescribed for infantile fever during dentition and in bronchitis.¹⁵⁽¹⁾ For the powdered leaf, 1–8 g mixed with the juice of *Adhatoda zeylanica* leaf and honey is recommended for cough, asthma, and hemoptysis.^{16(a)} An infusion of leaves is used for hoarseness.¹⁵⁽¹⁾

German Commission E recommended fir shoots of *Abies alba* internally for catarrh of the respiratory tract and externally for mild rheumatic or neuralgic pains. Average daily dose: 5–6 g. Externally for full bath: 200–300 g.⁸ Contraindicated in obstructive bronchial diseases and whooping cough.^{13,14}

Abrus precatorius Linn**Root****Guñjā****A****BOTANICAL SOURCE(S)**

Abrus precatorius Linn
(Fam. Fabaceae)

Sushruta, including Gunjaa, among the poisonous root plants.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Guñjā (Root).

API, Part I, Vol. II.

The outer surface of the root is dark brown while the wood is light yellow. Indian licorice is a wrong synonym of the root as quoted in standard reference works. The root cannot be substituted for Indian licorice (*Glycyrrhiza glabra*) as the ash value, extractive value and froth number differ. Moreover, it is devoid of glycyrrhetic acid and the sweet value.^{20(a)} (Please see *mark in Regional Language Names.)

AYURVEDIC SYNONYMS

Raktikā, Kakananti.

Shikhanikā, Tāmra, Kākantikā,⁴ Kunni, Chirihintikā, Gunjaka, Kaakchini, Kamboji, Kubjaka, Chirmiti.⁷

HABITAT

The Himalayas ascending to 900 m and throughout the plains.

Native to Southeast Asia, now naturalized in other tropical and subtropical regions. Commonly found in Florida and Hawai.¹⁷

Seventeen species in the pantropical region¹; 2 species found in India, *A. precatorius* and *A. fruticulosa* Wall. Ex Wight & Arn.^{2(b)} Also found in Sri Lanka and Pakistan.⁵

REGIONAL LANGUAGE NAMES

Eng: Jequirity;
Assam: Rati;
Beng: Kunch, Shonkainh;
Guj: Rati, Chanothee, Chonotee;

Hindi: Ratti, Ghungchi;
Kan: Guluganji, Gulagunja;
Mal: Kunni, Cuvanna Kunni;
Mar: Gunja;
Ori: Kainch;
Punj: Ratti;
Tam: Kunrimani, Kundumani;
Tel: Gurigingā, Gurivinda;
Urdu: Ghongchi, Ratti.

Eng. names: Precatory bean,^{13,17} Coral Pea, Crab's Eyes, Indian Licorice,* Lucky or Paternoster Beans, Rosary Pea,¹ Wild Liquorice,⁶ Love Bean, Buddhist Bead, Bead Vine, Black-eyed Susan.¹⁷

Wild Licorice is a misnomer. *Aralia nudicaulis* and *Ononis avensis* are also known as Wild Licorice.¹⁸

CONSTITUENTS

Glucoside (Glycyrrhizin).

Glycyrrhizin 1.25%; absrine, abruquinone A, B, C, D, E, F; choline, hypaphorine, precasine, precatorine 11%, precol, trigonelline, xylose, polysaccharide¹²; a new glycoside 7, 5-dihydroxy-6, 4'-dimethoxyisoflavone-7-O-beta-D-galactopyranoside.^{20(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Indralupta, Mukhaśosa, Sūla

Alopecia, dryness of mouth, colic (therapeutic uses based on classical texts from the seventh century to the sixteenth century).

The petroleum ether extract of the root at 1–5 days post-coitum prevented nidation in up to 100% of albino rats.^{20(a)}

95% ethanol extract of root (orally) at 10.0 mg/kg showed an anti-estrogenic effect.¹²

Abruquinones A, B, and D exhibit platelet aggregation and A, B, D, and F show strong anti-inflammatory and anti-allergic effects.⁴⁰

70% ethanol extract of fresh root (intraperitoneally) showed anticonvulsant and CNS depressant activity at variable doses in mice.¹²

A

**IMPORTANT FORMULATION/
APPLICATIONS**

Nilibhṛṅgādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), available in two variants, with gingelly oil and with coconut oil for promoting hair growth. Contains the root with the juice of Indigo, *Eclipta prostrata*, Baloon vine leaf and *Embelic myrobalan* fruit juice. The root was used as a snuff in masosinusitis (Vrindamadhava, sixth century).¹⁶ The root was chewed for pain due to dental caries (Rājamarttanda, eleventh century).¹⁶ Massage and snuff of the root and seed extract in oil was prescribed for treating chronic cervical

lymphadenitis (Bhāvaprakasha, sixteenth century).¹⁶

Hot water extract of the root is taken orally as an emmenagogue.¹²

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

1–3 g of the drug in powder form.

In Taiwan, a decoction of the dried root is given internally to treat bronchitis and hepatitis.¹²

A decoction of the root and leaf sap is taken orally for asthma in Tanzania.¹²

Abrus precatorius* Linn*Seed****Guñjā****BOTANICAL SOURCE(S)**

Abrus precatorius Linn
(Fam. Leguminosae) Seed

Krishna Gunjā (the black variety) of folk medicine is equated with *Cardiospermum halicacabum* Linn.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Guñjā (Seed).

API, Part I, Vol. I.

The fruit splits open as it dries to reveal three to five hard-coated seeds.¹⁷

Seeds are ovoid, scarlet with a black spot around the hilum or black with a white spot or uniformly black or white and glossy.^{2(b)}

International Pharmacopoeial name: Abri semen.

AYURVEDIC SYNONYMS

Raktikā, Kúkaṇantī.

Shikhanikā, Tāmra, Kākantikā,⁴ Kunni, Chirihintikā, Gunjaka, Kaakchini, Kamboji, Kubjaka, Chirimiti.⁷

HABITAT

A climber met with all along Himalayas, ascending to 900 m; spreading throughout plains;

flowering in August-September, and fruits ripen during winter.

Native to Southeast Asia, now naturalized in other tropical and subtropical regions. Commonly found in Florida and Hawai.¹⁷

Seventeen species in pantropical region¹;

2 species found in India, *A. precatorius* and *A. fruticulosa* Wall. Ex Wight & Arn. Syn.

A. pulchellus Wall.; *A. laevigatus* E. May.^{2(b)}

Also found in Sri Lanka and Pakistan.⁵

REGIONAL LANGUAGE NAMES

Eng: Jequirity;

Assam: Rati;

Beng: Kunch, Shonkainch;

Guj: Rati, Chanothee;

Hindi: Ratti, Ghungchi;

Kan: Galuganji, Gulagunjee;

Mal: Kunni, Cuvanna Kunni;

Mar: Gunja;

Ori: Kainch;

Punj: Ratti;

Tam: Kuntri, Kunrimani, Kundamani;

Tel: Guriginja, Gurivinda;

Urdu: Ghongcha, Ratti.

Eng. names: Precatory bean,^{13,17} Coral Pea, Crab's Eyes, Indian Licorice seeds, Lucky or Paternoster Beans, Rosary Pea,¹ Wild Licorice,⁶

Love Bean, Buddhist Bead, Bead Vine, Black-eyed Susan.¹⁷

Wild Licorice is a misnomer. *Aralia nudicaulis* and *Ononis avensis* are also known as Wild Licorice.¹⁸

CONSTITUENTS

An albuminous substance (abrine and abralin)

Abrine, a toxalbumin, similar to ricin of castor seed, is the chief poisonous constituent of the seed, present to the extent of 0.15% in the seed.^{2(b)}

Abrin is a single glycoprotein of molecular weight 60,000–65,000; it is a type 2 ribosome-inactivating protein. The toxin is composed of two chains (A and B). The A chain (effectomere) is responsible for the toxic activity, while the B chain (haptomere) binds to the glucose units of cell surface carbohydrates.¹⁷

Abrin is a potent inhibitor of protein synthesis and moderate inhibitor of DNA synthesis.¹³

The seed also contains the glucoside abralin and the major alkaloid abrine.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Vraṇa, Vātavyādhī, Indralupta

Leprosy/obstinate skin diseases; ulcer; diseases of the nervous system; baldness (therapeutic uses based on texts from the fifteenth to sixteenth century).

In leprosy, a paste of the seeds with butter was applied topically; in sciatica, stiffness of shoulder, and paralysis, the affected region is incised with a razor and a paste of the seeds was applied thereon; in baldness, the scalp was incised and a paste of the seeds was applied frequently; for treating scrofula, oil extract of seeds and root; for dandruff, oil extract of seeds and *Eclipta alba* was prescribed.¹⁶

Abrin has been studied for its cytotoxic effect on tumor cells, as well as for sterility, treating prostate and breast cancer^{2(c)} and as

a “molecular probe” to investigate cell function.^{13,17}

Experimentally, seed extracts showed anti-fertility activity in rats; adversely influenced pregnancy and the fetus in mice; and caused irreversible impairment in human sperm motility.¹³

IMPORTANT FORMULATION/ APPLICATIONS

Mṛtsanjivani Gutikā (Sahasrayoga, a non-Samhitā, Kerala Mātrīa Medica), contains 8 animal products, 6 mineral drugs and 21 herbal drugs including Kunni (Gunja) seeds; all in equal proportion.

For high fever, epilepsy, delirium.

Gunjabhadra Rasa (not in AFI; Bhaishajya Ratnāvali, seventeenth century), a mercury- and sulfur-based mineral drug, contains Gunjā seeds. For muscular atrophy.

Gunjā Tailam (Bhaishajya Ratnāvali) and Neeli Bhrṅgādi Tailam (Sahasrayoga), not quoted in API, are used for diseases of the scalp.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

60–180 mg of the detoxified drug in powder form.

Detoxification was done by steaming in *Dolaayantra* (one part of the seed with q.s. *Kanji*) for 3 hours and the testa was removed. (The classical *Dolaayantra* process should be reviewed and simplified.)

Only detoxified drug extracts in oil or with butter were advised in classical texts for topical application.

Abrin has been used with some clinical success as an analgesic in terminally ill patients.¹⁷

Abrin has been used as a molecular probe to investigate cellular function. In experimental studies, abrin was found to be effective in reducing solid tumor mass.¹⁷

The LD₅₀ of abrin given to mice is 0.04 µg. 5 mg of abrin is reported to be toxic to humans. In goats, ground seeds at 1–2 g/kg/day caused death in 2–5 days.¹⁷

A

Abutilon indicum Linn

Root

Atibalā

BOTANICAL SOURCE(S)

Abutilon indicum Linn
Sweet (Fam. Malvaceae)

Syn. *A. asiaticum* (Linn.). Sweet, *Sida guineense*.¹⁵
The plant is variable; subspecies include: var.
populifolium; *albescens*; *guineense*.^{2(b)}
Abutilon theophrastii Medic., Syn. *A. avicennae*
Gaertn, is an Indian alien found throughout
Eastern and Central America in waste places,
and is known as Indian Mallow, American Jute
and Velvetleaf, and Chingma in China.¹

PHARMACOPOEIAL AYURVEDIC DRUG

Atibalā (Root).
API, Part I, Vol. I.
The drug, as a whole plant, is collected after the
rainy season when in fruit.^{2(b)}
International Pharmacopoeial name: Abutili
radix.

AYURVEDIC SYNONYMS

Kankatikā, Rīṣyaprokṭā.
Valikā, Bhārādajā. ⁴ Vaatyāyani, Vaatyapushpi,
Urakshagandhni, Vishvadevaa, Gavedhuka. ^{4,18}

HABITAT

A hairy herb or under-shrub 1.0–1.5 m high;
annual or more often perennial with golden yel-
low flowers, flowering mostly throughout the year,
found abundantly throughout the hotter parts of
India, as a common weed on road sides and other
places in plains and hills, up to an elevation of
600 m.
A weed up to 3 mm in height in the sub-Himala-
yan tract and other hills at up to 1200 m and in
hotter parts of India.^{2(b)}
Abutilon: Distributed throughout the tropics and
subtropics of both hemispheres.⁵ 160 species in
tropical and warm regions; 18 in India and 48
in Australia.^{1,2(b)} Cultivated in China and the
neotropics.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Indian Mallow;
Assam: Jayavandha, Jayapateri;
Beng: Badela;
Guj: Kansaki, Khapat;
Hindi: Kanghi;
Kan: Shrimudrigida, Mudragida, Turube;
Mal: Uram, katuvan, Urubam, Urabam,
Vankuruntott, Oorpam, Tutti;
Mar: Chakrabhendi, Petari, Mudra;
Ori: Pedipidika;
Punj: Kangi, Kangibooti;
Tam: Tutti, Thuthi;
Tel: Tutturubenda.
Urdu: Kanghi,⁶ Musht-ul-Ghaul,
Darkht-e-Shaan.⁷
Common Eng. names: Abutilon-hemp,
Butterprint, Tientsin-jute, Velvetweed.¹⁹
China: Chinese-lantern (*Abutilon x hybridum*).
Japan: Ichibi (*Abutilon theophrastii*).¹⁹

CONSTITUENTS

Asparagine
Mostly, the drug is used as a dried whole plant.
11.5% aspergine is found in the seed, with total
amino acids 31.0%.^{2(c)}
Alantolactone, isoalantolactone, and gallic acid
were isolated from the root.²¹ Mucilage from
the root of *A. theophrastii* contains pentosans,
methylpentosans and uronic acids.¹⁵
Asparagine is a diuretic; gallic acid is an analgesic;
mucilage is for wound healing and as an anti-
inflammatory and mucus membrane protec-
tant; tannins are hemostatic.¹⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Meha, Vāta-rakta, Rakta-pitta
Polyurea, urinary disorders; gout; hemorrhagic
diseases (therapeutic uses based on a sixteenth
century text).
Infusion of the root was given in fevers, strangury
and hematuria; decoction of the root, mixed
with honey, was given in meno-metrorrhagia.¹⁶

Reported uses: the extract of the root in oil is used for treating paralysis and as a nervine tonic and antipyretic; the whole plant is used in urinary and uterine discharges, piles and lumbago.^{2(b)}

Bark is included in Western herbal medicine among herbal diuretics.¹⁷ (Used in urinary incontinence.)

IMPORTANT FORMULATION/ APPLICATIONS

Balā Taila (Ashtāngahridaya, seventh century), contains Balā (*Sida cordifolia*) as one of the main plant drugs with 46 supporting herbs including Atibalā root. For cough, asthma, epilepsy, and nervine disorders.

Nārāyana Taila (Bhaishajya Ratnāvali, seventeenth century) contains Balā and Atibalā, among 13 plant drugs, with 16 supporting herbs. For diseases of the nervous system.

Mahā Nārāyana Taila (Bhaishajya Ratnāvali), contains Atibalā roots, among 13 main plant drugs, with 42 supporting herbs (market samples contain both Balā and Atibalā). For neurological disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Decoction: 50–100 mL.

Fresh juice of the root: 10–20 mL.

Dose of Country Mallow (*Sida cordifolia*) powered root, seeds, and leaves: 0.5–1 g daily.¹³

The LD₅₀ of the fixed oil in mice was 933.3 mg/kg s.c. and 2357.9 mg/kg p.o.^{20(a)}

Caution: the *A. indicum* plant is considered to be abortifacient.^{2(c)}

Research potential: as a nervine tonic and immunostimulant^{20(a)} and as a herbal diuretic (compare *Boerhavia diffuse* and *Tribulus terrestris*).

Acacia catechu (Linn. f.) Wild.

Khadira

BOTANICAL SOURCE(S)

Acacia catechu (Linn. f.) Wild.
(Fam. Leguminosae)

Fam. Mimosaceae

PHARMACOPOEIAL AYURVEDIC DRUG

Khadira (Heartwood).

API, Part I, Vol. I.

Dry aqueous extract of the heartwood. Two types are sold in trade: hard blocks with a smooth, somewhat oily surface of a dark brown color; and thin, porous blocks with a rough surface of a yellowish brown or fawn color, lighter in weight and brittle (known as Pākharā).³⁶

International Pharmacopoeial name: Catechu.

AYURVEDIC SYNONYMS

Gāyatrī.

Kadara, Somvalka, Dantdhāvan, Kantaki,⁷
Raktasāra (heartwood extract).⁴

HABITAT

Dry parts of India.

Throughout the sub-Himalayan tract from Punjab to Assam at up to 1200 m. In drier regions of Madhya Pradesh, Bihar, Rajasthan, and Tamil Nadu.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Black catechu, Cutch tree;

Assam: Kharira, Khara, Khayar;

Beng: Khera, Khayera;

Guj: Khair, Kathe, Kher;

Hindi: Khair;

Kan: Kaggali, Kaggalinara, Kachinamara,
Koggigida;

Kash: Kath;

Mal: Karingali;

A

Mar: Khaira, Khair;
Ori: Khaira;
Punj: Khair;
Tam: Karungali, Karungkali;
Tel: Chandra, Kaviri;
Urdu: Chanbe Kaath.

Eng: Catechu Nigrum.
Urdu: Khair, Kaat, Katthaa (heartwood extract).⁷

CONSTITUENTS

Catechin, catechutannic acid and tannin.

Black catechu extracted from the heartwood contains catechins, (+)- and (–)-catechin, (+)- and (–)-epicatechin (2%–12%); catechin tannins (20%–60%);¹⁴ and flavonoids and anthocyanins include quercetin, quercitrin, cyanidanol.³¹

An Indian sample gave the following values: tannin 56.4%–62.5%; catechin 13.5%–17.8%; extractives 20.0%–32.0%; insolubles 2.9%–5.6%.^{2(b)}

Tannin content causes astringent and anti-bacterial properties of catechu. Catechin causes blood vessel constriction.

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Vraṇa, Śoṭha, Prameha

Obstinate skin diseases, ulcer, inflammation, polyuria (therapeutic uses based on texts from 1000 BC to sixteenth century).

Khadira was considered the best remedy for obstinate skin diseases, including leprosy and vitiligo (from 1000 BC to seventeenth century).

Catechin and its metabolites have been investigated for their anti-diarrhoeal, anti-inflammatory, hypotensive, hypoglycemic, liver-protective, chemo-protective and anti-leprotic activities.^{2(b,d),13,20}

Experimentally, catechin exhibited protective effects against liver damage and induced ulcers in animals. Research suggests that catechu extracts (gambrine constituent) can cause vasodilation and might have hypotensive effects.¹³

IMPORTANT FORMULATION/ APPLICATIONS

Khadirārishta (Shārangadhara Samhitā, thirteenth century AD), contains catechu with 14 supporting herbs.

Prescribed for dermatophytosis.

Khadirādi Gutika (Yogarātnākara, sixteenth century) contains khadira with 23 supporting herbs. Prescribed for diseases of the pharynx and larynx. (For Khadirādi Gutikā of Charaka Samhitā, 1000 BC, see *Acacia leucophloea*.)

Arimedādi Taila (Ashtāngahridaya, seventh century) contains 40 herbs. Prescribed as a topical gum paint for diseases of the teeth and gums.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–30 g of the drug for decoction

Catechu is included in mouthwashes and gargles for gingivitis, stomatitis, pharyngitis, and oval ulcers; topically for skin diseases and for dressing wounds.¹³

Khadirārishta: 15–30 mL (1–2 tablespoonful, with equal quantities of water after meals).

(+)-catechin (cyanidanor) is associated with fatal anemia.¹³⁽⁰⁷⁾

Cutch is subject to legal restrictions in some countries.¹⁸

Catechu is found to inhibit COX-1 modestly. Methylcatechin inhibits the binding of monocytes to vascular endothelial cells and may reduce atherosclerosis.¹³

Acacia leucophloea Willd.

Arimeda

BOTANICAL SOURCE(S)

Acacia leucophloea Willd.
(Fam. Fabaceae)

Syn. *A. alba* Willd.

In the glossary of *Indian Medicinal Plants* (CSIR), *A. farnesiana* is equated with Arimedah, Gandh Babool and Guya-babool. *The Wealth*

of India also equated it with Guya-babool and Gandh Babool. Indian National Science Academy scientists equated Arimeda with *A. leucophloea*.²⁷

PHARMACOPOEIAL AYURVEDIC DRUG

Arimeda (Stem bark).

API, Part I, Vol. II.

The extract of *A. farnesiana* was found to be devoid of bacterial and antifungal activity.^{20(a)} Arimeda is correctly equated with *A. leucophloea*.

AYURVEDIC SYNONYMS

Irimeda, Viḍkhadir.

Viṭkhadir, Arimajj, Rāmaka, Revāñ, Remajā,³⁰ Arimedaka, Godhāskandha,⁴ Kalaskandha.

HABITAT

Plains of Punjab and dry forest tracts throughout India.

Especially dry regions of Punjab, Rajasthan and Madhya Pradesh.⁷

Native: India, Bangladesh, Indonesia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam.

Distributed throughout South and Southeast Asia.

REGIONAL LANGUAGE NAMES

Beng: Guyababla, Sadababla;

Guj: Haramibaval, Pilobaval, Haribaval;

Hindi: Arimeda;

Mal: Karivelam, Velvelam, Velvelakam;

Mar: Pandal babal;

Ori: Arimeda;

Tam: Velvelam;

Urdu: Guar Babool.

Kan: Bilijali; Mar: Hewar;^{20(a)} Urdu: Guyaa Babool, Vilaayati Babool.⁷

Known as Distiller's Acacia. (The bark is used in the preparation of alcohol from palm juice and sugar.)

CONSTITUENTS

n-Hexacosanol, beta-amyrin, beta-sitosterol and tannin.

Flavonoids such as isookanin, cyanin, and leucoanthocyanin were also reported.^{20(a)} A new tannin on hydrolysis gave anthocyanidin, a phenolic acid, along with glucose. Subsequent extraction gave glucose 14.47% and gallic acid 61.08%.⁴¹

Methanol extract of the stem bark gave steroids+++; alkaloids++, tannins+++; glucosides++, polyphenols+++; gum and mucilage+++. Triterpenes were absent.⁴² In the bark, a tan to non-tan ratio of 17:7 has been reported.^{2(b)}

Heartwood contained *n*-octacosanol, beta-sitosterol, and (+)-pinitol. Root bark was found to afford the indole alkaloid tryptamine; new diterpenoids were leucophleol and leucophlexol, as well as leucoxol.^{20(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Meha, Mukharoga, Kaṇḍu, Viśajavrana, Śopha, Atisāra, Visarpa, Pāṇḍu, Dantaroga, Kāsa, Kṛmi, Udardapra śamana.

Obstinate skin diseases, polyurea, diseases of the mouth, pruritus, septic ulcers, edema, acute diarrhea, erysipelas, anemia, diseases of the teeth, cough, worm infestation, abdominal distress (therapeutic uses based on classical texts from 1000 BC to sixteenth century).

Methanol extract of stem bark exhibited a broad spectrum of antimicrobial activity against *Bacillus subtilis*, *B. cerus*, *Staphylococcus aureus*, *Micrococcus roseu* (Gram positive); *Salmonella typhi*, *Klebsiella pneumoniae*, *Escherichia coli*, *Pseudomonas aeruginosa* (Gram negative); *Aspergillus niger*, *Candida tropicali*, and *Saccharomyces cerevisiae* (fungal strains). Water extract was active against all except *Candida tropicali* and *Staphylococcus aureus*.⁴²

A

**IMPORTANT FORMULATION/
APPLICATIONS**

Khadiradi Gutika (Charaka Samhita, 1000 BC), contains Arimeda stem bark and Khadira (2:1) as main plant drugs with 37 supporting drugs. Prescribed for diseases of the mouth, throat, cough and hoarseness of the voice. Arimedadi Taila (Ashtāṅgahridaya, seventh century) contains Khadira and Arimeda stem bark (2:1) as the main drugs, with 38 supporting drugs. Prescribed as a topical gum paint for diseases of the teeth and gums.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

40 g for decoction. 3–5 g in powder form. Khadiradi Gutika: one pill is to be sucked slowly. Not more than 12 pills should be taken in 24 hours. Arimedadi Taila: to be used as a gum paint in shaky dentition and pyorrhea or as a mouth deodorant. The LD₅₀ dose of the ethanolic extract was found to be 1000 mg/kg i.p.²⁰⁽¹⁾

***Acacia nilotica* (Linn) Willd. ex
Del. sp. *indica* (Benth.) Brenan**

Babbūla

BOTANICAL SOURCE(S)

Acacia nilotica (Linn) Willd. ex
Del. sp. *indica* (Benth.) Brenan
Syn. *Acacia arabica* Willd.
(Fam. Leguminosae)

Fam. Mimosaceae
A. arabica auct. non Wild.
A. Arabica *sense* Baker (major part); Wild. var.
indica Benth.^{20(a)}

Indigenous to the plains of Andhra Pradesh and Maharashtra and throughout drier parts of India at up to 900 m.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Babula tree, Indian gum arabic tree;
Assam: Babala;
Beng: Babla;
Guj: Baval, Kaloabaval;
Hindi: Babula, Babura, Kikar;
Kan: Shameeruka, Kari lali, Kari gobli, Pulai Jali;
Kash: Sak;
Mal: Velutha Karuvelan;
Mar: Babhul, Babhula;
Ori: Babula, Babala;
Punj: Kikkar;
Tam: Karuvelan, Karuvel;
Tel: Nallatumma, Thumma.

Urdu: Aqaaqia, Kikar, Mughilaan, Samur.⁷

PHARMACOPEIAL AYURVEDIC DRUG

Babbūla (Stem bark).
API, Part I, Vol. I.
The commercial material consists more often older branches of the tree.³⁶
In classical texts of Ayurveda, the preferred plant part was leaf, followed by seeds and bark.^{16(a)}

AYURVEDIC SYNONYMS

Búvarī, Kinkirāta.
Babbūri, Ābhā, Shūlikā, Shitaka, Yugmakantaka.⁷
Suksmapatra, Pitapuṣpa, Mālāphala.^{16(b)}

HABITAT

Throughout India.

CONSTITUENTS

Tannins and gum
The tannin content of the bark varies considerably, from 20% to approximately 12%. The bark from branches yields 7%–12%.^{2(b)}

Polyphenolic compounds reported from the bark include quercetin, gallic acid, (+)-catechin, (–)-epicatechin, (+)-dicatechin, and (+)-leucocyanidin gallate. The bark also contains (–)-epi-gallo catechin.

Total water-soluble extractives and tannins in the bark of branches were found to be 27%–36% and 14%, respectively.

Total phenolic and tannin contents in the dried bark were found to be 9.86% and 13.40%, respectively.^{20(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Kṛmiroga, Atisāra, Kāsa

Obstinate skin diseases including leprosy, worm infestation, acute diarrhea, cough/bronchitis (therapeutic uses based on texts from the fifteenth to sixteenth century).

Semisolid extract of Babbula bark was given with buttermilk, along with a buttermilk diet, for ascites (Bangasena, eighteenth century).^{16(a)}

Bark decoction is used as a gargle in sore throat and toothache.

Dry powder is applied to ulcers.¹⁵⁽²⁾

IMPORTANT FORMULATION/ APPLICATIONS

Mritsanjivani Surā (Bhaishajya Ratnavali, seven-teenth century), contains Babbūla bark, *Areca catechu* nut, and *Ziziphus jujuba* bark in equal proportion, with 40 supporting herbs (24 in OTC preparations). Prescribed as a restorative tonic for energy and stamina. (Soldiers used to drink this medicinal alcohol before going into battle.)

Babbularishta (Shārangadhara Samhitā, thirteenth century) contains Babbūla bark as the main herb with ten supporting herbs.

Prescribed as a blood-purifying, astringent, and hemostatic drug.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–30 g of the drug for decoction.

Decoction: 50–100 mL.¹⁶

Dose of classical Mritsanjivani Sura: 60 drops (under medical advice). Excise regulations may apply to commercial products.

Babbularishta: 15–30 mL (1–2 tablespoonful) with equal quantities of water after meals.

Acacia pennata (L.) Willd.

Ādārī

BOTANICAL SOURCE(S)

Acacia pennata (L.) Willd.

Syn. *Mimosa pennata* Linn.

(Fam. Mimosaceae)

National Academy of Ayurveda also equated *Acacia canescens* Grab., *Acacia torta* (Roxb.) Craib. syn. *A. pennata* sense Baker p.p., *A. intsia* Willd. and *A. caesia* Wight & Arn. non-Willd. with Ādārī, Ari, Ael, Aila, Arār and Lata khadira, as a related species.^{29,30}

PHARMAPOEIAL AYURVEDIC DRUG

Ādārī (Leaf).

API, Part I, Vol. VI.

Ādārī śimbi is mentioned only in one place in Sushruta Samhita, 1000 BC (Uttar-tantra 44/19). Its synonym has been mentioned as Khadiravalli in Abhidhan-Ratnamala and is provisionally equated with *A. pennata* and *Cassia auriculata*.^{20(a)} This is a confusing identification. Flowers of Ādārī śimbi were like *Dischrostachys cinerea* W.&A. and the fruit are reddish in color.^{20(a)} (*A. pennata* flowers are white or yellow with globose heads; pods are thin, flat and long with thick sutures 15–20 cm long.)

AYURVEDIC SYNONYMS

Khadiravallī, Āri.

Latākhadira, Ari, Arār, Āula.

A

HABITAT

Throughout India.

Up to an altitude of 1500 m.^{2(b)}

A. torta: found throughout India, ascending up to 1400 m in the sub-Himalayan tract from Chenab eastward.^{20(a)}

REGIONAL LANGUAGE NAMES

Beng: Kuchai;

Gun: Khervelya;

Hin: Biswal, Latakhadira, Aazi khair;

Kan: Siguri;

Mar: Aarai velyakhera;

Ori: Potadontari;

Tam: Iya kozhandu;

Tel: Karusakaya.

Tam: Indan, Indu; Mar: Shembi; Mai:

Kareencha;^{20(a)} Bihar: Avir, Marangakain;^{2(a)}

Eng: Climbing wattle.

CONSTITUENTS

Octadecadienoic, octadecanoic, palmitic and pentadecanoic acids; lupeol, α -spinasterol, β -sitosterol and tannins.

(Source: *ccras.nic.in*)

Terpenoids and a flavonoid glycoside isolated from the leaf, as Hh/GLI inhibitors, exhibited selected cytotoxicity against human pancreatic and prostate cancer cells.⁴³

Quercetin and apigenin, along with isorhamnetin, kaempferol, and isovitixin, isolated from the leaves, were tested for inhibitory effects on COX-1 and COX-2. Exhibited anti-inflammatory activity.⁴⁴

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara (fever), Raktadoṣa (disorder of blood), Agnimāndya (digestive impairment).

Used as single drug.

Not used as a single drug or in prescriptions during classical Ayurvedic period, from 1000 BC to the sixteenth century. Earliest record is found in an ethnobotanical study in *Bull bot Surv India*, 1963, 5, page 223.^{2(b)}

Preliminary biological screening was done in 1966.^{2(a,b)}

IMPORTANT FORMULATION/ APPLICATIONS

Uses recorded in ethnobotanical studies: Stem bark: in dental problems, in chronic diarrhea of animals.

Leaves: in indigestion of infants, bleeding gums, dental problems, body ache, and fever.^{20(b)}

Leaves are chewed with sugar and cumin for bleeding gums. A paste of leaves, mixed with milk, is given to infants for indigestion. A decoction of young leaves is taken for body pain, headache and fever.^{2(b,c)}

Root: for ricketts.^{20(a)}

Fruit pulp: piscicidal.^{2(b)}

Maanda Ennai (Theraiyar Varrakkam) of Siddha system contains Adāri leaf juice as the main plant drug. Prescribed (8 mL with breast milk) to infants for respiratory affections. (Not cited in API.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

A dual COX-2 and 5-lipoxygenase inhibitor, isolated from the leaves, has been patented in the U.S. (Patent 8124134).

The LD₅₀ of 50% ethanolic extract of the plant (excluding root) was found to be 125 mg/kg i.p. in mice.

LD₅₀ of *A. torta* plant extract (excluding root) was found to be 70 mg/kg i.p. in mice.^{20(a)}

Acacia suma Buch.-Ham.

Kadaraḥ

A

BOTANICAL SOURCE(S)

Acacia suma Buch.-Ham.
(Fam. Mimosaceae)

A. suma Buch-Ham ex voigt.
A. suma (Roxb.) Kurz Syn., *A. polyacantha* Willd.
ssp. *polyacantha* Brenan.^{15,20(a)}
A. ferruginea DC is also equated with *Shveta khadira*.⁷

PHARMACOPEIAL AYURVEDIC DRUG

Kadaraḥ (Heart wood).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Somavalkah, Śvetakhadirah.

Somavalka has also been recorded as a synonym of *Kaṭphala* (*Myrica nagi* Thunb).³⁰ It might have been used as a substitute.³⁰

HABITAT

West Bengal and Southern Western Ghat.

Throughout plains of India, particularly in Haryana, Gujarat, and the dry rocky hills of Rajasthan.

In most localities in West Bengal, Bihar, and Peninsular India.²⁰⁽¹⁾

REGIONAL LANGUAGE NAMES

Eng: White cutch tree, White catechu;
Beng: Shvet khadir;
Guj: Gorada, Gordio baaval;
Hindi: Safed khair;
Kan: Kandarāḥ;
Mal: Venkarinnali, Somarayattoli;
Mar: Paandharaa khair;
Tam: Kovil, Shilaiyunchai;
Tel: Tellatamma, Tellasundra, Tellachandra.

Beng: Sai kanta; Kan: Mugali; Mar: Kamtiya; Tel: Tella sundra.^{15,20(a)}

CONSTITUENTS

An alkaloid diaboline, β -sitosterol, stigmaterol, oleanolic acid and its 3β -acetate, a saponin containing oleanolic acid, galactose, mannose.

Quercetin and 5,4'-dihydroxy-7,3'-dimethoxyflavone-3-O-D-galactopyranoside in the heartwood^{2(b)} and a new proanthocyanidin in the bark have been reported.¹⁵

Triacanthanol, beta-sitosterol, daucosterin, and lupeol heptylate have been isolated from stem bark.⁴⁵ Cutch is prepared from the heartwood.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Madhumeha, Mukharoga, Udarda, Kaṇḍu, Medodoa, Vraṇa, Pāṇḍu, Kuṣṭha, Śvitra, Raktadoṣa

Diabetes mellitus, diseases of the mouth, urticaria, pruritus, obesity, anemia, skin diseases, leukoderma, disorders of the blood (therapeutic uses based on texts from 1000 BC to sixteenth century).

In an experimental study, orally administered methanolic bark extract significantly reduced elevated lipids and glycosylated hemoglobin in diabetic rats.⁴⁶

IMPORTANT FORMULATION/ APPLICATIONS

Ayaskṛti (Ashtangahridaya, seventh century), a herbomineral drug, contains *A. catechu* and *A. suma* heartwoods along with 21 plant drugs in equal proportion, 26 supporting herbs and iron pieces. It was formulated for treating anemia; urinary disorders and skin diseases. Now obsolete.

For treating diabetes, a decoction of *A. suma* and *A. catechu* heartwood and *Areca catechu* nut was prescribed (Vrandamadhava, eighth century).^{16(a)}

In folk medicine, the wood is used as a blood purifier.^{20(a)}

The seeds are reported to have marked hypoglycemic effects on normal albino rats.^{2(b)}

A

A decoction of pods is used for urino-genital diseases.

An infusion of the leaves has anti-diarrhea and anti-dysenteric properties.

A decoction of the bark is used as a gargle for sore throat and toothache; a dry powder is applied externally for ulcers.¹⁵⁽²⁾

DOSAGE/USAGE/CAUTIONS/COMMENTS

2–6 g.

Decoction: 50–500 mL.¹⁶

The LD₅₀ of 50% ethanolic extract of the plant was 37 mg/kg i.p. in mice.^{20(a)}

Acalypha fruticosa Forsk.

Laghu Haritamañjarī

BOTANICAL SOURCE(S)

Acalypha fruticosa Forsk.
(Fam. Euphorbiaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Laghu Haritamañjarī (Root).

API, Part I, Vol. VI.

This is a non-classical drug. Sanskritized synonyms—Muktā-varcha and Haritamañjarī—were introduced by the National Academy of Ayurveda. Priyavrata Sharma^{16(b)} composed a Sanskrit *śloka* in the classical style to reinforce the herb's inclusion into Ayurveda. It has been claimed that Punarnavādi Churna (Vaidya Manorama, thirteenth century) contained Haritamañjarī,^{16(a)} but Bhaishajya Ratnavali formulations do not contain the drug.

AYURVEDIC SYNONYMS

Laghu-kuppī.

Chinni.

HABITAT

In plains from Orissa to Tamil Nadu, Karnataka and Kerala.

Occurs from Sudan east to Somalia and south through East Africa to Southern Africa, as well as in Yemen, Southern India, Sri Lanka, and Myanmar.

REGIONAL LANGUAGE NAMES

Hindi: Chinni-ka jhar, Chinni;

Kan: Chinni, Chinnimara, Chinnigida;

Mal: Sinni-maram;

Mar: Khokali;

Tam: Chinni;

Tel: Chinna kuppi.

Siddha-Tamil: Siru sinni ver, Aathaathzhai, Seethaattzhai, Sotthaachedi; Tel: Mulakandu chettu; Kan: Kuppigida; Mai: Kuppiamani.

Eng: Birch-leaved *Acalypha*.

CONSTITUENTS

Arjunolic acid.

Arjunolic acid is a potent tumor inhibitor.

Phytochemicals of the root were not available in standard reference works.

Leaf extract showed significant anti-bacterial activity, while the root extract was devoid of antifungal activity.⁴⁷

Powdered samples of aerial parts showed flavonoids in high amounts when compared to alkaloids, tannins, phenols, and steroids. 1,2-benzenedicarboxylic acid di-iso-octyl ester, *n*-hexadecanoic acid, 9–12-octadinoic acid, alpha-D-glucopyranoside and eicosyltrichlorosilane were identified.

In the leaf, fixed oils, fats, phenolic compounds, tannins, lignans, protein, and amino acids were absent.⁴⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya (digestive impairment), Vraṇa (ulcer).

Used as a single drug.

A leaf infusion is taken to treat stomach problems. Ground leaves are applied to scabies and sores.

Root infusion is taken for whooping cough.⁴⁷

IMPORTANT FORMULATION/APPLICATIONS

Erasa Kenthi Mezhugu, Pulippaani Vaidhyam, a Siddha herbo-mineral drug, contains Siru Sinni ver root with 37 other herbs and 8 calx of metals and minerals. Prescribed for skin diseases, leprosy, chancre, and malignant ulcers. Aadaathodai Ney, Agaththiyar, a Siddha drug in a purified butter base, contains Siru sinnever and 14 other herbs in equal proportions. Prescribed

for chronic fevers, cough, bronchitis and chest pain.

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (powder): 3 to 6 g.

In folk medicine, the root is given for gonorrhea.^{20(a)}

In Northern Kenya, a soup of the root boiled with goat bones is given for liver problems. A root decoction is taken for fever, convulsions, ulcers of venereal origin and swellings of the scrotum.⁴⁷

The LD₅₀ of 50% ethanolic extract of the plant was >1000 mg/kg i.p. in mice.^{20(a)}

Acalypha indica L.

Haritamañjarī

BOTANICAL SOURCE(S)

Acalypha indica L.
(Fam. Euphorbiaceae)

A. racemosa Wall, ex Baill.

Syn. *A. paniculata* miq. (used as a substitute of *A. indica*).

Mostly collected from wild sources in West Bengal, Andhra Pradesh, Tamil Nadu and Kerala. Often found adulterated with the leaves and roots of *A. fruticosa*.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Haritamañjarī (Whole plant).

API, Part I, Vol. VI.

Medicinal part of the plant is the whole flowering plant.

Haritamañjarī is used as a substitute of Ipecuanha.²⁶ This is a non-classical drug. Sanskritized synonyms—Muktā-varcha and Haritamañjarī—were introduced by the National Academy of Ayurveda. Priyavrata Sharma^{16(b)} composed a Sanskrit *shloka* in the classical style to reinforce the herb's inclusion into Ayurveda. It has been claimed that Punarnavādi Churna (Vaidya Manorama, thirteenth century) contained

Haritamañjarī,^{16(a)} but Bhaishajya Ratnāvali formulations do not contain the drug.

AYURVEDIC SYNONYMS

Muktavarcā.

Kuppai meni.

In 1933, R.N. Chopra referred to a Sanskrit synonym Arittamunjayrie and a Telugu synonym Haritamanjiti.⁵¹ Dr. Chopra could have used Haritmanjiri in both instances, but the Sanskrit synonym was retained by him until 1992.

HABITAT

The plains and hotter parts of India, as a weed.

Africa, Indo-China, Malesia, Ethiopia, and widely naturalized elsewhere.^{19,14}

A. racemosa: found in Andhra Pradesh, Tamil Nadu, and Kerala at up to an altitude of 1500 m.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Indian acalypha;

Assam: Patrasaki, Mukuta manjari;

Ben: Muktajhuri;

Guj: Vanchi kanto;

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Hin: Kuppi, Aamaabhaaji;

Kan: Kuppigida;

Mal: Kuppameni;

Mar: Khokli, Khajoti;

Ori: Indramaris, Nakachana;

Pun: Kuppi;

Tam: Kupaaimeni;

Tel: Kuppichettu, Kuppinta, Muripindi.

Guj: Vanchhi kanto; Tel: Mulakandu chettu;

Kan: Kuppigida.

Eng: Copperleaf, Indian Nettle, Three-seeded-mercury,¹⁹ Cat's Nettle.¹⁴

CONSTITUENTS

Alkaloids: acalyphine, quinine, amides such as acalyphamide, sterols, a flavonol kaempferol and cyanogenic glycoside.

Cyanogenic glycoside acalyphine (0.3%, 3-cyanopyridone derivative); tannins including tri-O-methyl ellagic acid¹⁴; two alkaloids, acalyphine and triacetaminine, an essential oil, *n*-octacosanol, kaempferol, quebrachitol, and beta-sitosterol acetate (whole plant).

Leaves gave acalyphamide (as an acetate), aurantiamide and its acetate, succinimide, calypholacetate, 2-mythylanthraquinone, tri-O-methylellagic acid and beta-sitosterol and its beta-D-glucoside.¹⁵

Acalphine was isolated in 1937.

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya (digestive impairment), Dantaśūla (toothache), Karnaśūla (otalgia), Kāsa (cough), Sandhiśoṭha (arthritis), Śvāsa (Asthma), Vibandha (constipation). Used as single drug.

Whole plant: anthelmintic, emetic and expectorant. Used in asthma and bronchitis.¹⁵⁽³⁾

Plant extracts showed promising wound-healing, anti-inflammatory, analgesic and antibacterial activities against *Aeromonas hydrophila* and *Bacillus cereus*.⁵⁰

A paste of the leaves is applied on scabies, bed sores, maggot-infested wounds, and other skin diseases.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

The juice of aerial parts is used as an ingredient of a Siddha (herbomineral) drug Anna Parvala Sindhooram, used for the prevention and reversal of the atherocholesterolemia.^{2(d),49}

Kanthaka Parpam, Anubhava Vaidya Navaneetham of Abdullah Sahib, a Siddha herbo-mineral drug processed in *Acalypha* juice, is prescribed in skin diseases, leproma, and fistula.

Parangippatti Pathangam, Pulippani Vaidhyam, a Siddha herbo-mineral drug, is prescribed in venereal diseases, venereal sores, skin diseases, and lepromatous dermae diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 5 g. Svarasa (juice): 5 to 10 ml, 1 to 3 drops in Karnasula.

In homeopathic medicine, *A. indica* tinctures are used for violent dry cough and hemoptysis (Clarke).

Petroleum ether and ethanolic extracts of the whole plant demonstrated post-coital anti-fertility effects in female albino rats.⁵⁰

For bronchial asthma: 30–60 mL aqueous extract of the plant twice or thrice daily for relief from wheezing, severe cough, and expectoration.^{20(a)}

Achyranthes aspera Linn.

Whole plant

Apāmārga

BOTANICAL SOURCE(S)

Achyranthes aspera Linn.
(Fam. Amaranthaceae)

Syn. *A. canescens* R.Br., *A. argentea* Decne.,
A. grandiflora Moq., *A. repens* Linn.⁵¹

Two varieties of Apāmārga have been mentioned in classical texts: the white

(Gaur-dand Apāmārga, Ashtānga Hridaya, seventh century) and the red variety (Rakta Apāmārga).

PHARMACOPOEIAL AYURVEDIC DRUG

Apāmārga (Whole plant).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Mayūra, Mayūraka, Pratyakpuṣpa, Kharamañjar, Śikhari.

Kharapushpā, Kharamanjari, Adhaśālya, Kinihi, Vashira.⁴

HABITAT

A stiff, erect, 03–09 m high herb found commonly as a weed throughout India up to 900 m.

An erect or procumbent annual or perennial herb, 1–2 m in height, often with a woody base, commonly found as a weed of waysides and waste places throughout India up to an altitude of 2100 m.^{2(b),20(a)}

REGIONAL LANGUAGE NAMES

Eng: Prickly chaff flower;

Beng: Apamg;

Guj: Aghedo;

Hindi: Chirchita, Latjira;

Kan: Uttarani;

Mal: Katalati;

Mar: Aghada;

Punj: Puthakanda;

Tam: Nayuruvi;

Tel: Uttarenu;

Urdu: Chirchita.

Urdu: Atkum, Latjeeraa.

CONSTITUENTS

Saponins.

Saponins on hydrolysis gave oleanolic acid, glucose, galactose, rhamnose, and xylose (experimentally, effect comparable to that

of adrenaline). Saponin A and B and saponins C and D (from unripe fruits) have been characterized.^{2(b),20(a),26} The shoots contain 36,47-dihydroxyhenpentacontan-4-one, tritriacontanol, 27-cyclohexylheptacosan-7-ol, 17-penta-triacontanol and 16-hydroxy-26-methylheptacosan-2-one.^{2(c)} Pentatriacontane, 6-pentatriacontanone, hexatriacontane, and triacontane were reported from the stem.^{20(a)}

Ashes of the plant (kshāra) yield large quantities of potash.^{2(b)} Kshāras are administered internally in gastrointestinal disorders.

THERAPEUTIC AND OTHER ATTRIBUTES

Śūla, Udara roga, Apacī, Arśa, Kaṇḍu, Medoroga

Colic, diseases of the abdomen, chronic lymphadenitis, piles, itching, and obesity (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka prescribed dried fruits alone or in prescriptions for hemierania. A decoction of the whole plant is given as a diuretic in renal dropsies and general anasarca and pneumonia; an infusion in water is given in bronchial infection; a powder is used for treating rheumatism; and ash with honey is used for cough.¹⁶

IMPORTANT FORMULATION/ APPLICATIONS

Apāmārga Kshāra (Sushruta Samhita, 1000 BC), is a single herb drug. Prescribed for colic, constipation, tympanites, piles, colitis, and calculus.

Apāmārga Kshāra Taila (Bhaishajya Ratnāvali, seventeenth century) is a single herb extract in oil. Prescribed as an eardrop for tinnitus and deafness. It is an obsolete drug.

Jyotishmati Taila (Yogaratanākara, sixteenth century), contains Mayūraka aqueous ash and Jyotishmati oil. A massage oil to be applied topically for treating leukoderma/vitiligo.

Abhaya Lavana (Bhaishajya Ratnāvali) contains salt equal to alkaline ashes of Apāmārga and 16

A

other herbs and 8 supporting herbs. Prescribed for diseases of the liver and spleen.

Gudapippali (Bhaishajya Ratnāvali) contains 5 salts and 16 herbs. Apāmārga ash is a minor ingredient. Recommended for splenic diseases.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

20–50 g of the drug for decoction.

Leaf juice: 11 g.

Powdered seeds: 3 g.

An alkaline powder of the plant is used for preparing *Kshaarsutra* for treating fistula-in-ano.

<i>Achyranthes aspera</i> Linn.	Root	Apāmārga
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BOTANICAL SOURCE(S)

Achyranthes aspera Linn.
(Fam. Amaranthaceae)

Syn. *A. canescens* R.Br., *A. argentea* Decne.,
A. grandiflora Moq., *A. repens* Linn.⁵¹

The white variety of Apāmārga (Gaur-dand Apāmārga) was recommended in Ashtāngahr̥daya (seventh century) for promoting fertility, as well as for bearing a male child.

It seems that *A. aspera* has been wrongly equated with White Apāmārga. Its stem bark exhibited 100% abortifacient activity experimentally. In South India, *Cyathula prostrata*, known as Kshudra Apāmārga (Cheria Kadaladi), is equated with Rakta Apāmārga. Both species are abortifacient and indicate that the classical Apāmārga, which was used for promoting fertility, was some other species.

PHARMACOPOEIAL AYURVEDIC DRUG

Apāmārga (Root).

API, Part I, Vol. III.

The root has a single-layered epidermis, followed by two to five layers of parenchymatous cortex, including a distinct endodermis that shows Casparian dots on the radial walls. Yellowish brown in color.

AYURVEDIC SYNONYMS

Adhaḥśālya, Śikhari, Mayūraaka.

Kharapushpā, Kharamanjari, Kinihi, Vashira.⁴

HABITAT

A stiff, erect, 3–9 m high herb found commonly as a weed throughout India up to 900 m.

An erect or procumbent annual or perennial herb, 1–2 m in height, often with a woody base, commonly found as a weed of waysides and waste places throughout India up to an altitude of 2100 m.^{2(b),20(a)}

REGIONAL LANGUAGE NAMES

Eng: Prickly chaff flower;

Assam: Chirchita;

Beng: Apang;

Guj: Aghedo;

Hindi: Chirchira, Latjira;

Kan: Uttarane, Uttaren;

Mal: Kadeledee;

Mar: Anghada;

Punj: Puthakanda, Lattajeera;

Tam: Nayuruvi;

Tel: Uttareni;

Urdu: Chirchita.

Urdu: Atkum, Latjeeraa.

CONSTITUENTS

Saponins.

The root was found to contain oleanolic acid as the aglycone from the saponin fraction, as well as alkaloids, flavonoids, steroids, and terpenoids; glycosides were absent.^{20(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Chardi, Ādhmana, Kaṇḍu, Śūla, Apacī, Granthi, Bhagandara, Hṛda roga, Jwara, Świtra, Vādhirya, Udara roga, Yakṛt roga, Danta roga, Rakta vikāra

Used in emesis, flatulence, itch, colic, scrofula, cysts, fistulae-in-ano, heart disease, fever, leukoderma, deafness, diseases of the abdomen, diseases of the liver, diseases of tooth, blood disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

The root is used for gastroenteritis, piles, dysuria, jaundice, edema and anemia. The paste, applied on navel, pelvis and vulva, induces labor easily. Application of a paste of the root gives relief in pain during puerperium.¹⁶

Alkaline ash was prescribed for promoting growth of normal tissue after surgery, as well as for treating rheumatism, dyspepsia, intestinal parasites, piles, and cough.²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Agastya Haritaki Rasāyana (Ashtāngahridaya, seventh century), contains *Terminalia chebula* as the main herb; *A. aspera* root is among 21 other herbs. Prescribed for allergic respiratory conditions; cough, chronic bronchitis, asthma.

Mahā-Pañchgavya Ghrita (not included in AFI, Parts I and II) Pañch-gavya Ghrita (Ashtānga Hridaya, seventh century) does not contain *A. aspera* root.

Mahā-vishagarbha Taila (Bhaishajya Ratnavali, seventeenth century) contains *A. aspera* root as one of the 64 main herbs. Used as a massage oil for inflammatory conditions.

Panaviralaadi Bhasma (Sahasrayoga, a non-Samhitā Kerala Materia Medica) contains ashes of four herbs. It is prescribed for asites.

Apāmārga Kshāra and Apāmārga Kshāra Taila: see *A. Aspera* whole plant entry.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

Aconitum chasmanthum Stapf. Ex Holmes Vatsanābha

BOTANICAL SOURCE(S)

Aconitum chasmanthum Stapf. Ex Holmes (Fam. Ranunculaceae)

Vatsanābha has been variously described as the root of *Aconitum deinorrhizum* Stapf., *A. ferox* Wall or *A. chasmanthum*.

The material coming from eastern Nepal, Sikkim and other areas of the eastern Himalayas consists either of the root of *A. falconeri* Stapf. or is mixed with *A. laciniatum* Stapf., *A. ferox* and *A. spicatum* Stapf.

The material from Jammu and Kashmir and Himachal Pradesh consists mostly of *A. violaceum* Jacob with the occasional presence of

A. balfourii Stapf., *A. deinorrhizum* Stapf. and *A. chasmanthum*.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Vatsanābha (Root).

API, Part I, Vol. II.

The root is biennial, paired and tuberous.

The roots are smaller, shorter and thicker than those of *A. napellus*.

AYURVEDIC SYNONYMS

Amṛta, Viṣa, Vajranāga, Sthāvaraviṣa, Vatsanāgaka.

Śṛṅgika-Viṣa.

A

HABITAT

Subalpine and alpine zones of the western Himalayas, in high plateaus between 2000–4000 m, roots are generally collected late in September.

Plentiful in its wild state in Kashmir and Lahaul.

Also found in the mountains of Assam and in the sub-alpine grasslands of Himachal Pradesh.

REGIONAL LANGUAGE NAMES

Eng: Aconite;

Assam: Bish, Mithavish;

Beng: Kathavish;

Guj: Vachhanaag, Basanaag;

Hindi: Bisa, Meethabisha, Bachhnaag, Teliya bish;

Kan: Basanalli, Vatsanabha, Vatsanabhi, Vachanaga;

Mal: Vatsanabhi;

Mar: Bachnaga;

Ori: Tahara, Mahura, Mithvisa;

Punj: Mitha visha, Mithatelia;

Tam: Vasanavi, Vatsanabhi, Nabhi, Vasanbhi;

Tel: Vatsanabhi, Naabhi;

Urdu: Bachnak, Mithatelia, Beesh, Atees.

Eng: Indian Napellus; Hindi: Mohri; Kashmir: Ban-bal-nag; Indian Bazar: Patisa.

In AFI, Vol. I, *A. chasmanthum* is equated with Śṛṅgika and *A. ferox* with Vatsanābha. In AFI, Vol. II, *A. chasmanthum* is equated with Vatsanābha.

CONSTITUENTS

Alkaloids.

The alkaloid content of the root ranges from 2.98% to 3.11%.

Alkaloids indaconitine, chasmaconitine, chasmanthine, chasmanine, and homochasmanine have been isolated.^{2(b)}

Total alkaloid content in commercial *A. ferox* varies from 0.63% to 4.7%.^{2(b)} The major alkaloid was identified as psuedoaconitine and minor alkaloids as bikhaconitine, veratroyl pseudoacaonine, and diacetyl pseudoaconitine.^{20(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Sannipāta, Vātakaphajvara, Vātaroga, Jvarātisāra, Kanṇtharoga

Used in typhoid fever, rheumatic and congestive fever, diseases of the nervous system, fever due to gastroenteritis and diseases of pharynx and larynx (therapeutic uses based on texts from 1000 BC to sixteenth century).

Vatsanābha is a virulent poison, but when mitigated, it works as an alterative, anti-inflammatory, diaphoretic, expectorant, stomachic, and nerve tonic.³⁶

IMPORTANT FORMULATION/ APPLICATIONS

Tribhuvana-Kirti Rasa, (Yogarātnākara, sixteenth century), a herbomineral drug, contains purified aconite, purified cinnabar and borax with 8 supporting herbs. Prescribed for typhoid and intermittent fevers.

Sūtashekhara Rasa (Yogarātnākara) contains purified aconite. This is a herbo-mineral, mercurial drug prescribed for neurological and rheumatic affections.

Ānandabhairava Rasa (Rasendra Sārsangraha) and Vātvidhwansa Rasa (Yogarātnākara) are also herbo-mineral mercurial preparations.

Mahaviṣgarbha Taila (Bhaishajya Ratnāvali, seventeenth century), a medicinal massage oil for rheumatic and neurological affections, contains 71 herbs. Aconite is a minor constituent.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

15–30 mgs of the drug in powder form.

Mercurial herbo-mineral preparations containing aconite should be taken under medical supervision.

Aconite can also be absorbed through the skin and cause significant toxicity.

Aconite is the most common cause of severe herbal poisoning.¹³ A small amount of aconitine, as low as 0.2 mg, can produce severe symptoms.

Herbal medicines containing aconite warrant strict regulatory measures.^{20(a)}

Aconitum heterophyllum Wall. ex. Royle

Ativiṣā

A

BOTANICAL SOURCE(S)

Aconitum heterophyllum Wall, ex. Royle
(Fam. Ranunculaceae)

In South India, *Cryptocoryne spiralis* Fisch. and *C. retrospiralis* (Araceae) are used as Ativiṣā.^{3,20(a)} Mustaka (*Cyperus rotundus*) is a substitute of Ativiṣā.³ *A. palmatum* D. Don. is equated with Prativiṣā and Patis.⁷

PHARMACOPOEIAL AYURVEDIC DRUG

Ativiṣā (Root).

API, Part I, Vol. I.

Daughter tubers constitute the main drug. Mother tubers are considered inferior.³⁶

Commercial Atis (Patis) of the market is not the root of *A. heterophyllum*.^{2(b)}

The market drug is adulterated with the roots of *Chaerophyllum villosum* Wall.³⁶ and *Aconitum kashmiricum* Stapf.^{2(b)}

AYURVEDIC SYNONYMS

Aruṇā, Ghuṇapriyā, Viṣā.

Bhangurā,³ Shuklakandā, Viśwa, Ghuṇvallaḥḥa, Śiśubheṣajya,^{20(a)} Viṣā, Viṣākhyā.³⁰

Viṣa is equated with *A. ferox*.

Arunā variety was perhaps *A. palmatum*.³⁰

HABITAT

Western Himalayas; Garhwal, Kumaon and Kashmir at altitude between 2,500–4,000 m.

Cultivated at Manali and Rahla in Himachal Pradesh.⁷

REGIONAL LANGUAGE NAMES

Eng: Atis Root;

Assam: Aatich;

Beng: Ataicha;

Guj: Ativishni Kali, Ativikhani Kali;

Hindi: Atis;

Kan: Ativisha, Athihage;

Mal: Atividayam, Ativitayam;

Mar: Ativisha;

Ori: Atushi;

Punj: Atisa, Atees;

Tam: Ativadayam;

Tel: Ativasa;

Urdu: Atees.

Kan: Seetha shringe.

CONSTITUENTS

Alkaloids (Atisine, dihydroatisine, hetisine and heteratisine)

The root yielded 0.79% of total alkaloids: atisine, heterotisine, hestisine, heterophyllisine, heterophylline, heterophyllidine, atidine, hetidine, benzoylheterotisine, F-dihydroatisine, and hetisinone; atisinol is closely related to atisine.^{20(a)} The atisine yield was 0.4%.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Kāsa, Chardi, Amātisāra, Kṛmiroga

Used in pyrexia, cough, vomiting, diarrhea and worm infestation (therapeutic uses based on texts from 1000 BC to sixteenth century).

Reported uses: febrifugal, antiperiodic, anti-inflammatory, astringent and antispasmodic. Research potential in irritable bowel syndrome.

IMPORTANT FORMULATION/ APPLICATIONS

Bāla chaturbhadrikā Churna (Bhaishajya Ratnāvali, seventeenth century), the only compound with Ativiṣā root as one of the main drugs (total drugs 4, in equal proportion). Prescribed for diarrhea, vomiting, fever, and emaciation in children.

Other compound preparations quoted in the API contain Ativiṣā root as a supporting drug.

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Sudarshan Churna (Shārangadhara Samhitā, thirteenth century) is a drug of choice for treating fevers. In this case, the principal drug is *Swertia chirayita*. (Visha should be equated with *A. ferox* and Vishā with *A. heterophyllum* root.)³

DOSAGE/USAGE/CAUTIONS/COMMENTS

0.6–2.0 g of the drug in powder form.

The inert character of the *A. heterophyllum* plant is well known to hill people, who often use it as a vegetable.^{2(b)}

Acorus calamus Linn.

Vacā*

BOTANICAL SOURCE(S)

Acorus calamus Linn.
(Fam. Araceae)

Four chemo-types of Calamus are used in herbal medicine:

Type I: *Acorus calamus* L. var. *americanus*, a diploid American variety;

Type II: variety *vulgaris* L. (var. *calamus*), a European triploid;

Types III and IV: variety *augustatus* Bess and variety *versus* L., subtropical tetraploids.⁷

The chief constituents of the volatile oil are heavily dependent upon the chemical strain (di-, tri- or tetraploid).¹⁴

PHARMACOPOEIAL AYURVEDIC DRUG

Vacā (Rhizome).

API, Part I, Vol. II.

Roots of *Alpinia galanga* Willd, known as Sugandh Vachā, are sometimes supplied as Vachā.

Commercial material of northeast regions is adulterated with *Costus speciosus* (Koen) Sims.³⁶

There is a second variety of Vachā called Śveta Vachā or Haimavati Vachā. This is provisionally equated with *Acorus gramineus* Scoland or *Iris germanica* Linn. and *Paris polyphylla* Sm.³⁰

AYURVEDIC SYNONYMS

Ugragandhā, Ugrā, Śaḍgranthā.

Golomi, Shaṭparvā, Tikshṇagandhā.³

Bāl Vach (*Paris polyphylla*); Malaya Vachā (*Alpinia galanga*); Dweepāntara Vachā (*Smilax china* Linn.).

HABITAT

Throughout India, ascending up to 1800 m in the Himalayas.*

REGIONAL LANGUAGE NAMES

Eng: The sweet flag;

Guj: Ghoduvaj, Ghodvach;

Hindi: Bach, Gora-bach;

Kan: Baje, Narru berua;

Mal: Vayambu;

Mar: Vaca, Vekhanda;

Punj: Varch, Ghodavaca;

Tam: Vasambu, Pillai maruntho;

Tel: Vasa;

Urdu: Waja-e-Turki.

CONSTITUENTS

Volatile oil (principal constituents of the volatile oil are Asamyl alcohol, Eugenol and Asarone), also contains a bitter principle Acorin (Glucoside), Starch and Tannin.

Beta-asarone is present in the different chemo-types: in type I, beta-asarone and other phenylpropanoids are absent. It is superior in spasmolytic activity to other types. In types II, III, and IV, the major constituent is usually beta-asarone (isoasarone) up to 96%. Indian calamus oil contains up to 82% asarone and its beta-isomer (beta-asarone is carcinogenic in animals).⁷

* Vacā = Vachā. In Ayurvedic classical reference works "c" is to be pronounced as "ch." Caraka as Charaka.

The American variety is isoasarone free. The European form contains less than 10% isoasarone; others contain up to 96% beta-isoasarone in volatile oil.¹⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Apasmāra, Unmāda, Vibandha, Ādhmāna, Śūla, Karṇa srāva, Kāsa, Śvāsa, Smṛti daurbalya

Used in epilepsy, schizophrenia, constipation, tympanites, colic, otitis media, cough, asthma, and weakness of memory (therapeutic uses based on texts from 1000 BC to sixteenth century).

Calamus volatile essential oil: analgesic, antispasmodic, carminative and sedative.

Dried rhizomes and root: expectorant, sedative, emmenagogue; used for diarrhea of children, dysentery, dyspepsia, hysteria, neuralgia and glandular diseases.^{15(c)} Brain tonic in weak memory and psychoneurosis.⁷

IMPORTANT FORMULATION/ APPLICATIONS

Sāraswata Churna (Bhāvaprakasha, sixteenth century), contains 13 herbs. Vachā rhizome is among 3 main herbs.

Used for epilepsy and schizophrenia.

Sāraswatārishta (Bhaishajya Ratnāvali, seventeenth century) contains Vachā as one of the 12 supporting herbs.

Used for psychoneurosis, anxiety, as a brain tonic. Mānasmitra Vataka (Sahasrayoga) contains Vachā with 70 other herbs. Used for epilepsy and schizophrenia.

Vachādi Taila (Ashtāngahridaya, seventh century) is a medicated oil for internal use in chronic lymphadenitis.

Vachā Lasunādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) is to be used as eardrops for otitis media.

Vachā rhizome is a minor supporting herb in Chandra Prabhā Vati (36 herbomineral drugs).

Hinguvachādi Churna (Ashtāngahridaya) contains Vachā with 19 other herbal drugs in equal proportions. Used for digestive disorders. Khadirādi Gutika (see Arimeda).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

60–120 mgs of the drug in powder form. 1–2 g of the drug in powder form for inducing vomiting.

Indian practitioners mostly use *A. calamus* externally. Śveta Vachā (Hemavati), equated with *A. gramineus*, a diploid, is used internally.

Unani physicians use *Paris polyphylla*.⁷

Alpha-asarone potentiates pentobarbital, accounting for some, but not all, of its neurodepressive activity. Beta-asarone is reportedly hallucinogenic.⁵³

Adhatoda vasica Nees

Vāsā

BOTANICAL SOURCE(S)

Adhatoda vasica Nees
(Fam. Acanthaceae)

Syn.: *A. zeylanica* Medic., *Justicia adhatoda* Linn.⁷

Jacobina tinctoria Henl. is equated with the red-flowered variety of Vāsā.⁷

A. beddomei C.B. Clarke is used in Kerala.⁵ It also contains vasicine and vasicinone⁵²

and is considered to be more active than *A. zeylanica*.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Vāsā (Leaf).

API, Part I, Vol. I.

Big-leaved variety of the plant exhibits a biphasic change in seasonal variations of alkaloids both

in the root and leaves. Small-leafed variety does not exhibit biphasic changes in seasonal variations of alkaloids.^{20(a)}

AYURVEDIC SYNONYMS

Vṛṣa, Āṭarūṣa, Vāsaka.

Simhāsya,³ Simhaparni, Simhavadanā, Vājidanta.^{4,7}
Ātaruṣka, Aḍūsā, Arusā, Vāsa, Vṛsha, Vṛshak.³⁰

HABITAT

In plains and sub-Himalayan tracts in India, ascending up to 1200 m.

Adhatoda: distributed throughout tropical regions of Asia and Africa (more than 600 species).¹
Three species occur in India.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Vasaka;
Assam: Titabahak, Bahak, Vachaka;
Beng: Baksa, Vasaka;
Guj: Aduso, Ardusi, Adulso;
Hindi: Aduss, Arusa;
Kan: Adsale, Adusoge, Atarusha, Adsole, Adasale;
Kash: Vasa;
Mal: Attalatakam, Atalotakam;
Mar: Adulsa, Vasa;
Ori: Basanga;
Punj: Bhekar, Vansa, Arusa;
Tam: Vasambu, Adathodai;
Tel: Addasaramu;
Urdu: Adusa, Basa.

Eng: Malabar Nut.^{2(b)}

CONSTITUENTS

Alkaloids and essential oil.

Major bioactive pyrralazoquinazoline alkaloid varied from 0.54% to 1.10%. Another bronchodilator, vasicinone, was identified as the auto-oxidation product of vasicine. The maximum alkaloidal content (2%) was found during August–October (vasicine about 95%, deoxyvasicine 3% and traces of vasicinone). Flavonoids include kaempferol, quercetin, vitexin and isovitaxin. Phenolic acids include syringic acid and *p*-coumaric acid.^{20(a),2(b),52}

Leaves on a dry basis yield 0.075% essential oil, containing limolene.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kāsa, Śvāsa, Kṣaya, Raktapitta, Prameha, Kāmalā, Kuṣṭha

Used for cough, asthma, phthisis, hemorrhagic diseases, urinary disorders, jaundice, and skin diseases (therapeutic uses based on Bhāvaprakāsha, sixteenth century).

Vasicine is a bitter bronchodilator, respiratory stimulant, cholagogue and a promising uterotonic for the control of post-partum hemorrhage. The essential oil is expectorant, rubefacient and anti-bacterial.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Vāsakāsava (Gadanigraha, twelfth century and Yogaratnākara) is a perfectly balanced compound for bronchitis, asthma, phthisis and hemorrhagic diseases. Vasaka plant is the main herbal drug, with 10 supporting herbs. (South Indian products contain the root.)

Vasāvāleha (Bhaishajya Ratnāvali, seventeenth century), contains Vāsā leaf as the main herb and *Piper longum* as the main supporting herb. Prescribed for cough and breathlessness.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10 – 20 ml of juice of fresh leaves. 10 – 20 g of the dried drug for decoction.

Decoction: 50–100 mL.

Used as a powder, fresh juice, infusion, decoction and alcoholic extract in asthma, chronic bronchitis, cold, cough, and whooping cough.

Dried leaf smoked as a cigarette for relief from bronchial troubles.¹⁵

Pipeline influences the bioavailability of vasicine (more than 300%).^{2(c)}

Due to its uterotonic effect, the plant should not be used during pregnancy.³²

Standardization basis marker compound (leaf): vasicine–NLT 0.6% ww (IP).

Adhatoda zeylanica Medic.

Vāsā

A

BOTANICAL SOURCE(S)

Adhatoda zeylanica Medic., Syn. *A. vasica* Nees (Fam. Acanthaceae)

Justicia adhatoda Linn.⁷

Jacobina tinctoria Henl. is equated with the red-flowered variety of Vāsā.⁷

A. beddomei C.B. Clarke is used in Kerala.⁵ It also contains vasicine and vasicinone.⁵²

It is considered to be more active than

A. zeylanica.^{2(b)}

PHARMACOPEIAL AYURVEDIC DRUG

Vāsā (Root).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Vṛṣa, Ātrūṣa, Vāsaka.

Simhāsya, Vājidanta.

Simhaparni, Simhavadanā,^{3,4} Ātaruṣka, Aḍūsā, Arusā, Vāsa, Vṛsha, Vṛshak.³⁰

HABITAT

Sub-Himalayan tracts of India ascending up to 1200 m, and in plains.

Adhatoda: distributed throughout the tropical regions of Asia and Africa (more than 600 species).¹ Three species occur in India.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Vasaka, Malabar nut tree;

Assam: Titabahak, Bahak, Vachaka;

Beng: Bakas, Basak;

Guj: Ardusi, Aradusi, Araduso;

Hindi: Adoosa, Arusa, Aduss;

Kan: Adusoye;

Mal: Adalodakam, Adarooshaka;

Mar: Adulsa, Vasa;

Ori: Vasanga, Basanga;

Punj: Vishuti, Bhekar, Vansa, Arusa;

Tam: Adatodai;

Tel: Adda, Saramu;

Urdu: Adusa (Arusa).

CONSTITUENTS

Alkaloids (Vasicine and Vasicinol) and oil.

The root contains vasicine, vasicol, vasicinol, vasicinolone, galactose, O-ethyl-alpha-galactoside, tritriacontane, beta-sitosterol, beta-D-glucoside and O-ethyl-alpha-D-galactoside.^{2(b),15,20(a)}

The root showed the presence of saponins.^{20(a)}

Extracts of the root showed anti-bacterial activity against *Micrococcus pyogenes* var. *aureus* and *E. coli*.

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Vāta roga, Kṛmi, Śvāsa, Kāsa, Jvara, Chardi, Meha, Kṣaya, Raktapitta, Trṣṇā

Used for obstinate skin diseases including leprosy, neurological affections, worm infestations, asthma, cough, fever, vomiting, polyuria, phthisis, hemorrhagic diseases and excessive thirst (therapeutic uses based on texts from 1000 BC to fifteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Kantakāsava (Bhaisajya Ratnāvali, seventeenth century), contains Vāsā root bark and *Datura alba* plant as main drugs, supported by 6 other herbs. Prescribed for chronic bronchitis, asthmatic cough, and breathlessness.

Panch-tikta Ghrita (Bhaishajya Ratnāvali) contains Vāsā root as one of the five main herbs. Prescribed for treating skin diseases, septic ulcers and worm infestations.

Brihat Manjishthādi Kvāth Churna (Shārangadhara Samhitā, thirteenth century) contains Vāsā root with 44 other herbs. Prescribed as a blood purifier.

Chyavanprāsh (Charaka Samhita, 1000 BC) is a fast-moving herbal confection. Used as a general tonic for maintaining health and vitality.

A

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g.

For whooping cough in children, a decoction of the root bark (50 mL) is given.

Ash (Kshāra) of the whole plant is given with honey for chronic cough and asthma.

Research potential: vasicine, after ergometrine and sparteine, is likely to prove to be the next oxytocic discovered from plant sources.^{2(c)}

Caution: vasicine and vasicinone may potentiate the bronchodilatory activity of theophyllin and isoprenaline.

Adiantum capillus-veneris* L.*Bījapatrā****BOTANICAL SOURCE(S)**

Adiantum capillus-veneris L.
(Fam. Adiantaceae/Polypodiaceae)

The market drug is adulterated with *A. venustum* Don.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Bījapatrā (Whole plant).

API, Part I, Vol. VI.

Could not be found in any Ayurvedic classical texts.

A non-classical synonym of Hansrāja of folk medicine.

AYURVEDIC SYNONYMS

Kṛṣṇadaṇḍikā, Hamsapadīsadrśā.

Hamsapadi sadṛśa refers to botanical features such as Hamsapadi-Kṛṣṇadandikā; again, this is a non-classical nomenclature. As the stipes of *A. capillus-veneris* are blackish, a Sanskritized synonym has been adopted.

Stipes of *A. lunulatum* Burm. are chestnut brown. Kṛṣṇa (black) maidenhair is equated with *Asplenium Adiantum nigrum* Linn.

HABITAT

Moist shady places especially on damp old walls and crevices of rocks.

Found chiefly in the Western Himalayas, ascending to an altitude of 2400 m, extending

into Manipur. Common in Punjab, Bihar, Maharashtra, and South India.

Found in Southern Europe, France and Southern and Central Britain.

REGIONAL LANGUAGE NAMES

Eng: Maiden-hair fern;
Guj: Kaalo hansaraaj, Hanspadi;
Hindi: Kaalaa hansraja;
Kan: Hansraaja, Mubarakā;
Mal: Plavu;
Mar: Hansraaja;
Ori: Hansraaja;
Tel: Naalla hamsapadu;
Urdu: Parsiaoshan.

Eng: Five-finger fern, Hair of Venus, Maiden fern, Rock fern.

CONSTITUENTS

Adiantone; adiantoxide; astragalin; nicotiflorin; isoquercitrin; rutin; kaempferol-3-O-rutinoside; 1-caFFEylglucose and sulphate esters of 1-coumarylglucose and 1-coumarylgalactose; kaempferol-3-glucuronide; quercetin; β-sitosterol; stigmaterol; campesterol.

Daphnoretin is obtained from the fronds.

Mucilage contains galacturonic acid, galactose, glucose, xylose and rhamnose, as well as tannins (5.5%), resorcinol, phlorogucinol, methylphloroglucinol and pyrocatechol.

The plant contains diacylglycerol-trimethylhomoserine. The dried plant yielded isoadiantone.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agni-rohiṇī (acute stage of diphtheria), Aṅgamarda (body ache), Apasmāra (epilepsy), Atisāra (diarrhoea), Bhrama (vertigo), Dāha (burning sensation), Gulma (abdominal lump), Jvara (fever), Kāsa (cough), Lūtāviṣa (spider bite), Mūtrakṛcchra (dysuria), Raktapitta (bleeding disorders), Raktavikāra (disorders of blood), Soṣa (emaciation), Śoṭha (oedema), Śvāsa (Asthma), Svabheda (hoarseness of voice), Visarpa (erysipelas), Vraṇa (ulcer).

(For Bijapatra, Hamspadi text of sixteenth century quoted.)

IMPORTANT FORMULATION/ APPLICATIONS

The drug is an expectorant and a demulcent, and is beneficial in bringing up phlegm. It is still taken as an infusion in Europe to treat bronchitis, cough and whooping cough, as well as for painful and excessive menstruation.¹⁴

In folk medicine in India, dried fronds are used as a stimulating pectoral, emmenagogue, purgative, demulcent and emollient.^{2(b)}

Alcoholic and aqueous extracts of the fronds as well as mucilage showed anti-diabetic and diuretic properties.

Ethanol extract of plant exhibited anti-viral activity against vascular stomatitis.^{2(d)}

Isoadiantone inhibited post-coital implantation in rats.^{2(d)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 1 to 3 g. Svarasa (juice): 10 to 20 g.

Fronds, pounded with honey, are administered in catarrhal affections. They are smoked to relieve colds.^{2(b)}

The LD₅₀ of the 50% ethanolic extract was found to be 82.5 mg/kg i.p. in mice.^{20(a)}

Adiantum lunulatum Burn.

Haṁsapadī

BOTANICAL SOURCE(S)

Adiantum lunulatum Burn.
(Fam. Polypodiaceae)

Adiantum Philippenese Linn. Syn. *A. lunulatum* Burn.³⁶

The market drug consists commonly of *Adiantum venustum* Don. and/or *A. capillus-veneris* Linn.

The genuine material is scarce.³⁶

In Kerala, *Desmodium triflorum* (L.) DC. is used as Haṁsapadī.³

Vitis pedata Vahl is also known as Haṁsapadī.²³

In Tamil Nadu, *Coldenia procumbens* L. is the source of Haṁsapadī.⁴

PHARMACOPOEIAL AYURVEDIC DRUG

Haṁsapadī (Whole plant).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Raktapādī, Kīṭamātā, Tripādikā.

Haṁsapādikā, Haṁspādī, Haṁsāhvayā, Himsrābhayā, Tripādī³⁰

HABITAT

Throughout moist places, generally on the slopes of hills, ascending up to an elevation of about 1370 m.

REGIONAL LANGUAGE NAMES

Eng: Maiden hair;

Assam: Sharul arj, Sharujeena, Parsiyav;

Guj: Hansaraja;

Hindi: Hanspadee, Hansaraj;

Kan: Hamsapadi;

Mar: Hansaraj;

A

Punj: Hamsaraj;
Tel: Hamsapadi.

Tam: Serieppadai.
Eng: Walking maiden hair fern, Black
maidenhair fern.

CONSTITUENTS

Constituents not quoted in API.

Fronds gave hopane-type, isohopane-type,
neohopane-type, norhopane-type and fernane-
type triterpenoids.^{54,55}

THERAPEUTIC AND OTHER ATTRIBUTES

Visarpa, Vraṇa, Dāha, Atisāra, Luta viṣa, Bhūta
graha, Kakṣa sphoṭa, Rakta vikāra

Used in erysipelas, ulcer, burning syndrome,
diarrhea, spider poison, ghost syndrome, arm-
pit boils, and blood disorders (therapeutic uses
based on Bhāvaprakasha, sixteenth century).

The plant is pungent and alexiteric. Used as a
cooling drug in burning sensation, epileptic
fits, dysentery, erysipelas, and fever. When
burnt with oil, the fronds are applied topically
for treating skin diseases.

The aqueous extract of the leaves was reported to
have anti-fungal activity against *Microsporium
nanum*. Ethanolic extract revealed hypotensive
activity experimentally.^{20(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Madhuyastīyādi Taila (Ashtāngahridaya, seventh
century), contains *Glycyrrhiza glabra* root as the
main herb, Haṁspadi plant is among 29 sup-
porting herbs, all in equal proportion. A massage
oil used during fever and burning syndrome.
Manasmitra Vataka (Sahasrayoga, a non-Samhitā,
Kerala Materia Medica), Svarnabhūpati
Rasa (Yogarātākara, sixteenth century) and
Kālakūkta Rasa (Bhaishajya Ratnāvali, sev-
enteenth century) are mineral drugs. Plant
juices, including that of Haṁspadi, are used for
processing the drugs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

Plant juice: 10–20 mL.^{16(a)}

The LD₅₀ of the 50% ethanolic extract was found
to be >500 mg/kg i.p. in rats.^{20(a)}

<i>Aegle marmelos</i> Corr.	Fruit pulp	Bilva
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BOTANICAL SOURCE(S)

Aegle marmelos Corr.
(Fam. Rutaceae)

In a survey, 12 varieties have been identified in
Uttar Pradesh and Bihar. In four varieties, the
color of the pulp was found to be different,
consisting of light yellow, straw-yellow, tan-
gerine yellow, and yellow. Some varieties have
a nauseating odor, whereas some are mild and
sweet scented.^{2(b)} Different types of ripe fruits,
differing in various characteristics, are found
in 24 Parganas of West Bengal.^{20(a)}

Physiochemical tests are required for identifying
the correct Ayurvedic drug source.

PHARMACOPOEIAL AYURVEDIC DRUG

Bilva (Pulp of entire, unripe or half ripe fruits).

API, Part I, Vol. I.

Peeled pieces of fruits of *Feronia limonia* (L.)

Swingle are occasionally found as adulterants.³⁶

Fruits are sometimes infected by *Xanthomonas
bilave*. *Fusarium solani* is reported to cause soft
fruit rot.^{21(b)}

The spherical flattened fruits were categorized as fruits of superior quality among samples from 24 Parganas.^{20(a)}

AYURVEDIC SYNONYMS

Śrīphala.

Mālūra,³ Shalātu,⁴ Rudrañirmālya, Rudrajatā, Shivajatakhyā,³ Shāndilya, Shailūsha, Shalya, Sadāphalā, Mahākapitha (Kapitha is equated with *Feronia limonia*).⁷

HABITAT

Grows wild and also cultivated throughout India.

Grows wild throughout the deciduous forests of India, ascending to about 1200 m in the Western Himalayas; it also occurs in Sri Lanka, Pakistan, Bangladesh, and Andaman Islands. It is planted near temples.^{2(b)}

It has spread to Indo-China, Thailand, Northern Malaysia, Eastern Java, and Northern Luzon.

REGIONAL LANGUAGE NAMES

Eng: Bengal Quince, Bael fruit;
Assam: Bael, Vael;
Beng: Bela, Bilva;
Guj: Bill, Bilum, Bilvaphal;
Hindi: Bela, Sripfal, Bel;
Kan: Bilva;
Kash: Bel;
Mal: Koovalam;
Mar: Bel, Baela;
Ori: Bela;
Punj: Bil;
Tam: Vilvam;
Tel: Maredu;
Urdu: Bel.

CONSTITUENTS

Marmalosin, tannins, mucilage, fatty oil and sugar

The fruit gave the following values: calcium 85.0, phosphorus 50.0, iron 0.6, thiamine 0.13, riboflavin 1–2, niacin 1.1, oxalic acid 18.7, and vitamin C 8.0 mg/100 g. It also contains marmelosin (imperatorin), marmelide (an isomer of imperatorin), beta-sitosterol, psoralen and tannic acid.

The fruit and rind yield 7%–9% and 18%–22% tannins, respectively. The fruit gum (2%) gave galactose 20.4%, arabinose 10.7%, and D-galacturonic acid 25.2% and traces of rhamnose.

Seeds yield an oil (34.4%) on a dry basis.^{2(b)}
The mucilage contained four sugars.^{20(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Pravāhikā, Agnimāndya, Grahañiroga

Used in dysentery, dyspepsia, and chronic diarrhea with malabsorption (therapeutic uses based on texts from 1000 BC to sixteenth century).

Extracts of the fruit were found to be devoid of any *in vitro* anti-bacterial activity.^{20(a)}

In a clinical study, the pulp of ripened fruit (125–250 g) or the powder of unripened fruits (3–6 g, three times) gave 46.46% marked relief in helminthiasis.^{20(a)}

Powdered unripe fruits (5 g, three times) cured 52% of cases of dysentery.^{20(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Bilvādi Lehya (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains the root pulp. Prescribed for dyspepsia, diarrhea, dysentery, vomiting.

Brhatgāḍdhara Churna (Sharangadhara Samhita, thirteenth century) contains unripe fruit in equal proportions to 12 other herbs that are anti-diarrheal and anti-dysenteric.

Gāḍdhara Churna contains unripe fruit pulp and five other herbs in equal proportions. Prescribed for diarrhea and dysentery.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Dried fruit pulp powder: 2–12 g.

Infusion: 10–20 mL.

Decoction: 28–56 mL.⁵²

Unripe fruit is contraindicated with banana and curd.³

BOTANICAL SOURCE(S)

Aegle marmelos Corr.
(Fam. Rutaceae)

In a survey, 12 varieties have been identified in Uttar Pradesh and Bihar. In four varieties, the color of pulp was found to be different, consisting of light yellow, straw-yellow, tangerine yellow, and yellow. Some varieties have a nauseating odor, whereas some are mild and sweet scented.^{2(b)} Different types of ripe fruits, differing in various characteristics, are found in 24 Parganas of West Bengal.^{20(a)} Physiochemical tests are required for identifying the correct Ayurvedic drug source.

PHARMACOPOEIAL AYURVEDIC DRUG

Bilva (Dried root).

API, Part I, Vol. III.

Market samples of the root consists mostly of cut lengths of stouter lateral roots, 30–120 cm in length and 15–30 cm in thickness. In Kerala, the entire root, or more often only the wood of larger roots, is accepted as official.

AYURVEDIC SYNONYMS

Śrīphala.

Mālūra,³ Shalātu,⁴ Rudranirmālya, Rudrajatā, Shivajatakhyā,³ Shāndilya, Shailūsha, Shalya, Sadāphalā, Mahākapitha (Kapitha is equated with *Feronia limonia*).⁷

HABITAT

Occuring in the plains and up to 1000 m in the hills, also cultivated.

Grows wild throughout the deciduous forests of India, ascending to about 1200 m in the Western Himalayas; it also occurs in Sri Lanka, Pakistan, Bangladesh, and Andaman Islands. It is planted near temples.^{2(b)} It has spread to Indo-China, Thailand, Northern Malaysia, Eastern Java, and Northern Luzon.

REGIONAL LANGUAGE NAMES

Eng: Bael root, Bengal quince;
Assam: Bael, Vael,
Beng: Bela, Bilva;
Guj: Bilivaphal, Bill, Bilum;
Hindi: Bel, Bela, Sripthal;
Kan: Bilva;
Mal: Koovalam;
Mar: Baela, Bel;
Ori: Bela;
Punj: Bil;
Tam: Vilvam;
Tel: Maredu;
Urdu: Bel.

CONSTITUENTS

Auraptene, Coumarins, Glycosides.

The roots contain lupeol, auraptene, marmin, and umbelligerone;^{20(a)} the alcoholic extract additionally gave psoralen, tembamide, marmacin, skimmianine, and skimmin.^{2(b)} The root bark contains marmin, marmasin, the coumarin decursinol, the alkaloid haplopine, skimmianine, gammafagarine, xanthotoxin, umbelliferone, and lupeol.^{2(b),20(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vātavyādhi, Śotha, Śūla, Agnimāndya, Chardi, Mūtrakṣchra, Āmavāta

Used in neurological diseases, inflammations, colic, indigestion, emesis, dysuria, and rheumatism (therapeutic uses based on fifteenth century texts).

The root bark has been used particularly in intermittent fevers.^{2(b)}

Classical Dashmūla Kwāth exhibited significant anti-pyretic and mild anti-inflammatory effects, reduced spontaneous motor activity, potentiated pentobarbitone hypnosis and antagonized amphetamine-induced hyperactivity in mice.^{20(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Dashamūlārishta (Sharangadhara Samhita, thirteenth century), contains the “five bigger” and the “five lesser” roots with 58 supporting herbs. The classical composition has been revised in AFI, Part I, second revised edn. Now, the “five bigger roots” can be substituted by the stem bark and the “five lesser roots” by the plant. The drug’s classical attributes should be revalidated.

Restructured compounds may fall into a non-Ayurvedic category.

The same comment is applicable to Amritarishta (Bhaishājya Ratnāvali, seventeenth century); Dashamūla Kwāth Churna (Ashtangahridaya, seventh century); Agastya Haritaki Rasāyana

(Ashtangahridaya); and Dantyaṛishta (Ashtangahridaya).

Bilvādi Lehya (Sahasrayoga, a non-Samhita, Kerala Materia Medica) contains Bilvā root as the main herb with nine supporting herbs. It is prescribed for anorexia and indigestion.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–6 g of the drug in powder form.

Classical Dashmūlarishta is the largest-selling nervine and restorative tonic for females. It is a reputed bitter, alterative and stimulant drug of Ayurveda.

Dose: one to two tablespoons (15–30 mL) with equal quantities of water after meals.

Aegle marmelos Corr. Stem bark

Bilva

BOTANICAL SOURCE(S)

Aegle marmelos Corr.
(Fam. Rutaceae)

In a survey, 12 varieties have been identified in Uttar Pradesh and Bihar. In four varieties, the color of pulp was found to be different, consisting of light yellow, straw-yellow, tangerine yellow, and yellow. Some varieties have a nauseating odor, whereas some are mild and sweet scented.^{2(b)} Different types of ripe fruits, differing in various characteristics, are found in 24 Parganas of West Bengal.^{20(a)}

Physiochemical tests are required for identifying the correct Ayurvedic drug source.

PHARMACOPOEIAL AYURVEDIC DRUG

Bilva (Stem bark).

API, Part I, Vol. IV.

Stem bark of *A. marmelos* is sometimes found mixed with the stem bark of *Crataeva nurvala* Buch-Ham.³¹ The root bark is 3–5 mm thick and cream-yellow. The stem bark is 4–8 mm thick and gray.^{20(a)}

AYURVEDIC SYNONYMS

Sriphala.

Mālūra,³ Shalātu,⁴ Rudranirmālya, Rudrajatā, Shivajatakhyā,³ Shāndilya, Shailūsha, Shalya, Sadāphalā, Mahākāpitha (Kāpitha is equated with *Feronia limonia*).⁷

HABITAT

Occuring in the plains and up to 1000 m in the hills, also cultivated.

Grows wild throughout the deciduous forests of India, ascending to about 1200 m in the Western Himalayas; it also occurs in Sri Lanka, Pakistan, Bangladesh and Andaman Islands. It is planted near temples.^{2(b)}

It has spread to Indo-China, Thailand, Northern Malaysia, Eastern Java and Northern Luzon.

REGIONAL LANGUAGE NAMES

Eng: Bengal quince, Bael;

Assam: Bael, Vacl;

Beng: Bela, Bilva;

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Guj: Bill, Bilum;
 Hindi: Bela, Sripthal, Bel;
 Kan: Bilva;
 Mal: Koovalam;
 Mar: Bel, Baela;
 Ori: Bela;
 Punj: Bil;
 Tam: Vilvam;
 Tel: Maredu;
 Urdu: Belgiri (Bael).

CONSTITUENTS

Coumarins and Sterols.

The mature bark contains marmesin, gamma-fagarine, umbelliferone, and beta-sitosterol.^{2(b)}
 The stem bark contained 5.52% tannins and 6.36% non-tannins;²⁰ lignan-glucosides, (–)-lyoniresinol 2 alpha-O-beta-D-glucopyranoside, (–)-4-epilyoniresinol 3-alpha-O-beta-D-glucopyranoside, (+)-lyoniresinol 3 alpha-O-beta-D-glucopyranoside and (–)-lyoniresinol 3 alpha-O-beta-D-glucopyranoside.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Chardi, Vātavyādhi, Śūla, Śoṭha, Atisāra, Raktātisāra, Kuksiśūla amaśūla, Arśa, Medoroga, Grahaniroga, Madhumeha, Pravāhikā

Used in emesis, neurological disorders, colic, inflammations, acute diarrhea, ulcerative colitis, gastritis, piles, obesity, malabsorption syndrome, diabetes and gastro-enterocolitis (therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Pushyānuga Churna (Bhaishajya Ratnāvali, seventeenth century); Grahihi Mihira Taila; Sudarshan Churna;* Chandanadi Taila (Yoga Ratnākara (sixteenth century); and Anu Taila (Ashtangahridaya, seventh century) contain stem bark of Bilva as a supporting herb. Sudarshan Churna* of South India does not contain any part of *A. marmelos*. In the AFI, the root has been substituted with the stem bark.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

15–30 mL.

Aerva lanata (Linn.) Juss.

Paṭṭūra

BOTANICAL SOURCE(S)

Aerva lanata (Linn.) Juss.
 (Fam. Amaranthaceae)

In Kerala, *Aerva lanata* is used as Bhadrā.^{3*} *A. lanata* is a substitute of Pāshānabheda,⁷ while in Kerala, *Rotula aquatica* Lour. and *Homonoia reparia* Lour. are used.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Paṭṭūra (Whole plant).

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Paṭṭūra was identified as Shālinch (*Alternanthera sessilis* [L.] R. Br.), as well as Shitavāra or Kurant (*Celosia argentea* var. *christa* Voss.) of Ashtāngahridaya (seventh century).^{30,3}

AYURVEDIC SYNONYMS

Gorakṣagañja, Bhadrā.*

Bhadra:* in Bhāvaprakasha (sixteenth century), Bhadrā was equated with Katphala, Chandrashura, and Prasārini.³

Gorakhagaṇjā, Aādānpākī, and Shatkabhedī are unconfirmed synonyms of Paṭṭūra.

HABITAT

Throughout India in waste lands.
Throughout tropical India as a weed in fields; it is also found growing in Arabia, tropical Africa, Sri Lanka, the Philippines and Java.

REGIONAL LANGUAGE NAMES

Beng: Chaya;
Guj: Gorakhganjo;
Hindi: Gorakhaganja;
Kan: Bilihindisoppu;
Mal: Cherula;
Mar: Kapurphutee, Kumrapindee;
Punj: Bhuikallan;
Tam: Cherupoolai;
Tel: Pindichettu, Kanda pindi.

Hindi: Kapurijadi.²⁰

CONSTITUENTS

α-Amyrin and β-sitosterol, β-sitosterol palmitate, campesterol, chrysin, flavonoid glycosides and tannins.
The plant contains kaempferol 3-galactoside, kaempferol-3-rhamnogalactoside, betulin and hentriacontane and its D-glucosides.^{2(c)}
Aerial parts contain alkaloids methylaervin, aervin, aervoside, aervolanin, and four beta-coumaroyl-glycosides.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aśmari, Mūtrakṛcchra
Used in calculosis and dysuria (classical uses based on texts from first century BC to sixteenth century). A Sanskrit verse, composed by a contemporary scholar, has been quoted in the API for validating Gorakhshaganjā as a classical drug.¹⁶
Extracts of the leaf, stem and root have shown significant diuretic activity in albino rats.⁵⁷
A. lanata aqueous suspensions reduced glycolic acid oxidase in the liver and lactate dehydrogenase in the liver and kidneys; they also diminished the markers of crystal deposition in the kidneys.⁵⁸

IMPORTANT FORMULATION/ APPLICATIONS

Shatāvaryādi Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains *Asparagus racemosus* root juice and *Tribulus terrestris* fruit decoction (both in equal proportion) with 30 supporting herbs, including Paṭṭūra plant. Prescribed for dysuria and other disorders, including urinary calculus.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50–100 ml in the form of decoction.
Research potential: various extracts of the leaves were reported to have angiotensin converting enzyme-inhibitory action to varying degrees.⁵⁶

Ailanthus excelsa Roxb.

Aralu

BOTANICAL SOURCE(S)

Ailanthus excelsa Roxb.
(Fam. Simarubaceae)
Syn. *Pongellion wightii* van Tiegh.¹⁵
Ailanthus excelsa root and root bark is commonly used as a substitute of Shyonāka (*Oroxylum*

indicum Vent.), root bark is used in parts of Rajasthan and Gujarat.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Aralu (Stem bark).
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AYURVEDIC SYNONYMS

Kaṭvaṅga, Dīrghavṛnta.

Pūtivraksha,⁷ Nimbākāradala, Pañktipatraka,^{20(a)} Parvata nimb.³⁰

Aralu and Shyonāka remained synonyms for a long time. Now, Shyonāka has been identified as *Oroxylum indicum* Vent.³

HABITAT

Bihar, Chhota Nagpur, Madhya Pradesh, forests of Ganjam, Vishakhapatnam and Deccan.

Indigenous to Central and South India; found throughout Madhya Pradesh; in the Broach and Panchmahal districts in Gujarat; in some coastal districts in Andhra Pradesh; and in the Ganjam and Puri districts of Odisha.

Cultivated as an avenue tree.^{21(b)}

REGIONAL LANGUAGE NAMES

Assam: Aralu;

Guj: Aralavo;

Hindi: Arlu, Maruk, Ghoda karanj;

Kan: Hiremara hebbever;

Kash: Merumaram, Mattipongilyam;

Mal: Merumaram, Mattipongilyam;

Mar: Ghoda karanj;

Ori: Dakshinakabala, Mahala;

Punj: Aruo;

Tam: Peruvagai;

Tel: Peddmanu.

Eng: Tree of Heaven, Maharukh.⁷

A. altissima is also known as Tree of Heaven.

CONSTITUENTS

β-sitosterol, Quassinoids, Ailantic acid, 2-6 Dimethoxy-Benzoquinone and Melanthin.

Quassinoids isolated from the stem bark include glaucarubin and excelsin. The bark also contain ailanic acid, 2-6-dimethoxybenzoquinone, beta-sitosterol, malanthin, tricontane, hexatriacontane,^{2(b)} excelsin, 13-18-dehydro-excelsin, 1,12-deoxy-13-formylailanthinol, and glaucarbucol.^{20(a)}

Indole alkoids of the bark are of the beta-carbolic type.

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra, Kṛmi, Arśa, Sannipāta jwara, Bhrama, Tvakaroga, Chardi, Kuṣṭha, Pravāhikā, Grahani, Prameha, Śwāsa, Gulma, Mūsṣaka visaja roga

Used in diarrhea, worm infestations, piles, typhoid, psychoneurosis, skin diseases, vomiting, obstinate skin diseases including leprosy, dysentery, chronic diarrhea with malabsorption, polyuria, asthma, chlorosis, and rat poisoning (therapeutic uses based on texts from the fifteenth to sixteenth centuries).

Evidence suggests that the quassinoid constituents exhibit astringent, anti-pyretic and anti-spasmodic activities, as well as anti-protozoan, anthelmintic, and cytotoxic properties.^{13,14}

IMPORTANT FORMULATION/ APPLICATIONS

Aralu Putapāka (Sushruta Samhita, 1000 BC) was the extract of the bark heated on steam, following “putpāk” process. For diarrhea.¹⁶⁽¹⁾

Pshyānuga Churna (Bhaishajya Ratnāvali, seventeenth century) contains Aralu bark and 25 other herbs, all in equal proportions. Prescribed for leucorrhea and menorrhagia.

Brihat Gangādhara Churna (Sharangadhara Samhita, thirteenth century) contains Aralu bark and 12 other herbs, all in equal proportions. Prescribed for diarrhea and dysentery.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

Juice: 10–20 mL.

Decoction: 50–100 mL.^{16(b)}

The LD₅₀ of the extract was found to be 166 mg/kg i.p. in mice.^{20(a)}

An alcoholic extract of stem bark exhibited remarkably high anti-implantation (72.2%) and early abortifacient activities (27.7%) in albino rats.^{2(c),20(a)}

Alangium salviifolium (Linn. f.) Wang.

Aṅkolaḥ

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BOTANICAL SOURCE(S)

Alangium salviifolium (Linn. f.)

Wang.

Syn. *A. lamarckii* Thw.

(Fam. Alangiaceae)

Alangium salviifolium (L.f.) Wang. ssp. *salviifolium* Mukerjee, *A. salviifolium* ssp. *Decapetalum* (Lam.) Wang., *A. decapetalum* Lam., *A. tomentosum* Lam. *Grewia salviolia* L.f.¹⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Aṅkolaḥ (Leaf).

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AYURVEDIC SYNONYMS

Ankola, Ankoṭa, Deerghakeela, Nikochaka, Tāmraphala, Gupta sneha.

Ankoṭha, Ankolla, Talkota (Sushruta).³⁰

Gandhapushpa, Gūḍhamallikā,²⁰ Pitasāra, Virechi, Bhūsutā.⁴

HABITAT

The plains and foothills throughout India.

Also found in Sri Lanka, Bangladesh, China, Indo-China, the Philippines and Africa.

REGIONAL LANGUAGE NAMES

Eng: Sage-leaved alangium;

Beng: Akarkanta, Baghankura, Aankod, Angkura, Dhalakura;

Guj: Ankol, Onkla;

Hindi: Ankol, Ankora, Dhera;

Kan: Ankolimara, Ansaroli, Arinjl, Ankol;

Mal: Ankolam, Velittanti, Irinjl, Chemmaram;

Mar: Ankola;

Ori: Ankul, Baghonokhiya, Dolanku, Konkobolo;

Tam: Alangi, Ankolum, Atikoevam;

Tel: Ankolamu, Udagu, Urgan;

Urdu: Ankola.

Hindi: Dheraa.³⁰

CONSTITUENTS

Alkaloids (Alangimarckine, deoxytubulosine, ankorine); campesterol, episterol, stigmast-5, 22, 25-trein-3β-ol, alangidiol and isoalangidiol.

Alkaloidal fractions: experimentally, the total alkaloidal fraction showed anti-inflammatory, anti-spasmodic, and hypotensive activities. Alangimackine showed hypoglycemic effects. The alkaloid also produced a moderate cytostatic activity *in vitro*.

Deoxytubulosine exhibited potent cytotoxic, anti-microbial, and anti-tumor activities.^{20(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Matsyaviṣa, Amavāta, Jvara, Kaṇtharoga, Śoṭha, Śopha, Śūla, Kṛmi, Visarpa, Graha bādhā, Raktavikāra, Mūsakaviṣa, Jantuvīṣa, Lūtāviṣa, Kukkuraviṣa, Viṣarīkāra

Used in fish poison, rheumatism, fever, throat infections, inflammations, edema, colic, worm infestations, fear psychosis, disorders of the blood, rat bites, poisonous animal bites, spider poison, dog bites, and disorders due to poison (therapeutic uses based on texts from 1000 BC to sixteenth century).

During the classical period, the root bark was prescribed internally, as well as externally, in cases of animal poisons, including rabies.* (Sushruta Samhita, Ashtāṅgahridaya, Chakradatta, Rājamārttanda, Gadanigraha, Shārangadhara Samhitā, and Bhāvaprakāśhas).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

The plant is considered an antidote to snake poison.* Leaves are antirheumatic, used as a poultice in rheumatic pain, also on bone

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fractures; prescribed in fever, diarrhea, elephantiasis and fungal affections.^{20(a)}

A “reputed” single drug of the classical period of Ayurveda for the treatment of rabies, it was also used as an antidote to other poisonous bites, including snake bites.* It was used for leprosy and other skin diseases and syphilis.⁵

* In an experimental study, when the total alkaloidal fraction of the leaves was administered orally (10 mg/100 g bw/day) to albino rats, 67.7% rats died during treatment.^{20(a)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

2–10 g.

Febrifuge dose: 0.13–0.32 g.

Emetic: 2.6–3.2 g.

Caution: in case of any poisoning, the patient should be moved immediately to a poison center or hospital.

Albizia lebbbeck Benth.

Śirīṣa

BOTANICAL SOURCE(S)

Albizzia lebbbeck Benth.

(Fam. Fabaceae)

(*Albizia* is the correct botanical name.)

Stem bark of *Albizia marginata* Merr. is used as Shirisha in Kerala, or as a substitute in south India.³

A. odoratissima Benth. is used as a substitute in northern and western India.

PHARMACOPOEIAL AYURVEDIC DRUG

Śirīṣa (Stem bark).

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A. odoratissima Benth. is known as Krishna Shirisha.

A. procera (Roxb.) Benth. has been identified as Katabhi or Kinihi.

AYURVEDIC SYNONYMS

Bhaṇḍi, Śītapuṣpa, Śukapriya, Mṛdupuṣpa.

Katabhi, Kinihi, Shuka-taru,³⁰ Plavaga, Vipra, Shuka vrksha, Kapitana, Shyāma varṇa.⁴

HABITAT

Common throughout India, ascending to 1200 m on the Himalayas.

Mostly confined to tropical and subtropical regions of Asia, Africa, and Australia.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Siris tree, Lebbeck tree;

Beng: Sirish, Siris;

Guj: Shirish;

Kan: Bagey, Bage mara, Hombage;

Mal: Vaka, Nenmenivaka;

Mar: Siris;

Ori: Sersuan, Sirisha;

Punj: Sirish, Sareehn;

Tam: Vakai;

Tel: Dirisena;

Urdu: Siris.

Eng: East Indian Walnut.⁷

CONSTITUENTS

Saponins and Tannins.

The bark gave echinocystic acid-3-O glucoside and echinocystic acid-3-O-alpha-L-rhamnopyranosyl (1 → 2)-beta-D-glycopyranoside (saponins); oleanolic acid and echinocystic acid (sapogenins); and *n*-octacosanol, beta-amyrin and beta-sitosterol (Uttar Pradesh sample).^{20(a)}

Tannins (7%–11%) of condensed type viz. D-catechin were found.^{2(b)}

The alcoholic extract of stem bark contains cardenolide glycosides of a digitoxin nature and anthraquinone glycosides.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Pāmā, Kuṣṭha, Kaṇḍu, Visarpa, Kāsa, Vraṇa, Śoṭha, Śwāsa, Mūṣaka viṣa, Sita pitta, Raktaduṣṭi, Pinasa, Viṣamajwara, Pratiśyāya, Sarpadansa (Casake), Visadusti, Suryavarta, Ardhāvabhedaka, Kṛmi roga, Netrābhiaṣanda

Used in eczema, obstinate skin diseases including leprosy, itching, erysipelas, cough, ulcer, edema, asthma, rat bites, urticaria, blood disorders, sinusitis, malarial fever, rhinitis, snake bites, poisoning, chronic sinusitis, hemicrania/migraine, worm infestations and conjunctivitis (therapeutic uses based on texts from 1000 BC to sixteenth century).

The mechanism of action of the bark decoction in atopic allergy has been studied in detail.⁵⁹ Charaka used seeds, bark and leaves in prescriptions (internally and externally) in hemicrania, urinary anomalies, chronic skin diseases and toxic conditions.²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Vajraka Taila (Ashtāngahridaya, seventh century), contains seeds of Śirīṣa as a supporting component.

Dashāṅga Lepa (Bhaishajya Ratnāvali, seventeenth century), the paste of Śirīṣa stem bark and nine other herbs in purified butter, is applied externally on inflammations, erysipelas and skin diseases, and on the forehead in fever.

Ayaskṛti (Ashtāngahridaya): see *Acacia suma*.

Devadārvārishta (Bhaishajya Ratnāvali): *Cedrus deodara* heartwood is the main drug.

Brhan-maricāḍya Taila (Yogaratanakara) contains 32 plant drugs in equal proportions.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

25–50 g (Kwatha). 3–6 g. (Curna).

Decoction: 50–100 mL.

According to Charaka, Shirish was the best drug for poisoning. Vomiting should be induced by giving a decoction of the leaf, bark, root and fruit with ricewater.^{16(a)}

Alhagi pseudalhagi (Bieb). Desv.

Yavāsaka

BOTANICAL SOURCE(S)

Alhagi pseudalhagi (Bieb). Desv.
(Fam. Fabaceae)

Syn. *A. camelorum* Fisch. ex DC., *A. maurorum* Medic.

In Kerala, *Tragia involucrata* Linn. is used for both Yavāsā and Dhanvayāsā.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Yavāsaka (Whole plant).

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The herb is sometimes sold as Dhamāsā.³⁶

Alhagi-manna is known as Yāsasharkarā⁷ and is not found on Indian plant, but is collected from Turkey, Iraq, and Iran.^{2(b)}

AYURVEDIC SYNONYMS

Yavāsa, Yāsa.

Yāsa, Duhspārshā, Durālabhā, Kunāshaka,⁷
Marudhavā, Dirgh-mula, Vālapatra,
Samudrānta, Dūra-mūla, Ati-kantaka,
Tāmramūli, Kacchurā.⁴

The synonyms Dhanvayāsā or Dhanvayāsaka are now equated with *Fagonia cretica*. *Anantā*, *Duh-sparshā* and *Durālabhā* are considered to be its synonyms.³⁰

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HABITAT

Arid and dry regions of Gujarat, Punjab, Uttar Pradesh and Rajasthan.

Widely spread in the Ganges Valley and in arid tracts in Maharashtra, Gujarat, Punjab, and Rajasthan, ascending to an altitude of 900 m in Bihar. It is also found in Kashmir in rocky and gravelly soil. The *Alhagi* genus is distributed from the Mediterranean and Sahara to central Asia and the Himalayas.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Persian manna plant;

Assam: Bhatuashak;

Guj: Javaso;

Hindi: Javaasa;

Kan: Turuchana gida, Javaasa, Neladangara, Ballidurabi, Duralabha;

Mal: Venkatithura, Valiya kotithuva;

Mar: Dhamasa;

Tam: Punaikanjuri, Kanchori;

Tel: Chinnadoolagondi, Dhanvayasamu;

Urdu: Turanjabeen.

Eng: Camel Thorn.^{2(b)}

Alhagi manna is known as Turanjbeen. The plant's Unani name is Jawansaa.³⁷

CONSTITUENTS

Sugars (Melizitose, Sucrose, Invert sugars).

Alhagi manna contains sucrose 41.5%, melizitose 25.0%, reducing sugars 9.0%, ash 3.4%, water 4.6%, and impurities 14.0%.

Manna from pods mainly contains sucrose.

The aerial parts contain flavonoids (highest concentration of rutin in leaves), sterols, triterpenes, saponins, anthraquinones, tannins, (+)-catechin, (±)-gallocatechin, and (–)-epigallocatechin.^{2(c,d)} They also contain choline and betaine.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Tr̥ṣṇa, Chardi, Kāsa, Jwara, Vātarakta, Raktapitta, Visarpa

Thirst, vomiting, cough, fever, hemorrhagic diseases, erysipelas (therapeutic uses based on texts from 1000 BC to sixteenth century).

Proanthocyanidins exhibit hypolipidemic activity.^{2(c)} The plant exhibited anti-protozoal, cardiotonic, antibilious, diaphoretic, laxative, diuretic, anti-septic, and expectorant properties.^{2(b)}

The ether extract of the shoot showed antibacterial activity against *Staphylococcus* and *Escherichia coli*.^{20(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Chinnodbhavādi Kwāth Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains Yavāsa plant as one of the 6 main herbs. Prescribed for typhoid and high fever.

Gandharva-hastādi Kwath Churna (Sahasrayoga) contains Yavasa plant as one of the seven main herbs. Prescribed for constipation and indigestion.

Bhārāṅgādi Kwath Churna (Sahasrayoga) contains Yavasa plant as one of the ten main herbs. Prescribed for intermittent and chronic fevers.

Arimedādi Taila (Ashtāṅgahridaya, seventh century), a medicated oil for topical application in pyorrhea and gum diseases, contains Yavasa among its 32 herbs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–50 g of the drug for decoction.

Whole plant: laxative, diuretic, expectorant, antibilious and anti-septic.

Twigs: decoction for cough in children.

Leaves: oil for rheumatism.

Root: decoction for abscesses and swellings.¹⁵

Alhagi manna: expectorant, anti-emetic, and laxative.^{2(b)}

The LD₅₀ of the plant extract was found to be 750 mg/kg i.p. in rats.^{20(a)}

Allium sativum Linn.**Laśuna****A****BOTANICAL SOURCE(S)**

Allium sativum Linn.
(Fam. Liliaceae)

Bulbs of *Allium ampeloprasum* Linn. are larger in size, having two to four cloves, and are considered a good substitute in some parts of North India.

A single-clove variety of *A. sativum*, grown in Rajasthan, is considered more potent.³⁶ *Allium ascalonicum* Linn. is equated with one-cloved garlic.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Laśuna (Bulb).

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The bulbs, cut and dried at a temperature not exceeding 65°C, are powdered. They should contain 0.45% allicin.^{11(a)}

International Pharmacopoeial drug name: *Allii sativi* bulbus.

AYURVEDIC SYNONYMS

Rasona, Yavanesta.

Rasonaka, Ugragandha,⁴ Mahaushadh, Arishta.⁷
Bigger-cloved var.: Granjan'a, Mahākanda,
Jarjjara, Dirghpatraka.⁴

HABITAT

Cultivated as a condiment crop in India.

Garlic is native to the mountainous regions of Central Asia, from which it spread in prehistoric times to the Mediterranean region. The wild ancestor of garlic was a flowering form producing seeds on aerial bulbs.^{2(b)} Cultivation of garlic is conducted in Karnataka (two varieties), Tamil Nadu (a new variety), and Rajasthan (larger-cloved variety). The normal condiment var. is cultivated in other states.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Garlic;
Assam: Maharu;
Beng: Lasun;
Mal: Vellulli, Nelluthulli;
Mar: Lasun;
Punj: Lasan;
Tam: Vellaipoondur;
Tel: Vellulli, Tellapya, Tellagadda;
Urdu: Lahsan, Seer.

Eng: Camphor of the poor, Nectar of the Gods, Man's Treacle, Stinking Rose.¹³

CONSTITUENTS

Volatile oil containing Allyl Disulphide and Diallyl Disulphide. Also contains Allin, Allicin, Mucilage and Albumin.

Powdered material should contain about 1% of alliin (+)-S-allyl-L-cysteine sulfoxide as the main sulfur-containing amino acid, as well as (+)-S-methyl-L-cysteine sulfoxide, gamma-L-glutamyl peptides, S-allyl-cysteine, ubiquitous amino acids, steroids, and adenosine.

In the presence of enzyme alliinase, alliin will be converted to allicin (1 mg of alliin is considered to be equivalent to 0.45 mg of allicin).^{11(a)} Further conversion yields ajoene.¹³

THERAPEUTIC AND OTHER ATTRIBUTES

Jirna jwara, Kṛmiroga, Gulma, Kuṣṭha, Arśa, Kāsa, Swāsa, Pinasa, Śūla, Karṇaśūla, Vātavyādhi, Hikṛ, Medoroga, Yoni vyāpata, Visucikā, Pliḥ vṛddhi, Kṣaya, Viśama jwara, Apasmāra, Unmāda, Sasa, Śōpha, Hṛdroga, Vātaśūla, Trikaśūla, Vraṇa kṛmi

Used in chronic fever, worm infestations, tympanites, obstinate skin diseases, piles, cough, asthma, chronic rhinitis/sinusitis, colic, earache, rheumatism, hiccup, obesity, diseases of the female genital tract, gastroenteritis, enlargement of the spleen, emaciation, intermittent fever, epilepsy, insanity, edema, cardiac diseases,

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neuralgic pain, pain in the sacral region and infected ulcers (therapeutic uses based on texts from 1000 BC to sixteenth century).

**IMPORTANT FORMULATION/
APPLICATIONS**

Laṣunādi Vati (Vaidya Manorama, thirteenth century), contains Laṣuna bulbs and purified sulphur with 7 supporting herbs. Prescribed for gastroenteritis, diarrhea, and indigestion. Vachā-laṣunādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), a composite herbal drug in an oil base, contains Laṣuna with *Curcuma longa*, *Aegle marmelos* leaf juice, and *Acorus calamus* in an oil base. It is prescribed for otitis. Laṣunādi Ghrita (Ashtāngahridaya, seventh century) contains Laṣuna bulbs as the main herb with 20 supporting herbs. It is prescribed for abdominal lumps and neurological diseases.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

3 g of the drug.

Minced fresh bulbs: 4 g per day.
Infusion: 4 g in 150 mL water.
Fluid extract 1:1 (g/mL): 4 mL.
Tincture 1:5 (g/mL): 20 mL.⁹
Aged garlic extract is standardized to S-allyl-L-cysteine and contains only 3% less alliin.
For hyperlipidemia: powder extract (standardized to 1.3% alliin), 300 mg three times.
Aged garlic extract (0.03% alliin), 7.2 g per day.
For hypertension: powder extract 600–900 mg per day. Aged garlic extract 2400 mg per day.
For tinea infections (topically): ajoene 0.4% cream or 0.6% gel.¹³
Standardization basis marker compound: alliin-NLT 0.2% w/w (IP).

Aloe barbadensis Mill. Kanyāsāra

BOTANICAL SOURCE(S)

Aloe barbadensis Mill.
Syn. *Aloe vera* Tourn. ex Linn. *Aloe indica* Royle. (Fam. Liliaceae).
Aloe vera (Linn) Burm. f., *A. perfoliata* Linn.
Other Indian species:
A. var. chinensis Baker (South India and Central India);
A. var. littoralis Koeing ex Baker (sea coasts of Tamil Nadu);
A. variegata Linn. (Maharashtra).^{16(b)}

PHARMACOPEIAL AYURVEDIC DRUG

Kanyāsāra (Dried juice of leaves).
API, Part I, Vol. I.
Sources of imported aloe dried juices: Curacao aloe (yellow–brown), Cape aloe (greenish–brown), Socotrine aloe (dark brown), and Zangibar aloe (light blue).

International Pharmacopoeial name: aloe barbadensis,⁸ aloe.

AYURVEDIC SYNONYMS

Kumārīrasa-sambhava, Sahāsāra.
Aloe entered into Ayurvedic medicine after the twelfth century.
In Sushruta Samhitā, Kanyā was mentioned among the 18 “divine herbs” used in Somā.^{16(c),30}
During the sixteenth century, Kanyā was also known as a synonym of Sthūlailā (*Amomum subulatum* Roxb.).⁴

HABITAT

Throughout India.
Aloe: 446 species in the tropics, especially South Africa, Madagascar, Arabia and the Canary Islands.¹

REGIONAL LANGUAGE NAMES

Eng: Indian Aloe;
Assam: Musabhar, Machambar;
Beng: Ghritakalmi;
Guj: Eliyo, Eariyo;
Hindi: Musabhar, Elva;
Kan: Karibola, Lolesara satva, Lovalsara, Lolesara;
Kash: Musabbar, Siber;
Mal: Chenninayakam;
Mar: Korphad;
Ori: Musabara;
Punj: Kalasohaga, Mussabar, Alua;
Tam: Kattazhi, Satthukkathazhai;
Tel: Musambaram;
Urdu: Musabbar, Ailiva, Siber.

CONSTITUENTS

Anthraquinone, glycoside.

Main active constituents: 25%–40% of barbaloin, a mixture of aloin A and B and their respective 6-O-p-coumaroyl esters; 3%–4% of 7-hydroxy-aloins A and B and their 6-O-p-coumaroyl esters (characteristic of Barbados aloes); and 8-O-methyl-7-hydroxyaloin A and B and their 6-O-cinnamoyl esters (all are aloes-emodin anthrone C-glycosides). Small amounts of the aglycones, aloes-emodin and chrysophanol.

Other constituents include methylchromone glycosides.^{11(b)}

The barbaloin content of Indian aloes was found to be very low (4.24%).^{20(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Udararoga, Kaṣṭhārtava, Jvara, Yakṛdvikāra

Used in disease of the abdomen, dysmenorrhea, fever, and liver disorders (drug coverage based on a non-classical text, Ayurveda Vijnāna).

Classical references: Rāja Nighantu (fifteenth century); Bhāvaprakāsha (sixteenth century); and Sidha-bhesajamanimāla (eighteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Rajahpravartini Vati (Bhaishajya Ratnāvali, sixteenth century), contains Kanyāsāra, *Ferula asafoetida*, sodium biocarbonate and ferrum sulphate in equal proportion. Prescribed for amenorrhea and dysmenorrhea.

Chukkumtipplyāda Gutika (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Bol, interpreted as Cennināyāka (Kumari) in the AFI, Part I. (See original text of Sahasrayoga, published by the Central Council for Research in Ayurveda and Siddha.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

125–500 mg of the drug in powder form

As a laxative: 0.04–0.17 g (Curacao or Barbados aloe) or 0.06–0.17 g (Cape aloe). As a dried juice, corresponding to 10–30 mg hydroxy-anthraquinones per day or 0.1 g as a single dose.¹⁰⁽¹⁾

Contraindicated in Crohn's disease, ulcerative colitis, appendicitis and inflamed intestinal diseases.⁸

Alpinia calcarata Rosc.

Granthimūla

BOTANICAL SOURCE(S)

Alpinia calcarata Rosc.
(Fam. Zingiberaceae)

Alpinia galanga Willd. is equated with Greater Galangal; *A. officinarum* (Hence) with Lesser

Galangal; and *A. speciosa* (Wendl.) K. Sehum. with Light Galangal. The API designated *A. calcarata* as the white variety of Galangal. In South India, the rhizome of *A. galanga* (Peratta) and *A. calcarata* (Aratta) are used as Rāsnā.⁵

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PHARMACOPOEIAL AYURVEDIC DRUG

Granthimūla (Rhizome).

API, Part I, Vol. VI.

A non-classical Sanskritized nomenclature.

Granthi, Granthikā, and Granthika mūla of classical Ayurveda are equated with the root of *Piper longum*.^{4,20(b)}

AYURVEDIC SYNONYMS

Śvetakulañjana.

A non-classical Sanskritized nomenclature, indicating the white-flowered var. of *Alpinia*.

A. officinarum flowers are also white.^{2(b)}

The flowers of *A. galanga* are greenish-white.^{2(b)}

HABITAT

Eastern and southern India, often cultivated.

A. officinarum: native to China; cultivated in West Bengal and Assam.

A. calcarata: cultivated in the gardens of eastern and southern India.^{2(b)}

REGIONAL LANGUAGE NAMES

Assam: Sugandhi bach;

Hindi: Safed kulanjana;

Ori: Chittaratha;

Mal: Toroni;

Tam: Nattarattai;

Tel: Dumparastramu.

Ori: Toroni,

Tam: Amkalinji,

Mai: Kattuchena,^{2(b)} Peratta.⁵

CONSTITUENTS

Volatile oil rich in methyl cinnamate, cineol, camphor.

A. calcarata: Berhampur (Odisha) and Bangalore rhizome oil contained alpha-pinene (1.9%–2.3%), camphene (4.4%–5.5%), beta-pinene

(2.0%–4.1%), 1, 8-cineole (21.2%–25.7%), camphor (2.6%–4.6%), alpha-fenchyl acetate (10.2%–29.2%), and geraniol (0%–34.3%). (In the Bangalore sample, geraniol was the major component, which was not detected in the Berhampur sample.)⁶⁰

THERAPEUTIC AND OTHER ATTRIBUTES

Amavāta (rheumatism), Hikkā (hiccup), Kāsa (cough), Prameha (metabolic disorder), Śvāsa (Asthma), Sandhiśūla (joint pain), Śūla (pain/colic). Used as single drug.

Kulanja of Rāja Nighantu (seventeenth century) was pungent and bitter; it was used for improving blood circulation and for stimulating digestive functions due to its hot (*ushna*), warming properties.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

Alpinia genus plants are pharmacologically active drugs. Their structures indicate, they are also active against 5-lipoxygenase, the enzyme involved in leukotriene biosynthesis,¹³ extracts exhibit anti-inflammatory activity and inhibit prostaglandin synthesis.³¹

The decoction of the *A. calcarata* rhizome revealed anti-inflammatory activity against carrageenin-induced rat paw edema.^{20(b)}

The ethanolic extract exhibited *in vitro* anthelmintic activity against human *Ascaris lumbricoides*.^{20(b)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 1 to 3 g.

Decoction: 50–100 mL.

The LD₅₀ of *A. galanga* extract was 1000 mg/kg i.p. in mice. In another study, it was 188 mg/kg i.p. in mice.^{20(b)}

Alpinia galanga Willd.

Kulañjana

A

BOTANICAL SOURCE(S)

Alpinia galanga Willd.
(Fam. Zingiberaceae)

Syn. *Amomum galanga* (L.) Lour.

Alpinia galanga Willd. is equated with Greater Galangal; *A. officinarum* Hence with Lesser Galangal; and *A. speciosa* (Wendl.) K. Sehum. with Light Galangal.

In South India, the rhizomes of *A. galanga* (Peraratta) and *A. calcarata* (Aratta) are used as Rāsnā.⁵

PHARMACOPEIAL AYURVEDIC DRUG

Kulañjana (Rhizome).

API, Part I, Vol. V.

Sthulagranthi of Bhāvaprakāsha (sixteenth century), Kulanja of Rāja Nighantu (fourteenth century) and Kulinjan of Nighantu Ratnākara (eighteenth century) have been equated with Malaya Vachā/*Alpinia galanga*.

Khulanjana nomenclature belongs to Unani medicine, which was used as a synonym of Sugandha Vachā. Elāparṇi and Kulanja.

AYURVEDIC SYNONYMS

Sugandhamūla, Malaya vacā, Sthūlagranthi, Mahābharī vacā, Rāsnā (South).

HABITAT

Eastern Himalayas and southwest India.

Native to Indonesia, naturalized in many parts of India. Frequently met with in sub-Himalayan regions of Bihar, West Bengal and Assam. Extensively cultivated all over India.

REGIONAL LANGUAGE NAMES

Eng: Greater galangal, Javagalangal;
Assam: Khulanjaana;
Beng: Kulanjan, Kurachi vach;
Guj: Kulinjan jaanu, Kolinjan;

Hindi: Kulanjan, Kulinjan;

Kan: Doddarasagadde, Dhoomraasmi;

Mal: Aratta, Ciffaratta;

Mar: Kulinlan, Koshta kulinjan, Mothe kolanjan;

Tam: Arattai, Sittarattai;

Tel: Dumparaastramu.

CONSTITUENTS

Essential oil, containing α -pinene, β -pinene, limonene, cineol, terpinen-4-ol and α -terpineol.

Essential oil (0.04%) gave 2-methylpropylacetate, butyl acetate, alpha-pinene, camphene, sabinene, beta-pinene, myrcene, p-cymene, 1, 8-cineole, limonene, gamma-terpinene, terpinolene, linalool, borneol, 4-terpineol, p-cymenol, alpha-terpineol, carvol I and II, chavicol, bornyl acetate tridecane, chavicol acetate, citronellyl acetate, neryl acetate, geranyl acetate, alpha copaene, methyleugenol, beta-caryophyllene, alpha-bergamotene, alpha-humulene, trans-beta-farnesene, santalene, ar-curcumen, eugenyl acetate, beta-bisabolene, pentadecane, beta-sesquiphellandrene, and caryophyllene oxide.^{25,26}

THERAPEUTIC AND OTHER ATTRIBUTES

Pratiśyāya, Śvāsa, Hikkā, Śopha, Vātaja śūla, Udararoga, Kampa, Visamajvara, Kaphajakāsa, Aśiti, Vātavyādhi, Mahākuṣṭha

Used in coryza, asthma, hiccup, edema, neuralgic pain, diseases of the abdomen, tremors, intermittent fever, bronchitis, diseases of the nervous system, leprosy and other chronic skin diseases (drug coverage based on a classical text of the fourteenth century).

Kulanja of Raja Nighantu (seventeenth century) was pungent and bitter; it was used for improving blood circulation and for stimulating digestive functions due to its hot (*ushna*), warming properties.¹⁵

Alpinia genus plants are pharmacologically active drugs. Their structures indicate that they are also active against 5-lipoxygenase, the enzyme

A

involved in leukotriene biosynthesis.¹³ Extracts exhibit anti-inflammatory activity and inhibit prostaglandin synthesis.³¹

IMPORTANT FORMULATION/ APPLICATIONS

Brāhmi Vati (not in AFI); Rāsanādi kashāya, Rāsanādarvādi kashāya, Rāsanāpanchkam, Rāsanāsaptakam, Rāsanāṣunthyādi kashāya, Rāsanāirandādi kashāya (all from Sahasrayoga, a non-Samhitā, Kerala Materia Medica).

Different plants from different genera and families are used as Rāsanā in Kerala, Andhra Pradesh, Madhya Pradesh, Bihar, Bengal, and Uttar Pradesh.

Dodonaea viscosa L. is used in Andhra Pradesh; *Alpinia galanga* is used in Siddha medicine of South India.³ (See Reference 3, page 268; Reference 16(c), page 243; and Reference 30, pages 337–338.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g powder.

Decoction: 50–100 mL.

The LD₅₀ of the essential oil was 0.068 mL/100 g in guinea pigs.^{2(b)}

The LD₅₀ of the *A. galanga* extract was 1000 mg/kg i.p. in mice. In another study, this was 188 mg/kg i.p. in mice.^{20(b)}

Alstonia scholaris (Linn.) R. Br.

Saptaparnā

BOTANICAL SOURCE(S)

Alstonia scholaris (Linn.) R. Br.
(Fam. Apocynaceae)

The genus *Alstonia* can be divided into three groups on the basis of major alkaloids: (i) the villalstonine or dimeric indole type, as in *A. villosa*, *A. macrophylla*, and *A. muelleriana*; (ii) the echitamine type, as in *A. scholaris*, *A. neriifolia*, and *A. verticillosa*; (iii) the yohimbine or yohimbine type, as in *A. venenata*.

The main alkaloid of one group does not occur in another.^{20(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Saptaparnā (Stem bark).

API, Part I, Vol. I.

A higher value for echitamine (as hydrochloride 0.5%) has been reported from a sample of Shimoga (Karnataka).^{2(b)}

AYURVEDIC SYNONYMS

Saptacchada, Saptaparnī, Saptāhvā.

Guchhapuspa, Chhatrī.⁴

HABITAT

Sub-Himalayan tracts ascending to 900 m from Jammu eastwards and western peninsula, in deciduous forests.

Alstonia: Indomalesia to Australia.¹

Alstonia constricta: Fever Bark,¹³ known as Australian quinine, is used in the Far East for malaria. It contains indole alkaloids including yohimbine, reserpine, alstonine, and alstonidine.¹⁴

REGIONAL LANGUAGE NAMES

Eng: Dita;

Assam: Chatiyan;

Beng: Chatin;

Guj: Saptaparna, Satvana;

Hindi: Chhativan, Satawana;

Kan: Maddale, Hale, Eleyalaga;

Mal: Daivaphal, Ezilampala;

Mar: Satveen;

Ori: Chhatiana, Chatiana;

Punj: Sathi, Satanna;

Tam: Ezilampalai;

Tel: Edakula ponna.

Eng: Devil's Tree.²⁰

CONSTITUENTS

Alkaloids (echitamine, ditamine and echitamidine).

The total alkaloid content in the Indian bark is reported to be 0.16%–0.27%, with echitamine as hydrochloride (0.08%–0.10%) being the chief constituent, and echitamidine, akuammidine, and ditamine being present in small quantities.

The non-alkaloid constituents of the stem bark include alpha-amyrin and its acetate (0.8%) and lupeol acetate (0.7%) on an air-drying basis.^{2(b),20(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śūla, Gulma, Kṛmiroga, Kusṣṭha, Jvara, Sāndrameha

Used in colic, abdominal lumps, worm infestations, leprosy, fever, and phosphaturia (therapeutic uses based on texts from the thirteenth to the sixteenth centuries).

Experimentally, echitamine chloride obtained from bark showed anti-malarial activity in a rodent test system infected with *Plasmodium berghei*, while the petroleum ether and methanol extract of the bark (from Jammu and Kolkata) were found to be devoid of anti-malarial activity.

“Ayush 64” was found to be effective in 94.5% of patients (CCRAS).

IMPORTANT FORMULATION/ APPLICATIONS

Āragvadhādi Kwāth Churna (Ashtāngahridaya, seventh century), contains Saptacchada stem bark and 20 other herbs in equal proportion. Prescribed for obstinate skin diseases and in toxic conditions.

Amritārishta (Bhaishajya Ratnāvali, seventeenth century) contains 11 main herbs. Saptacchada is among the supportive herbs that are added after fermentation. It is prescribed as an anti-periodic.

Vajraka Taila (Ashtāngahridaya), processed in cow’s urine, contains Saptāhvā stem bark with 19 herbs, all in equal proportions. It is prescribed topically for infected ulcers, leprosy, and obstinate skin diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–30 g of the drug for decoction.

“Ayush 64” (CCRAS patent) is an anti-malarial and anti-filarial composite drug: it is administered as four tablets (500 mg each) thrice daily, for 5–7 days; for children (5–12 years), it is administered as two tablets (500 mg each) thrice daily, for 5–7 days. (The 500-mg capsule contains aqueous extracts of *A. scholaris* bark, *Picrorhiza kurroa* root, *Swertia chirata* whole plant (100 mg each), and *Caesalpinia crista* seed powder 200 mg.)

Alternanthera sessilis (Linn.) R. Br.

Matsyākṣī

BOTANICAL SOURCE(S)

Alternanthera sessilis (Linn.) R. Br.

Syn. *A. triandra* Lam.,

A. denticulata R. Br., *A. nodiflora* R. Br.,

A. repens Gmel. non Link.

(Fam. Amaranthaceae)

In different parts of Kerala, *A. sessilis*, *Ginus oppositifolius* and *Portulaca oleracea* are used as Lonikā.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Matsyākṣī (Whole plant).

API, Part I, Vol. II.

Matsyākshaka of Bhāvaprakāsha (sixteenth century) is equated with *A. sessilis*,^{3,27,30} as well as with *Enhydra fluctuans* Lour.³⁰

Pattūra, Brāhmi, Aindri and Indrāni have been wrongly suggested as synonyms of Matsyākshaka.³

AYURVEDIC SYNONYMS

Matsyagandhā, Bahli, Matsyāduni, Gandālī, Gartkalambukā.

Matsyākṣī and Matsyākshaka are different drugs.³⁰

HABITAT

Throughout the warmer parts of India, frequently found in wet places especially around tanks and ponds.

It is cultivated as a pot herb. The leaves are used like spinach.^{2(b)}

REGIONAL LANGUAGE NAMES

Beng: Sanchesak, Salincha sak;

Guj: Jalajambo;

Hindi: Gudari sag;

Kan: Honagonne soppu;

Mal: Ponnankanni, Kozuppa;

Mar: Kanchari;

Ori: Matsagandha, Salincha saaga;

Tam: Ponnangkanni;

Tel: Ponnaganti koora.

CONSTITUENTS

Sugar, Saponins and Sterols.

Glucose and rhamnose as sugar moieties and a saponin having oleanolic acid as aglycone.^{2(c)}

The plant was reported to yield nonacosane, 16-hentriacontane, beta-sitosterol, stigmasterol, and handianol.^{20(b)} The leaves gave 3 beta-O-(beta-D-glucopyranosyluronic acid)-28-O-beta-D-glycopyranosyl oleanolic acid and a flavone glycoside, robinetin-7-O-beta-D-glucopyranoside.

The leaves also contain significant amounts of alpha- and beta-tocopherols.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Raktavikāra, Pittavikara

Used in leprosy and other obstinate skin diseases, blood disorders, and cholerrhagia (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) used the entire plant in prescriptions for promoting memory and intelligence, and externally for complexion. Bhavaprakasha (sixteenth century) attributed blood-purifying properties to the herb. It was used as a styptic in ulcerative colitis and for treating infected wounds.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Traikantaka Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), a herbomineral drug, contains Trikantaka as the main herb, Matsyakshi plant as one of the 18 supporting herbs with Shilajatu (gypsum). Prescribed for dysuria and other urinary disorders including urinary calculus.

Trikantaka has been provisionally equated with *Acanthospermum hispidam*³⁰ or *Martynia diandra*.³

Trikantaka and Gokshuraka were used in different compounds from 1000 BC to 1600 AD (Bhavaprakāsha period). Trikantaka (having three spines) and Gokshuraka (having four to five spines) were not identical.

Trikantaka belonged to the “Five thorn-bearing herbs” of Ayurveda (*Pancha Kantaka*).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–3 g of the drug in powder form.

The LD₅₀ of the plant's ethanolic extract was found to be 500 mg/kg i.p. in mice.^{20(b)}

Althaea officinalis Linn.**Root****Khatmī****A****BOTANICAL SOURCE(S)**

Althaea officinalis Linn.
(Fam. Malvaceae)

Though Unani physicians prefer the imported root, *Alcea rosea* Linn., syn. *Althaea rosea* (L.) Cav. is often used as a substitute of *Althaea officinalis*.

Mainly the roots (*Althaea radix*), but also the leaves (*Althaea folium*) and flowers (*Althaea flos*) are used in herbal medicine.¹²

PHARMACOPOEIAL AYURVEDIC DRUG

Khatmī (Root).

API, Part I, Vol. V.

International Pharmacopoeial name: *Althaeae radix*.

AYURVEDIC SYNONYMS

Non-Ayurvedic synonyms: Althea (USA); Khairi (Arab countries); Marsh mallow (Russia, Bolivia, Poland); Malva blanca (France).¹²⁽²⁾

HABITAT

Occuring in Kashmir region.

Native to the British Isles.¹²⁽¹²⁾ A perennial that grows in salt marshes and moist regions throughout Europe, western and northern Asia and the eastern U.S.¹⁷

In northern Himalayan regions, it was introduced in Manali at an altitude of 2000 m.^{20(b)}

A. rosea, a native to China, is commonly cultivated in Indian gardens. It resembles *A. officinalis*. All parts contain mucilage.^{2(b),20(b)}

REGIONAL LANGUAGE NAMES

Eng: Marsh mallow;
Hindi: Khatmi;
Mar: Khatmi;
Tam: Khatmi;

Tel: Khatmi;

Urdu: Aslua khitmi, Reshah-e-Khatmi, Bardul khatmi.¹²⁽²⁾

CONSTITUENTS

Galacturonic acid, galactose, glucose, xylose & rhamnose, polysaccharide althaea mucilage-O, asparagine, betaine, lecithin and phytosterol, polysaccharides.

Mucilage is at about 11% in winter, reducing to 6% in mid-summer, and it consists of polysaccharides composed of L-rhamnose, D-galactose, E-galacturonic acid, and D-glucuronic acid, as well as an arabinin. Flavonoids (ca. 0.2%) are present as aglycones. Phenolic acids are present in small amounts. Coumarin scopoletin is present. Starch (37%), pectin (11%), fat (1.7%), asparagine (up to 2%), and tannins are present.^{11,17,24}

THERAPEUTIC AND OTHER ATTRIBUTES

Kāsa, Pratiśyāya, Mūtradāha, Mūtrāśayaśoṭha, Kaṇṭharoga, Mūtrakṛcchra, Āntrāśoṭha, Dāha, Raktapitta

Used in cough, coryza, urethralgia, ureteritis, dysuria, diseases of throat, colitis, burning syndrome, and bleeding disorders (uses based on a Sanskrit *shloka* composed by a contemporary scholar to facilitate the entry of a Unani drug into Ayurveda).

Gojihvādi Kwāth Churna (quoted in the API) is a post-classical period compound introduced by a contemporary Ayurvedic scholar for inducting Unani herbs into Ayurveda. Unani herbs include Gozabān, Unnāb, Zuphā, Khubakālān, Sapistān, Gulebanafshā and Khātmi (AFI, Part II).

IMPORTANT FORMULATION/ APPLICATIONS

In Unani medicine, the root of Khatmi is given in inflammations and irritation of alimentary

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canal and of the respiratory and urinary organs. As a decoction, the root is found helpful where the natural mucus membrane is abraded. The decoction of root in linctus base is used as an expectorant, especially for whooping cough.¹⁸
The root is also used as an emollient enema. The drug originally belonged to Greek and Arabian medicine.⁹

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g.

For dry cough or pharyngeal irritation: 0.5–3 g of drug as a cold macerate or 2–8 mL of syrup.
For gastro-intestinal irritation: 3–5 g as an aqueous cold macerate, up to three times daily.^{11(a)}
For Kwāth Churna, if boiled, the root will lose its potency. It can only withstand temperatures of 40–60°C.^{11(a)}

<i>Althaea officinalis</i> Linn.	Seed	Khatmī
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BOTANICAL SOURCE(S)

Althaea officinalis Linn.
(Fam. Malvaceae)

Althaea rosea (L.) Cav. is often used as a substitute of *Althaea officinalis*.
Mainly the roots (*Althaea radix*), but also the leaves (*Althaea folium*) and flowers (*Althaea flos*) are used in herbal medicine.¹² The seeds are used only for self-medication.

PHARMACOPOEIAL AYURVEDIC DRUG

Khatmī (Seed).

API, Part I, Vol. V.
The seeds are dark brown, glabrous, kidney shaped, and somewhat compressed.

AYURVEDIC SYNONYMS

Non-Ayurvedic synonyms: Althea, Wymote (USA); Khairi (Arab countries); Marshmallow (Russia, Bolivia, Poland); Malva blanca (France).¹²⁽²⁾

HABITAT

Occuring in Kashmir region.

Native to the British Isles.¹²⁽¹²⁾ A perennial that grows in salt marshes and moist regions

throughout Europe, western and northern Asia, and the eastern U.S.¹⁷

In northern Himalayan regions, it was introduced in Manali at an altitude of 2000 m.^{20(b)}

A. rosea, a native to China, is commonly cultivated in Indian gardens. It resembles *A. officinalis*. All parts contain mucilage.^{2(b),20(b)}

REGIONAL LANGUAGE NAMES

Eng: Marsh mallow;
Hindi: Khatmi bija;
Mar: Khatmi;
Tam: Khatmi;
Tel: Khatmi;
Urdu: Bajrul Khitmi, Tukhma-e-Khatmi.

CONSTITUENTS

Glucose, sucrose, galactose and mannose; linoleic acid; isobutylalcohol, limonene, phellandrene, γ-toluerldehyde, citral, terpenol, β-sitosterol.

The seeds contain a fatty oil (15.3%) composed of oleic acid 30.8%, linoleic acid 52.9%, linolenic acid 2.5%, palmitic acid 9.7%, and stearic acid 9.7%.^{2(b)}

Fatty acid fractions of seeds were found to dominate in linoleic and petroselinic acids. The presence of dibutyl phthalate and 4-morpholino butylamine has also been reported.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Pratiśyāya, Kāsa, Mūtrakṛcchra, Mūtradāha, Kaṇtharoga

Used in coryza, cough, dysuria, urethralgia, and diseases of throat (uses based on the same Sanskrit *shloka* that was quoted for the root).
See comments on the Khatmi root.

IMPORTANT FORMULATION/ APPLICATIONS

Application in Unani medicine: Seeds are an ingredient in Bayaz-e-Kabir's compound,

Laoq Nazli, prescribed for removing phlegm from lungs; in Laoq-e-Sual (Qarabadeen-e-Jadeed), prescribed for dry cough and other inflammatory conditions of the air passage. The seeds have also been incorporated in Marham-e-Dakhyleyun (Qarabadeen-e-Jadeed) and used for anal fissures, chronic ulcers in and around anus and in vulvovaginitis.¹⁸

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Unani confections: 10–15 g.

Amaranthus tricolor Linn.

Rāmaśitalikā

BOTANICAL SOURCE(S)

Amaranthus tricolor Linn.

Syn. *A. gangeticus* Linn.

A. melancholicus Linn.

A. polygamus Linn. Hook. f.

A. tristis Linn. (Fam; Amaranthaceae).

PHARMACOPOEIAL AYURVEDIC DRUG

Rāmaśitalikā (whole plant).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Māriṣa rakta, Ārāmaśitalikā.

Rakta-Mārsha, Ārāma shitalā (based on API quoted text).

HABITAT

Annual herb, found throughout India.

Cultivated as annuals all over India throughout the year. Many forms differ in shape and color, being green, red or white. The variegated forms are cultivated in gardens as ornaments.

“Joseph’s Coat” possesses rich scarlet foliage, “Weeping willow-leaved” Amaranth carmine, “Chameleon” bronze and “Fountain” orange.

REGIONAL LANGUAGE NAMES

Beng: Lal shak;

Guj: Tandalijo (lal);

Hindi: Lal marsa;

Kan: Dantu, Harave soppu, Dantina soppu, Chikkarive;

Mal: Aramaseetalam;

Mar: Mash;

Punj: Lal marsa sag;

Tam: Mulaikkeerai;

Tel: Erra tatakura.

Eng: Chinese spinach, Fountain plant, Garden Amaranth, Weeping-willow Amaranth.

Hindi: Chaulai, Chumli saag, Laalnaliya, Laal saag.

CONSTITUENTS

Fatty oils, Sitosterol, Calcium and Magnesium.

Seeds contain fat 2.8%–5.1%, palmitic acid 10.9%–24.2%, stearic acid 0.1%–3.1%, oleic acid 22.8%–38.3%, and linoleic acid 45.6%–51.6%.

A

Five sterols have been isolated from the stem, leaves and seeds, with spinasterol being in the highest amounts.

24-methylene-cyclo-artenol has been reported only from the seeds.

The leaves contain the pigments betacyanin A and B, *n*-alkanols, a strong antibacterial 16-hentriacontanone and sterols. The leaves contain arsenic 0.6 mg/g on a dry basis; they also contain quercetin.^{2(b,c,d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Śoṣa, Visphoṭa, Vraṇa

Used in burning syndrome, cachexia, blisterous eruptions, and ulcers (therapeutic uses based on texts from the fourteenth to the sixteenth centuries).

The plant is used in cough and bronchitis, as a blood purifier, as a tonic in dropsy and as an astringent in menorrhagia, diarrhea, and dysentery. The decoction of the herb is a diuretic.

The roots are used against colic, gonorrhoea, and eczema. The roots or seeds are given in leucorrhea.

The leaves are used for intestinal and urinary discharges.^{2(b),20(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Chandrakalā Rasa (Yogarātnākara, sixteenth century), a mineral drug, contains purified mercury, sulphur, calcined copper and mica, processed with 18 plants including *A. tricolor*, following the classical procedure. Specific for dysuria, high fever, acute illness.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 ml of the drug in juice form.

The green leafy vegetable of *A. tricolor* is a pro-vitamin A source. 30 g/day provides 100 µg beta-carotene/day.^{20(b)}

Amomum subulatum Roxb.

Sthūlailā

BOTANICAL SOURCE(S)

Amomum subulatum Roxb.
(Fam. Zingiberaceae)

In Kerala, fruits of *Peucedanum grande* C.B. Clarke are used as Sthūlailā.³

PHARMACOPEIAL AYURVEDIC DRUG

Sthūlailā (Seed).

API, Part I, Vol. II.

Four varieties are sold in the Indian market:

“Sawney,” “Pink-Golsey,” “Ramanag” and “Ramsey.”^{2(c)}

Fruits of *A. aromaticum* Roxb. are sold as “Morang elaichi.” In South India, larger-sized capsules of *Elettaria cardamomum* are sold as “Hyderabad elaiichi.”³⁶

AYURVEDIC SYNONYMS

Bhadrā, Bhadrailā.

Triputā,³⁶ Elā-mahatī,³ Kanyā, Tridivodbhavā.⁴

HABITAT

Cultivated in swampy places along the sides of mountain streams in Bengal and Assam.

Maximum production is in Sikkim, followed by the sub-Himalayan region of West Bengal, Assam, Nepal, and Bhutan. It is also cultivated in Thailand, Indonesia, and Laos.

REGIONAL LANGUAGE NAMES

Eng: Greater or Nepal cardamom;

Beng: Baara aliach;

Guj: Elaicho, Mothi elichi;

Hindi: Bari elachi;

Kan: Dodda yalakki, Nepdi elakki;
 Mal: Valiya elam, Perelam;
 Mar: Mothi elayachi;
 Ori: Bada aleicha, Aleicha;
 Punj: Budi eleichi;
 Tam: Periya elam, Beraelam, Kattu elam;
 Tel: Pedda elakulu;
 Urdu: badi elaichi, Heel kalan.

Eng: Larger cardamom.

CONSTITUENTS

Volatile oil (rich in Cineole).

The volatile oil 1.66%–2.44%. The principal constituent is cineol 64.94%–74%; other constituents include alpha-pinene 2.0%; beta-pinene 2.4%; sabinene 0.2%; myrcene 0.3%; alpha-terpinene 0.2%; limonene 10.3%; *p*-cymene 0.2%; terpinen-4-ol 2.0%; and nerolidol 1.0%. The seeds contain chalone (cardamonin), flavone (alpinetin), the glycosides petunidin 3,5-diglycoside and leucocyanidin-3-O-beta-D-glycopyranoside and an aurone glycoside subulin.^{2(b,c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śvāsa, Kāsa, Trṣṇa, Chardi, Mukharoga, Hṛllāsa, Kaṇḍu

Used in dyspnea, cough, thirst, vomiting, diseases of the mouth, nausea, and itching (therapeutic uses based on classical texts from 1000 BC to sixteenth century).

Hareṇukā of Ashtāngahridaya (seventh century) has been equated with Bhadra elā or Bṛhata elā.^{16(a),3}

Sushruta (1000 BC) used Hareṇukā for intestinal mucus, anorexia, colic pain, catarrh, and internal tumors. Elā was also used for all of these ailments.²⁸

Charaka used Elā for rhinitis, hemicrania and pleural afflictions.²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Sārivādyāsava (Bhaishajya Ratnāvali, seventeenth century), contains both varieties of cardamom with 21 herbs. Prescribed as a blood purifier. Greater cardamom is included in all of the following quoted drugs as a supporting herb: Karpurādyārka (Arkprakāsha) contains 50 ingredients.

Kalyāna Ghrita (Ashtāngahridaya, seventh century) contains 27 herbs.

Vastyamayāntaka Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains 56 herbs.

Manasmitra Vataka (Sahasrayoga) contains 72 herbs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

0.5–1 g of the drug in powder form.

As decoction: 3–6 g.¹⁴

Overdose of the essential oil can lead to poisoning.¹⁴

Cardamom seeds can trigger gallstone colic (spasmodic pain).¹³

Amomum subulatum Roxb.

Fruit

Sthūlailā

BOTANICAL SOURCE(S)

Amomum subulatum Roxb.
 (Fam. Zingiberaceae)

In Kerala, fruits of *Peucedanum grande* C.B. Clarke are used as Sthūlailā.³

PHARMACOPOEIAL AYURVEDIC DRUG

Sthūlailā (Fruit).

API, Part I, Vol. VI.

Four varieties are sold in the Indian market:

“Sawney,” “Pink-Golsey,” “Ramanag” and “Ramsey”.^{2(c)}

A

Fruits of *A. aromaticum* Roxb. are sold as “Morang elaichi.” In South India, larger-sized capsules of *Elettaria cardamomum* are sold as “Hyderabadi elaichi.”³⁶

AYURVEDIC SYNONYMS

Br̥hadelā, Br̥hat elā, Bhadrailā.

Triputā,³⁶ Elā-mahati,³ Kanyā, Tridivodbhavā.⁴

HABITAT

West Bengal, Sikkim and Assam hills.

Maximum production is in Sikkim, followed by the sub-Himalayan region of West Bengal and Assam.

Nepal, Bhutan, Thailand, Indonesia, and Laos also grow this on a commercial scale.

REGIONAL LANGUAGE NAMES

Eng: The greater cardamom;

Ben: Bara elachi, Baara aliachi, Bad elaach;

Guj: Mothi elichi, Moto-elachi;

Hindi: Baraa-elaachi, Badi ilaayachi;

Kan: Dodda yalakki;

Mal: Valiya elam, Perelam, Peri-elav;

Mar: Mothe elaayachi, Moteveldode;

Ori: Badaa alaicha, Alaicha;

Pun: Budi eleichi; Tam: Periya elam;

Tel: Peddayelaki, Pedda elakulu;

Urdu: Ilaayachi badi, Heel kalan.

Eng: Larger cardamom.

CONSTITUENTS

Volatile oil predominantly containing cineol with other constituents such as α -pinene, β -pinene, sabinene, myrcene, α -terpinene, β -terpinene, limonene, *p*-cymene, terpinenol, α -terpineol, δ -terpineol and nerolidol.

Constituents are of the seed essential oil. See Reference 2(b).

Fruit constituents include protocathechualdehyde, protocatechuic acid, 1,7-bis (3,4-dihydroxyphenyl) hepta-4E,

6E-dien-3-one and 2,3,7-trihydroxy-5-(3,4-dihydroxy-E-styryl)-6,7,8,9-tetrahydro-5H-benzocycloheptane.²⁵⁶ Methanol and acetone extracts of the powdered fruit were found to contain 1.04846% and 0.8634% w/w of protocatechuic acid, respectively. The extracts showed the presence of carbohydrates, flavonoids, amino acids, steroids, triterpenoids, glycosides, tannins, and phenolics.²⁵⁷ In one screening, alkaloids and phenolics were found to be absent in the pericarp of the fruit.^{20(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aruci (tastelessness), Bastivikāra (bladder disorders), Chardi (emesis), Dantaroga (disease of tooth), Hṛllāsa (nausea), Kaṇḍū (itching), Kaṇṭharoga (disease of throat), Kāsa (cough), Mukharoga (disease of mouth), Raktapitta (bleeding disorder), Raktavikāra (disorders of blood), Śīrōroga (disease of head), Śūla (pain/colic), Śvāsa (Asthma), Tṛṣā (thirst), Tvakroga (skin diseases), Viṣavikāra (disorders due to poison), Vraṇa (uncle).

Used as single drug.

Therapeutic uses are based on texts from the thirteenth to the sixteenth centuries. Most of the attributes need revalidation.

IMPORTANT FORMULATION/ APPLICATIONS

The pericarp is used for headache and stomatitis.^{2(b),20(b)}

Instead of whole fruit, the seeds are used. The seed was already included in API, Vol. II.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 1 to 3 g.

Dried fruits should contain not less than 1% volatile oil and not more than 8% total ash and 3% acid-insoluble ash.^{2(b)}

Amorphophallus campanulatus (Roxb.) Blume.

Sūraṇa

BOTANICAL SOURCE(S)

Amorphophallus campanulatus (Roxb.) Blume.
(Fam. Araceae)

Syn: *A. paeoniifolius* (Dennst.) Nicolson.^{20(b)}

Cultivated form: *A. paeoniifolius* var. *campanulatus* (Decne) Sivad.⁵ Wild form: *A. paeoniifolius* var. *paeoniifolius* (Dennst.) Nicolson.⁵

A. dubius Blume, allied to *A. campanulatus* of Kerala, is probably used in indigenous medicine.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Sūraṇa (Corm).

API, Part I, Vol. III.

Though corm is the main drug, the root is applied to boils and prescribed as an emmenagogue. The fermented juice of petiole is used to treat diarrhea. A paste of the seeds is applied on rheumatic swellings.^{20(b)}

AYURVEDIC SYNONYMS

Arśoghna, Kandala.

Kandūla, Kand-ayak.⁷ Gudāmayaharā.¹⁸

HABITAT

Cultivated throughout the plains of India.

Native to tropical Asia.

REGIONAL LANGUAGE NAMES

Eng: Elephant foot;

Beng: Ole;

Guj: Sooran;

Hindi: Suranakanda, Zamikanda;

Kan: Suranagadde;

Mal: Chena, Kattuchena, Kattuchenai, Cena karana;

Mar: Jungli suran, Suran;

Ori: Ollaokanda, Suran;

Punj: Gimikanda;

Tam: Karunai kizhangu;

Tel: Mancai kanda durada gadda;

Urdu: Zamin-qand, Zamikand.

Eng: Elephant-foot yam.

CONSTITUENTS

Betulinic acid, beta-Sitosterol, Stigmasterol, Lupeol, Triacontane, Glucose, Galactose, Rhamnose and Xylose.

Corms contain carbohydrates 18.4%, starch 17.7%, oxalic acid 1.3%, and minerals 0.8%.

Essential amino acids are composed of arginine 11.16, histidine 1.58, leucine 5.9, isoleucine 5.0, lysine 4.44, methionine 1.04, phenylalanine 6.22, threonine 4.47, tryptophan 0.63, and valine 4.95 g/16 g Nitrogen.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa, Plihāgulma, Śwāsa, Kāsa, Āṣṭhilā

Used in piles, splenomegaly, dyspnea, cough, and enlarged prostate (therapeutic uses based on classical texts from eleventh to sixteenth centuries).

Sūraṇa corm belongs to the *Panchāgni* or *Panch-hutāshna* group of Ayurvedic herbs, specifically for piles, diseases of the liver and deranged digestion.¹⁸

The tuber starch produced a decrease in tissue cholesterol, biliary bile salts, and triglycerides in the serum; an inhibitory activity against trypsin and alpha-chymotrypsin was shown in experimental animals.^{20(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Sūraṇa vataka (Shārangadhara Samhitā, seventh century), contains Sūraṇa tuber and *Argyreia speciosa* stems as main herbs with 14 supporting herbs.

Prescribed for piles, inflammatory diseases.

Samudrādyā Churna (Bhaishajya Ratnāvali,

seventeenth century) contains the Sūraṇa tuber

with ten carminative and antispasmodic drugs. Prescribed for colic, tympanites and liver and spleen disorders.

Suranāvaloha (details not available).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–10 g of the drug in powder form.

The tuber was prescribed by Sushruta as a part of diet for treating piles, rectal polyp formations and condyloma.²⁸

Corms are to be consumed after they are washed and boiled well in tamarind water or buttermilk.^{2(b)}

Ash, recovered after Ayurvedic process of closed heating, is prescribed for hemorrhoids with salt and oil; and with butter and jaggery topically for tumors.^{16(a)}

The methanolic extract at 250 mg/kg was tolerated by mice.^{20(b)}

***Anacyclus pyrethrum* DC.**

Ākārakarabha

BOTANICAL SOURCE(S)

Anacyclus pyrethrum DC.
(Fam. Asteraceae)

Syn. *A. officinarum* Hayne.

Not to be confused with the flowering heads
of *Spilanthes acmella* Murr., known as Desi
Akarkarā.³

**PHARMACOPOEIAL AYURVEDIC
DRUG**

Ākāraḥ (Root).

API, Part I, Vol. II.

The roots have long been imported into India for medicinal use.^{2(b)}

AYURVEDIC SYNONYMS

Ākallaka.

Ākulakrit,³ Agragāhi.

HABITAT

As an annual.

Native to North Africa.

Distributed in the Mediterranean region.

Cultivated in Algeria.

Grown on an experimental basis at an elevation of 900 m at Katra (Jammu and Kashmir) from seeds imported from Algeria.^{2(b),15}

REGIONAL LANGUAGE NAMES

Eng: Pellitory;

Beng: Akarakara;

Guj: Akkalkaro, Akkalgaro;

Hindi: Akalkara;

Kan: Akkallakara, Akkallakara, Akallaka

Hommugulu, Akalakarabha;

Mal: Akkikaruka, Akravu:

Mar: Akkalakara, Akkalakada;

Ori: Akarakara;

Punj: Akarakarabh, Akarakara;

Tam: Akkaraka, Akkarakaram;

Tel: Akkalakarra;

Urdu: Aqarqarha.

Eng: Spanish Pellitory.^{2(b)}

Not to be confused with Pellitory-of-the-Wall,
equated with *Parietaria officinalis*.¹⁴

CONSTITUENTS

Volatile oil and Alkaloid (Pyrethrin).

Anacyclin, enetriylene alcohol, *N*-(2'-*P*-hydroxyphenylethyl)-deca- and tetradeca-*trans*-2, *trans*-4-dienamides, inulin, pellitorine (a mixture of isobutylamides), polyacetylenic amides, and sesamin.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Pratiśyāya, Śoṭha, Ajirna, Kāsa, Śvāsa, Grdhrasī, Pakṣāghāta, Udararoga, Naṣṭārtava, Śūlaroga, Dantaśūla

Used in rhinitis, edema, indigestion, cough, dyspnea, sciatica, paralysis, diseases of the abdomen, amenorrhea, colic and toothache (therapeutic uses based on texts from the fourth to the sixteenth centuries).

Ascribed uses: in folk medicine, the root is used in epilepsy and insanity. It is also given in paralysis, hemiplegia, and rheumatism.^{20(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Kumāryāsava (Sharangadhara Samhita, seventh century), contains Aloe vera juice and calcined iron as main drugs with 42 supporting drugs including Akallaka, all in equal

proportion. Prescribed for enlargement of liver, spleen and anemia.

Kasturyādi Gutika (Sahasrayoga, a non-Samhita, Kerala Materia Medica) contains deer musk, the glands of civet cats and 39 herbo-mineral drugs, including Agragrāhi. It is available only in South India. It is prescribed as a cardiac stimulant.

Nāgavallabha Rasa (Yogarātnakara, sixteenth century) contains deer musk and ten herbo-mineral drugs, including Ākārakarabha root. It is prescribed for phthisis, neurological diseases and polyuria.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

0.5–1 g. of the drug in powder form.

Decoction of root: used as a gargle in sore throat, carious teeth and tonsillitis.¹⁵

The powdered root in larger doses is an irritant to the mucous membrane.^{2(b)}

The LD₅₀ for the aqueous extract of the root was found to be 750 mg/kg i.p. in mice.^{20(b)}

Anethum sowa Roxb. ex Flem.

Śatāhvā

BOTANICAL SOURCE(S)

Anethum sowa Roxb. ex Flem.
Syn. *A. graveolens* Linn. var. *sowa* Roxb., *A. graveolens* DC., *Peucedanum sowa* Roxb., *P. graveolens* Benth.
(Fam. Apiaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Śatāhvā (Fruit).

API, Part I, Vol. II.

In classical texts, two Śatāhvā (Śatpushpā and Madhurikā) have been mentioned. Śatpushpā is now equated with Sowa and Madhurikā with *Foeniculum vulgare* Mill.^{16(b)}

International pharmaceutical name: *Anethi fructus* (dill seeds).

AYURVEDIC SYNONYMS

Śatapuṣpā.

HABITAT

Throughout tropical and subtropical region of India, and cultivated.

Anethum genus is found in Europe, North America and West Asia.

A. graveolens Linn. is native to Mediterranean Europe. *A. sowa* Roxb. ex. Flem. (Indian dill, Sowa) is found in cooler climates throughout the Indian subcontinent. It is considered synonymous with *A. graveolens* Linn.^{2(b)}

A

REGIONAL LANGUAGE NAMES

(Dill)

Eng: Indian dil fruit;

Beng: Suva, Sulpha, Shulupa, Sowa;

Guj: Suva;

Hindi: Soya, Sova;

Kan: Sabasige;

Mar: Badishep, Shepa, Shepu;

Punj: Soya;

Tam: Satakuppa;

Tel: Sadapa;

Urdu: Shibt, Soya.

CONSTITUENTS

Essential oil.

There is a wide variation in the seed essential oils of different regions: carvone is a major constituent (19.5%–69.7%); dihydrocarvone (7.2%–14.3%); limonene (9.0%–34.4%); apiol (5.7%–15.6%); alpha-pinene (5.0%–7.3%); and alpha-terpene (3.6%–7.3%). Less variation is found in eugenol (3%), thymol (2.4%) and caryophyllene (3.6%).^{2(b),15,24}

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Netra roga, Vraṇa, Śūla, Atisāra

Used in fever, ophthalmic diseases, ulcer, colic and acute diarrhea (therapeutic uses based on classical texts from the twelfth to the sixteenth centuries).

Helps relax smooth muscles of the digestive tract and acts as an anti-flatulent. In prescriptions, helps prevent infections from diarrhea.¹⁸

Acts as a diuretic, emmenagogue, and galactagogue.¹⁵

Experimentally, it has been shown to inhibit *E. coli*.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Brihat Phala Ghrita (Shārangadhara Samhitā, thirteenth century), contains 33 herbs, all in equal proportion. Prescribed as a uterine tonic, for promoting fertility.

Gorochanādi Vati (Vaidya Yogaratnāvali, 1953) contains 50 ingredients, with 28 being of animal and mineral origin.

Obsolete drug for toxemic states during high fever. Nārāyana Churna (Ashtāngahridaya, seventh century) contains 5 salts and 28 carminative and digestive herbs, all in equal proportions. It is prescribed for diseases of the digestive system.

Saḍabindu Taila (Bhaishajya Ratnāvali, seventeenth century) contains *Eclipta alba* juice as the main herb, with nine supportive herbs in equal proportions. It is used in a nasal drop form in frontal congestion.

Shatpushpā is a supporting herb in all of these drugs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

The toxic constituent dill-apiol was as high as 30% in a Jammu sample.^{2(b)} The total toxic constituents in a Haldwani sample (myristicin, apiol and dill-apiol) were 15.3%.^{2(b)}

The vizag fruit variety from Andhra Pradesh is dill-apiol free, with a 54%–56% carvone content.⁷

Angelica archangelica* Linn.*Caṇḍā****BOTANICAL SOURCE(S)***Angelica archangelica* Linn.

(Fam. Apiaceae)

Syn. *Archangelica officinalis* (Moench) Hoofm,
A. officinalis var. *himalaica* Clarke.^{20(b)}

In Kerala, *Costus speciosus* (Koenig) Smith is considered to be the exclusive source of Caṇḍā.⁵

Kampferia galanga Linn. is used as Choraka.³

PHARMACOPOEIAL AYURVEDIC DRUG

Caṇḍā (Dried root).

API, Part I, Vol. V.

International Pharmacopoeial name: *Angelicae radix*.^{11(b)}

AYURVEDIC SYNONYMS

Laghu coraka.

Chañḍāma-shuka.³

Choraka is equated with *Angelica glauca* Edgew.^{16(b),30} Syn. Kitava, Chandā, Duhputra, Shaṁkana, Ripu,⁴ Kshemaka.^{16(c)}

HABITAT

Wild in inner valleys of Himalayas viz. Kashmir, Chamba, Kullu, Pangi, Lahaul and Kinnaur at altitudes between 3200 and 4200 m.

Also reported to come from Sikkim.^{2(b)}

A. glauca: found in Kashmir, Himachal Pradesh and the hills of Uttarakhand at an altitude of 1800–3700 m. It is also reported to come from Rajasthan and Bihar.^{20(b)}

REGIONAL LANGUAGE NAMES

Hindi: Choraka bheda, Dudhachoraa.

Eng: Angel's wort.¹⁴

CONSTITUENTS

Essential oil: containing limonene, α -phellandrene, pinene, p-cymene, terpinolene, myrcene, fenchone, linalool, α -terpineol, cadinene, borneol, β -caryophyllene, bisabolol, angelica lactone, and other mono and sesquiterpenes. Other constituents include selimone, archangelin, and oxypeucedanin.

The root from Kashmir gave 0.1%–0.37% essential oils, contained mainly alpha-phellandrene.^{2(b)}

The root from Northwestern region of the Himalayas contained mainly beta-caryophyllene.^{20(b)} Furocoumarins include archangelin 0.2%, oxypeucedanin hydrate 0.15%, ostruthol 0.2%, osthol; isocoumarin, angelicain, a flavone archagelenone and diprenyl mannginin are also present.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śoṭha, Śvāsa, Apasmāra, Hikkā, Arśa, Kaṇḍu, Pidakā, Kotha

Used in inflammation, asthma, epilepsy, hiccup, piles, itch, and carbuncle urticaria (therapeutic uses based on classical texts from 1000 BC).

Shshruta prescribed Chaṇḍā internally in skin eruptions and vitiated blood.²⁸

Charaka prescribed the root of Choraka in prescriptions for headache, insanity, epilepsy, coryza, hiccup, and bronchial asthma.^{16(a)}

Sushruta included Choraka among a group of herbs as antidotes to poisons.

Vagabhata (sixth to seventh centuries) included in Elādi group, which alleviates allergic conditions.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Manjishṭhādi Taila (Sahasrayoga), a composite herbal drug in oil base, contains Aloe vera juice with 28 supporting herbs (excluding deer musk), in equal proportion. In place of “Choraka-dwya” (both spp. of Choraka) of the original text, AFI included only Chaṇḍā. Prescribed as a massage oil in migraine, cluster headache, diseases of the eye and neurological problems.

Angelica is used for dyspepsia, flatulence and anorexia, and is used topically for neuralgia, rheumatism, and skin diseases.

Research suggests it might protect the liver from chronic alcohol toxicity.^{61,13}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

Most of the coumarins have shown significant calcium antagonistic activity *in vitro*.¹³ Furanocoumarin can be photosensitizing.¹³

Poisoning has been recorded with high doses of angelica oils.¹⁷

It is contraindicated in bleeding disorders.

A *Angelica glauca* Edgw.**Corakah****BOTANICAL SOURCE(S)**

Angelica glauca Edgw.
(Fam. Apiaceae)

Costus speciosus (Koenig) Smith is used in Kerala for Chaṇḍā and Choraka (the white and yellow varieties).⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Corakah (Root & Root stock).

API, Part I, Vol. V.

The root and root stock of both *Angelica species* (*A. glauca* and *A. archangelica*) are sold in drug markets as Choraka.²⁰

AYURVEDIC SYNONYMS

Taskarah, Ksemakah.

Synonyms of the sixteenth century: Choraka, Chaṇḍā, Kitava, Duḥputra, Śaṃkana and Ripu.⁴ In *Elādigana*, in the drug group specific for itch, pimples, and urticarial rashes, both Choraka and Chaṇḍā, as two drugs, have been included.⁴

HABITAT

Temperate north-west Himalayas.

Kashmir, Himachal Pradesh and hills of Uttarakhand at an altitude of 1800–3700 m.

It is also reported to come from Rajasthan and Bihar.²⁰

It was introduced into Lal Bagh Botanical Garden, Bangalore.^{2(b)}

REGIONAL LANGUAGE NAMES

Beng: Chorak;

Guj: Chorak;

Hindi: Choraā, Gandrayan, Rikha choraā;

Kan: Choraka;

Mal: Choraka pullu;

Mar: Corak;

Punj: Choraā, Churaa;

Tel: Gaddi davanamu.

Eng: Angelica.

CONSTITUENTS

Oxypeucedanin, 3-butyldiene phthalide, 3-butyldiene dihydrophthalide [(E- and (Z)-ligustilide] and dimers of butyl phthalides [angiolide, angelicolide].

The essential oil from the roots (0.4%) gave 68 constituents, making up 92% of the oil; beta-phellandrene (15.29%) and (Z)-ligustilide (31.55%) were major constituents,^{2(d)} and there was also 3-valerylphthalide, beta-caryophyllene oxide, methyl pentadecanoate and alpha-cadinol.

A furocoumarin, 2"-O-acetyl oxypeucedanin hydrate, along with archangelin and oxypeucedinin, was also isolated.^{20(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kaṇḍu, Pitikā, Koṭha, Kuṣṭha, Jvara, Viṣaroga, Vṛana, Raktadoṣa, Agnimāndya, Śirah śula, Unmāda, Apasmāra, Hikkā, Śvasa, Pratiśyāya, Śitajvara, Balaroga

Used in itch, boils, urticaria, obstinate skin diseases including leprosy, fever, toxic conditions, vitiated blood, digestive impairment, headache, insanity, epilepsy, hiccup, asthma, coryza, eruptive fever, and diseases of children (therapeutic uses based on classical texts from 1000 BC to sixteenth century).

See *A. archangelica*. The therapeutic uses of *A. glauca* were similar to those of *A. archangelica*.^{20(b),16(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Gudūchyādi modaka (Yogarātnākara, sixteenth century), a sweet preparation, contains *Tinospora cordifolia* stem as main drug with 27 supporting herbs including Choraka root, all in equal proportion, 4 minerals and calcined metals.

Prescribed as a tonic in phthisis, dysuria, venereal diseases, and bleeding disorders.

Balāshvagandhālakshādi Taila (Bhaisajya Ratnāvali, seventeenth century) contains Choraka as one of the 16 supporting herbs. It is a massage oil for neuritis, emaciation and fever. Mahānārayana Taila (Bhaishajya Ratnāvali) contains 14 main herbs. Choraka is among 40 supporting herbs. It is a massage oil in paralysis, neurological disorders and arthritis.

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g.

In folk medicine, the powdered root is given with warm water in stomach ailments of children, as well as to prevent vomiting.^{20(b)}

Anisomeles malabarica (L.) R. Br. ex Sims

Sprṅkā

BOTANICAL SOURCE(S)

Anisomeles malabarica (L.) R. Br. ex Sims
(Fam. Lamiaceae)

In practice, in Kerala, *Adenosma indiana* (Lour.) Merr. (Fam. Scrophulariaceae) is mainly used as Sprṅkā.⁵

The AFI accepted *Anisomeles malabarica* as the main source and *Schizachyrium exile* Stapf. and *Delphinium zalil* Aitch & Hemsl as its substitutes (AFI, Part I, p. 325).

PHARMACOPOEIAL AYURVEDIC DRUG

Sprṅkā (Whole Plant).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Sprṅk, Devī, Vadhū, Sugandhā.

Brāhmaṇi, Nirmmālyā, Kulilā.⁴

HABITAT

In the Western Ghats from Maharashtra to Karnataka, Andhra Pradesh, Kerala and Tamil Nadu.

REGIONAL LANGUAGE NAMES

Ben: Sprk, Devī, Vadhū, Sugandhā;
Guj: Karpooree, Madhuree;
Hindi: Asabarag, Asarak;

Kan: Nalehullu, Hikke;

Mar: Karpoorvallee;

Tam: Irattai peymarutti, Perundumbai.

Eng: Malabar Catmint.^{2(b)}

CONSTITUENTS

Triterpenic acid, betulinic acid, two diterpenoids viz., ovatodioid and anisomelic acid, aerial parts contain five 14 membered macrocyclic diterpenes namely anisomelode, β-sitosterol, malabaric acid, 2-acetoxymalabaric acid, anisomelyl acetate and anisoelol; a terpenoid, anisomelin and a flavone 4, 5-dihydroxy-3, 6, 7-trimethoxyflavone.

(For quoted constituents, see Reference 32.)

In Kerala, the plant is found to be effective against a chloroquine-resistant (Dd₂) strain of the malarial parasite *Plasmodium falciparum* at a concentration of 100 mg/mL.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aśmarī (calculus), Kaṇḍū (itching), Kaphavikāra (disorders due to vitiation of *kapha* doṣa), Kāsa (cough), Koṭha (ringworm/impetigo/erythema), Mūtrakṛcchra (dysuria), Piḍakā (carbuncle), Prameha (metabolic disorder), Śvāsa (asthma), Vraṇa (ulcer).

Its therapeutic uses are based on texts from 1000 BC to sixteenth century.

A

IMPORTANT FORMULATION/
APPLICATIONS

Sahacharādi Taila (Ashtāngahridaya, seventh century), contains Sahachara and Shatāvare roots as the main plant drugs with 10 other herbs. Spṛk plant is among 18 supporting herbs, all in equal proportion. For neurological disorders. Balā Taila (Ashtāngahridaya) contains Balā as the main drug, and the Spṛkkā plant is among 46 supporting herbs, all in equal proportions. It is used for nervine disorders.

Balādhātryādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains the Spṛkkā plant among 46 supporting herbs, all in equal proportions. It is used in a nasal drop form in diseases of the eye and head, as well as in the form of a massage oil in nervine disorders.

DOSAGE/USAGE/CAUTIONS/
COMMENTS

Cūrṇa (powder): 3 to 5 g.

Anogeissus latifolia Wall. Fruit Dhava

BOTANICAL SOURCE(S)

Anogeissus latifolia Wall.
(Fam. Combretaceae)

Though *A. latifolia* is the well-identified source of Dhava, the Indian Medical Practitioners' Cooperative Stores Ltd. (IMPCOPS), Chennai, the manufacturers of Ayurvedic, Unani and Siddha drugs, has been using *Syzygium hemisphericum* (Walp.) Alston, syn. *Eugenia hemispherica* Wight, fam. Myrtaceae, as Dhava since 1968. IMPCOPS drug sources were reviewed by the botanist S. Usman Ali of The Captain Srinivas Murti Research Institute, Chennai.

Dhava of Dhanvantari Nighantu and Raja Nighantu (twelfth to fourteenth centuries): *tikta* (bitter) (API, Vol. VI).

HABITAT

The Himalayas and in the South Indian Hills.

Syzygium hemisphericum (Walp.) Alston, syn. *Eugenia hemispherica* Wight: South India, Western Ghats South, Maharashtra Sahyadri, Sri Lanka, up to 1400 m. Also found in East Indies, Malaya, the Pacific Islands and the Philippines (related species of *Eugenia jambos*).

PHARMACOPOEIAL AYURVEDIC DRUG

Dhava (Fruit).

API, Part I, Vol. VI.

Fruit: uni-seeded, yellowish or reddish-brown, small, shining, beaked and winged, with membranous wings, often irregularly denticulate at the edges.^{2(b)}

AYURVEDIC SYNONYMS

Gaura, Dhurandhara.

Dhava of Charak: Madhura-tvaka, Madhuravalkala, Vaka-vriksha (Crane tree).²⁸

REGIONAL LANGUAGE NAMES

Eng: Axle-wood;
Ben: Dhaauyaa gaachh;
Guj: Dhaavado;
Hindi: Baakali, Dhauraa, Dhav, Dhaavaa;
Kan: Dinduge;
Mal: Vellanava, Malukkanniram;
Mar: Dhaavdaa, Dhaval; Ori: Dhaau;
Tam: Vellanagai, Vellanamai;
Tel: Chirimaanu.

Folk name: Dhauri, Baakali.³⁰ Eng: Crane tree,²⁸ Button tree,¹⁸ Ghatti tree,^{20(b)} Dindiga tree (CCRAS).

CONSTITUENTS

Tannins, gallic acid, saponins, and flavonols like quercetin and myricetin.

The fruits are used rarely as they are acrid, astringent and constipating.

No ethnobotanical study of the fruit could be found in the published literature.^{20(b)} The seeds revealed the presence of 16.31% crude protein, 23.0% pentosan, and 2.0% water-soluble mucilage.^{20(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aśmari (calculus), Arśa (piles), Mūtrakṛcchra (dysuria), Medoroga (obesity), Pāndu (anemia), Prameha (metabolic disorder), Raktavikāra (disorders of blood), Upadāmsa (soft chancre).

Used as a single drug.

A. latifolia: the stem bark, gum, and flowers are preferred for use in medicine.

IMPORTANT FORMULATION/ APPLICATIONS

Fruits are collected when flowerheads commence to break up.^{2(b)} The collected drug material may contain dried flowers as well as fruits.

The flowers are considered astringent, anthelmintic, anti-diarrhoeal, anti-dysenteric, blood purifying and cooling. They are prescribed with the *Myristica fragrans* fruit in diarrhea and dysentery and with honey in children's abdominal discomfort. The cold water extract with purified sugar is given for bleeding piles. Ash of the flowers mixed with mustard oil is applied on burns.⁶³

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 5 to 10 g.

Flower: 4.5 g.⁶³

Anogeissus latifolia Wall.

Stem bark

Dhava

BOTANICAL SOURCE(S)

Anogeissus latifolia Wall.
(Fam. Combretaceae)

In Tamil Nadu, White Rose Apple Wood, *Syzygium hemisphericum*, known as Vennavalmaram, is used as Dhava,⁶ while *A. latifolia* is in abundance in Madurai, Tirunelveli, and Tamil Nadu, as well as in Andhra Pradesh, Karnataka, and Kerala.^{2(b)}

Heartwoods of both *A. latifolia* and *S. hemisphericum* were used for preparing cartwheels, which was the identification source of Dhava (see also Dhava fruit).

PHARMACOPOEIAL AYURVEDIC DRUG

Dhava (Stem bark).

API, Part I, Vol. VI.

The bark of *A. latifolia* is bitter and astringent,^{2(b)} while the bark of Dhava, which Charaka used, was sweet (*madhur-tvaka*; see synonyms). In Rāja Nighantu (fourteenth century), it was described as bitter and astringent. (This indicates that two different trees were used as Dhava.)

AYURVEDIC SYNONYMS

Gaura, Dhurandhara.

Dhava of Charak: Madhura-tvaka, Madhuravalkala, Vaka-vriksha (Crane tree).²⁸

A

Dhava of Dhanvantari Nighantu and Rāja Nighantu (twelfth–fourteenth centuries): *tikta* (bitter) (API, Vol. VI).

HABITAT

The Himalayas and in the South Indian Hills.

Syzygium hemisphericum (Walp.) Alston, syn. *Eugenia hemispherica* Wight: South India, Western Ghats South, Maharashtra Sahyadri and Sri Lanka at up to 1400 m. It is also found in the East Indies, Malaya, the Pacific Islands and the Philippines (related species of *Eugenia jambos*).

REGIONAL LANGUAGE NAMES

Eng: Axle-wood;
Ben: Dhaauyaa gaachh;
Guj: Dhaavado;
Hindi: Baakali, Dhauraa, Dhav, Dhaavaa;
Kan: Dinduge;
Mal: Vellanava, Malukkanniram;
Mar: Dhaavdaa, Dhaval;
Ori: Dhaau;
Tam: Vellanagai, Vellanamai;
Tel: Chirimaanu.

Folk name: Dhauri, Baakali.³⁰
Eng: Crane tree,²⁸ Button tree,¹⁸ Ghatti tree,^{20(b)} Dindiga tree (CCRAS).

Anogeissus acuminata Wall. ex Bedd. is also known as Button tree.

The folk names Dhauri and Baakali are also used for *Lagerstroemia parviflora* Roxb. It has been suggested to be Dhurandhara (a synonym of Dhava).³⁰

CONSTITUENTS

Phenolic compounds such as ellagic acid, flavellagic acid, and flavonols like quercetin, myricetin and procyanidin along with gallotannins, shikimic acid, quinic acid, amino acids, alanine and phenylalanine.

The bark contains tannins 2%–18%, pentosans 18.1%, and lignans 17.0%; (+)-leucocyanidin 0.5%; ellagic acid 0.5%; 3,3', 4-tri-O-methyl ellagic acid 0.7%; and 3, 3', 4-tri-O-methylflavellagic acid.^{2(b),20(b)} It also contains glycosides of ellagic, and flavellagic acids.

Sterols and triterpenoids have been isolated and reported.⁶²

THERAPEUTIC AND OTHER ATTRIBUTES

Aśmari (calculus), Arśa (piles), Mūtrakṛcchra (dysuria), Medoroga (obesity), Pāndu (anemia), Prameha (metabolic disorder), Raktavikāra (disorders of blood), Upadāmsa (soft chancre), Visarpa (erysipelas).

In folk medicine, the bark is used in chronic diarrhea, as an anti-dysenteric and as an anti-spasmodic for cough, asthma, colic, and headache. The decoction is used for leucorrhea.^{20(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Ayaśkriti (Ashtāngahridaya, seventh century), contains Dhava stem bark among 22 main herbs, with 25 supporting herbs. Prescribed as a hypoglycaemic, hematinic and astringent tonic. Nyagrodharādi Churna (Yogarātnākara, sixteenth century) contains 28 herbs in equal proportions. Dhava stem bark is one of these. It is prescribed for dysuria, diabetes, and diabetic carbuncle.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Kvatha (decoction): 30 to 50 mL.

A. latifolia is the main source of Ghatti gum. The fried gum confection is a popular household tonic for women after childbirth, as well as for leucorrhea.

Anthocephalus cadamba Miq.

Kadamba

A

BOTANICAL SOURCE(S)

Anthocephalus cadamba Miq., Syn. *A. indicus* A. Rich.

(Fam. Rubiaceae)

Syn. *A. chinensis* (Lam.) A. Rich. ex Walp.^{2(b)}
Cephalanthus chinensis Lam., *Nauclea cadamba* Roxb.¹⁵

Gaurakadambaka is equated with *Adina cordifolia* Benth. & Hook, f.; Girikadambaka and Dhūlikadamba with *Mitragyna parviflora* R. Korth; in Kerala, *Adina cordifolia*; Bhumikadamba with *Sphaeranthus indicus* Linn.^{16(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kadamba (Stem bark).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Vṛtta puṣpa, Priyaka.

Nipa, Sidhupuspa, Bhrrigavallabha,²⁷ Gandhmat-pushpa, Prāvrsheya, Mahonnati.⁴
 (Nipa is now equated with *Adina cordifolia*.)

HABITAT

All over India on the slopes of evergreen forests up to 500 m and planted in parks and near temples.

It is found in the sub-Himalayan tract from Nepal eastwards on the lower hills of Darjeeling terai in West Bengal, Chhota Nagpur (Bihar), Orissa, Andhra Pradesh, Karnataka, Kerala on the West Coast and the Western Ghats.

It is frequently cultivated as ornament.^{2(b),15}

REGIONAL LANGUAGE NAMES

Assam: Roghu, Kadam;

Beng: Kadam;

Guj: Kadamb, Kadam;

Hindi: Kadam, Kadamba;

Kan: Kadamba, Kadamba mara, Kadavala,

Neirumavinamara;

Mal: Attutekka, Katampu;

Mar: Kadamb;

Ori: Holiptiya, Kadamba nipo, Kadambal;

Punj: Kadamb;

Tam: Arattam, Indulam, Kadappai, Vellai kadambam, Vellaikhadambu, Kadambu needam, Vellai kadambu;

Tel: Kadambamu, Kadimi chettu.

Eng: Wild cinchona.^{2(b)}

CONSTITUENTS

Alkaloids, Steroids, Fats and Reducing Sugars.

Glycosides of indole alkaloids, cadambine, 3 alpha-dihydrocadambine, 3 alpha-isodihydrocadambine; sapogenins, cadambagenic, oleanolic, and quinovic acids, saponin A (cadambagenic acid, D-glucose and L-rhamnose), B (L-fucose and L-rhamnose) and C and D gave quinovic acid with D-glucose, with L-fucose as sugar moieties in C and L-rhamnose and L-fucose in D.^{2(b,c,d),15}

Tannins were present at levels of 4.61%.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Yonidośa, Vraṇa, Raktapitta, Viṣavrṇa (Daṇśaja vraṇa).

Used in burning disorders of the female genitals, ulcer hemorrhagic diseases, and poisonous insect bites (therapeutic uses based on classical texts from 1000 BC to sixteenth century).

Charaka and Sushruta used the bark as a sedative, anti-toxic, antiseptic, astringent and in hemoptysis.^{27,28}

The plant belongs to the *Rodhrādi* and *Kadambādi* groups of herbs, which are adipogenous, retentive and inspissant to semen, and an aphrodisiac; it is used for afflictions of the female genital system, urinary disorders and skin diseases.¹⁸

A

**IMPORTANT FORMULATION/
APPLICATIONS**

Nyagrodhādi Kwāth Churna (Ashtāngahridaya, seventh century), contains 21 herbs in equal proportion, Kadamba stem bark is one of them. Prescribed for diarrhea, bleeding disorders, ulcers and diseases of female genitals.

Nyagrodhrādi Churna (Yogarātnākara, sixteenth century) does not contain Kadamba.

Grahṇimihira Taila (Bhaishajya Ratnāvali, seventeenth century) contains 32 herbs in equal

proportions, Kadamba stem bark is one of these. It is prescribed internally with 12 g of buttermilk for diarrhea, dysentery, urinary disorders and threatened abortion.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

0.5–1.5 g of the drug in powder form.

48 g (composite drug) for decoction.

Apium graveolens* Linn.*Karaphsa****BOTANICAL SOURCE(S)**

Apium graveolens L.
(Fam. *Apiaceae*)

Ajmoda of Ayurvedic medicine is equated with *Trachyspermum roxburghianum* (DC.) Craib, Syn. *Carum roxburghianum* Kurz. CCRAS accepted Vilaayati Ajmod (*Apium graveolens* Linn.) as its substitute in 1990, as a drug source in 1996. In 2003, AFI equated Ajmod and Ajmodā with *Apium graveolens*.

PHARMACOPOEIAL AYURVEDIC DRUG

Karaphsa (Root).

API, Part I, Vol. VI.

Karafs is a Unani herb³⁷ that was imported from Iran. It was known as Vilaayati Ajmod (much smaller than the seed of Indian Ajmod). In Unani medicine, the root is considered to be more active than the seed.⁶³

International Pharmacopoeial name: *Apīi radix*.

AYURVEDIC SYNONYMS

Dīpyaka.

Atūragandhā, Modā, Mayūraka, Kharāhvā, Kāravi, Vasti, Markati.⁴

HABITAT

Punjab, Haryana, and Uttar Pradesh.

It is cultivated in Amritsar and adjoining parts of Punjab, Haryana, and Western Uttar Pradesh.^{2(b)}

It is found in Europe from England to Southern Russia, Western Asia as far as Eastern India and Northern and Southern Africa. It is cultivated and grows wild in North America, Mexico, and Argentina.¹⁴

REGIONAL LANGUAGE NAMES

Assam: Bonjamani, Bonajain, Yamani, Ajowan,
Ben: Randhuni, Banyamani;
Guj: Bodi ajamo, Ajamo;
Hindi: Ajmuda, Ajmod;
Kan: Oma, Ajavana, Omakki;
Mal: Ayamodakum, Oman;
Mar: Ajmoda ova;
Ori: Banajuani;
Pun: Valjawain, Ajmod;
Tel: Nuranji vamu;
Urdu: Karafs.

Eng: Celery, Marsh parsley, Fir-leaved celery, Smallage.

CONSTITUENTS

α-Pinene, β-pinene, limonene, pentylbenzene, β-selinene, 3-*n*-butyl phthalide.

Celery root: chief constituents of volatile oil include (+)-limonene, beta-pinene, p-cymene, cis-, 3-methyl-4-ethyl-hexane, phthalides

(3-butyliden phthalide, 3-butyl phthalide, ligustilide and neocnidilide); flavonoids include opiin and luteolin-7-O-apiosyl glucoside, furocoumarin include bergapten and polyynes include falcarinol and falcarindiol.¹⁴

THERAPEUTIC AND OTHER ATTRIBUTES

Āśmari (calculus), Bastiroga (diseases of urinary system), Gr̥dhrasī (sciatica), Hikkā (hiccup), Jalodara (ascites), Kaphaja siroroga (catarrhal siroroga/sinusitis), Kaphajvara (fever due to kapha dosa), Mūātraghāta (urinary obstruction/retention of urine), Mastiskadaurbalya (neurosthenia), Pr̥ṣṭhaśūla (lumbago), Pārśvasūla (intercostal neuralgia and pleurodynia), Sarvanga sopha (anasarca), Sula (pain), Udarasūla (pain in the abdomen), Udararoga (diseases of abdomen), Vātarakta (Gout), Yakṛtphlīhā vikāra (diseases of liver and spleen).

Used as single drug.

Claimed uses of *Apīi radix* (root), *fructus* (fruit), and *herba* (herb): for diuresis, for “blood purifying”, for regulation of the bowels, for stimulation of the glands, for rheumatic ailments, for gout, for stones, in treatments following malnutrition, in the prophylaxis of nervous

restlessness, for loss of appetite and for exhaustion (German Commission E monograph, 12.7.91).⁸

IMPORTANT FORMULATION/ APPLICATIONS

Phthalide constituents (limonene, selinene, and related phthalides) are sedative, diuretic, and antispasmodic.^{13,24(a)}

A phthalide derivative, NG-072, has been reported to be useful in the treatment of Alzheimer’s disease.^{2(a)} 3-*n*-butyl phthalide has shown anti-convalescent effects in pharmacological studies.^{24(a)}

A diuretic action has been demonstrated in animal experiments.⁸

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 5 to 7 g.

The root should be kept sealed, away from light and moisture.¹⁴

Pressed juice: 15 mL three times.

A cough mixture is prepared by boiling the root juice with sugar.¹⁴

It is contraindicated in kidney disorders and pregnancy.^{24(a)}

Apium leptophyllum (Pers.) F.V.M. ex Benth.

Ajamodā

BOTANICAL SOURCE(S)

Apium leptophyllum (Pers.) F.V.M. ex Benth.
(Fam. Umbelliferae)

Ajmoda of Ayurvedic medicine is equated with *Trachyspermum roxburghianum* (DC.) Craib, syn. *Carum roxburghianum* Kurz. CCRAS accepted Vilaayati Ajmod (*Apium graveolens* Linn.) as its substitute in 1990, and as a drug source in 1996.

In 2003, the AFI equated Ajmod and Ajmodā with *Apium graveolens*.

PHARMACOPOEIAL AYURVEDIC DRUG

Ajamodā (Fruit).

API, Part I, Vol. I.

International Pharmacopoeial name: *Apīi fructus*.

A

AYURVEDIC SYNONYMS

Dīpyaka.

Atugragandhā, Modā, Mayāraka, Kharāhuā,
Kúravi, Vasti, Markati.⁴

HABITAT

Cultivated in Andhra Pradesh, Gujarat, Madhya Pradesh and Karnataka.

A. leptophyllum is native to the U.S. It is common in waste places and gardens in Dehra Dun and the adjacent hills of Chakrata, Nainital, and Mussoorie.

A. graveolens: cultivated in Amritsar and adjoining parts of Punjab, Haryana, and Western Uttar Pradesh.

REGIONAL LANGUAGE NAMES

Assam: Bonjamani, Bonajain, Yamani, Ajowan;

Beng: Randhuni, Banyamani;

Guj: Bodi Ajamo, Ajamo;

Hindi: Ajmuda, Ajmod;

Kan: Oma, Ajavana, Omakka;

Kash: Fakhazur, Banjuan;

Mal: Ayamodakum, Oman;

Mar: Ajmoda, Oova;

Ori: Banajuani;

Punj: Valjawain, Ajmod;

Tam: Omam;

Tel: Nuranji vamu;

Urdu: Ajmod.

Eng: Celery, Wild celery, Marsh Parsley, Smallage.

CONSTITUENTS

Essential oil and fixed oil.

Essential oil (2%–3%)^{2(b)}; chief constituents are d-limonene (50%), d-selinene (10%–15%), sedanonic anhydride (0.5%), and sedanolide (2.5%–3%)^{2(b)}; phthalides include 3-butylden.

The fruits yield 17% fatty oils.^{2(b)}

Furocoumarins, leptophyllidin, leptophyllin, marmesin, and 9-hydroxy-4-methoxypsoralen

come from the fruits, while umbelliferone, bergapten, isopimpinlin, seselin and D-man-nitol have been isolated as major constituents from the seeds.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aruci, Adhmana, Gulma, Hikkā, Chardi, Kṛmi roga, Śūla

Used in anorexia, flatulence, tympanites, hiccup, emesis, worm infestations, and colic (therapeutic uses based on classical texts from the twelfth to the sixteenth centuries).

Phthalide constituents are sedative, diuretic, and anti-spasmodic.

3*n*-butyphaliol exhibited blood pressure-lowering and anti-convulsion effects. NG-072, a phthalide derivative, gave encouraging results in Alzheimer's disease.^{2(d),24(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Ajmodārka (Arkaprakāsh), distilled volatile constituents, contains Ajmoda fruit aquae. Prescribed in diarrhea and digestive disorders.

Ajmodādi Churna (Shārangadhara Samhitā, thirteenth century) contains Zingiber dried rhizomes as the main drug, and Ajmoda is among the 12 supporting herbs. It is prescribed for rheumatism, edema, sciatica, and colic.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Seed extract standardized to 2.2% volatile oil is available as a 450-mg capsule in the U.S.A.¹³

It is contraindicated in kidney disorders and pregnancy.

Aquilaria agallocha Roxb.

Agaru

A

BOTANICAL SOURCE(S)

Aquilaria agallocha Roxb.
(Fam. Thymelacaceae)

Syn: *A. malaccensis* Lam.

Due to drug's rare availability in South India *Vepris bilocularis* Engl. and *Anaphalis neelgerriana* DC. are used as Krishnāguru and *Dysoxylum labaricum* Bedd. ex Hiern as Sveta Agaru.³

PHARMACOPOEIAL AYURVEDIC DRUG

Agaru (Heart wood).

API, Part I, Vol. IV.

Agarwood or Eaglewood of commerce is derived from fungus-infected tree through wounds caused by species of *Aspergillus*, *Fusarium* and *Penicillium*, as well as by some species of *Fungi imperfecti*.¹⁵

AYURVEDIC SYNONYMS

Aguru, Lauha, Krmija.

Kālāguru, Krishnāguru, Jongaka,³⁰
Krmijaghna,^{16(b)} Asitaka,³ Vāsuka.²⁷

HABITAT

North East part of the country.

Found on the hills of Assam and Meghalaya and in Nagaland, Manipur and Tripura.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Eagle-wood;
Assam: Agaru;
Beng: Agaru, Agarkashtha, Agar chandan;
Guj: Agar;
Hindi: Agar;
Kan: Krishna agaru;
Mal: Akil;
Mar: Agar;
Punj: Ooda, Oodapharsi;
Tam: Akil kattai;
Tel: Agaru;
Urdu: Ood Hindi, Agar.

Eng: Agarwood, Aloewood, Malacca Eaglewood.^{2(b)}

CONSTITUENTS

Essential oil.

The yield of essential oil is 0.12%–3.46%. The main constituent is agarol.

Other constituents include agarospirol, hydroxyagariphilone, alpha- and beta-agarofuran, dihydroagarofuran, *nor*-keto-agarofuran, hydroxyagariphilone and agaro- and oxo-agarospirols.^{2(b),15} (For detailed chemical constituents, see references.)

Agarospirol is reported to be the second spiroterpenoid to be isolated from nature.^{20(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Karna roga, Aksi roga, Visa, Swāsa

Used in obstinate skin diseases including leprosy, otitis, ophthalmic diseases, poisoning and asthma (therapeutic uses based on classical texts from 1000 BC to sixteenth century).

Charaka used the powdered drug alone or in prescriptions (internal and external) for fever, toxicosis, hiccup, dermatosis, leucoderma, and rheumatism.²⁷

Sushruta used Agaru internally and externally in obesity, urethral discharges, blood poisoning, skin diseases, boils and for the quick healing of wounds after surgery.²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Madhūkāsava (Ashtāngahridaya, seventh century); Mrdvikāsava (Shārangadhara Samhitā, thirteenth century); Karpūradya Arka (Arkprakāsha, period not known); Chyavanprāsha Avaleha (Charaka Samhitā, 1000 BC); Anu Taila (Ashtāngahridaya); Chandānadi Taila (Yogarātnākara, sixteenth century); Khadirādi Gutikā (Charaka Samhitā); Svāsahara Kashāya Churna (Charaka Samhitā); Guduchyādi Taila, (Bhavaprakāsha, sixteenth century AD).

A

Aguru is among the supporting drugs in all of these composite drugs due to its stimulant and aromatic qualities.

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–3 g.

Aguru is not easily available even at 100,000 Rupees (U.S.\$2,000) for 1 kg. Aguru oil is one of the most highly prized essential oils of Middle East countries.

***Areca catechu* Linn.**

Pūga

BOTANICAL SOURCE(S)

Areca catechu Linn.
(Fam. Palmae)

Smaller fruits of *Pinanga dicksonii* Blume, syn. *A. dicksonii* Roxb. are used in North Canara (South India).³

PHARMACOPOEIAL AYURVEDIC DRUG

Pūga (dried ripe seed).

API, Part I, Vol. I.

International Pharmacopoeial name: *Arecae semen*.

AYURVEDIC SYNONYMS

Kramuka, Ghoṇṭā.

Pūgi phala, Guvāka, Ghoranta.⁷

Kramuka has been identified with Pūga phala.

Pūga, wherever it occurs in classical texts, invariably indicates the use of fruit, while the use of bark in cases of Kramuka has been emphasized. There is very little likelihood of the two being the same drug.³⁰ (See also Section 8.)

HABITAT

Cultivated in the coastal regions of Southern India, Bengal and Assam up to an altitude of 1000 m.

Sixty species are indigenous to the Indomalaya region.¹

About eight species occur in India.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Areca nut, Betel nut;
Assam: Tamol, Tamul;
Beng: Supari;
Guj: Sopari;
Hindi: Supari, Chhalia;
Kan: Adika;
Kash: Supari, Spari;
Mal: Adakku, Pakku;
Mar: Supari, Pophal;
Ori: Gua;
Punj: Supari, Spari;
Tam: Kamugu, Pakku, Pakhumaram;
Tel: Paka chekka, Vakka;
Urdu: Fufal, Choalia.

Eng: Pinang.¹

CONSTITUENTS

Alkaloid (arecoline), tannins and fats.

The alkaloid arecoline belongs to the pyridine group; its effect is similar to pilocarpine. Other alkaloids include arecaidine, arecolidine, guvacine, guvacoline, isoguvacine, *nor* arecaidine and *nor* arecoline.^{2(b),20(c)}

The nut contains 8%–18% tannins, 7.0%–15% non-tannins and 42.44% insolubles.

The tannins are prominently catechol tannins.^{2(b)}

Fatty acids include lauric 19.5%, myristic 46.2%, and palmitic 12.7%; the main unsaturated acids comprise 18.8%.^{20(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Mukhavikāra, Aruci, Yoniśaithilya, Svetapradara

Used in diseases of the mouth, anorexia, vaginal atony, and leucorrhea (therapeutic uses based on classical texts from the thirteenth to the sixteenth centuries).

Arecoline is reported to be cholinergic, exerting sialagogue and diaphoretic actions in normal doses.^{13,2(b)} Arecoline also has anthelmintic activity.¹³

Arecaidine and arecoline have carcinogenic potential.¹³ Most of the clinical studies in India were related to the nut's carcinogenic potential.^{20c}

IMPORTANT FORMULATION/ APPLICATIONS

Pūgakhandā (Bhaisajya Ratnāvali, seventeenth century), contains 30 herbs, Pūga nut as

the main drug with 29 supporting drugs. Prescribed for gynaecological disorders and vaginal atony.

Supāri Pāka and Laghu Supāri Pāka are commercial OTC products. They are used after parturition, as well as for leucorrhea.

Charaka prescribed a paste of Kramuka and sandalwood in bronchial asthma, anemia, anorexia and skin diseases; Pūga dry nuts alone in halitosis and loss of appetite.²⁷

Sushruta prescribed Kramuka in urethral discharges and skin diseases; Pūga was used as a purgative.²⁸

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g of the drug in powder form.

Pūga nut is one of the constituents of an Ayurvedic drug “Ayush AC-IV” (CCRAS), which is reported to have anti-fertility activity in women.^{20(c)}

Argyreia nervosa (Burm. f.) Boj.

Bastāntrī

BOTANICAL SOURCE(S)

Argyreia nervosa (Burm.f.) Boj., Syn. *A. speciosa* Sweet. (Fam. Convolvulaceae)

Roots of *Ipomoea pes-caprae* (L.) Sw., syn. *I. biloba* Chois. and *I. petaloiclea* Chois. are common substitutes in South and Northwest India, respectively.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Bastāntrī (dried root).

API, Part I, Vol. V.

Bastāntrī and Chāgalāntrī are synonyms of a variety of Vṛddhadaruka; at the same time, *Ipomoea pes-caprae* is also considered its source.^{16(a),30} A section of scholars recognizes *Lettsomia setoria* Roxb. as

classical Vṛddhadārūka and *A. speciosa* as its substitute.^{16(a)}

AYURVEDIC SYNONYMS

Vṛddhadāru, Antah koṭarapuṣpī, Chāgalāntrī.

Vṛddhadārūka, Sthavira, Sthaviradaaru.³

HABITAT

Extensively planted in gardens along trellises and walls, also found wild as an escape.

Throughout India up to an altitude of 300 m.

The genus is distributed in Africa, Australia, and the Indo-Malaysian region.^{2(b)}

In Western herbal medicine, Hawaiian Baby Woodrose is equated with *A. nervosa*; it is found in Florida, California, and Hawaii.⁷

A

REGIONAL LANGUAGE NAMES

Eng: Elephant creeper;
 Beng: Bijataadaka, Bridhadarak;
 Guj: Samudara sosha, Varadhaaro, Shamadrasosh;
 Hindi: Samandar-kaa-paat, Samundarsosh,
 Ghaavapattaa, Vidhaaraa;
 Kan: Samudrapala, Samudraballi;
 Mal: Samudra pacchha, Samudra-pala, Marikkunn
 marututari;
 Mar: Samudrashok;
 Tam: Samudrappachai;
 Tel: Samudrapaala;
 Urdu: Samandarotha (correct spelling is
 Samandarsokh).

Eng: Wooly Morning Glory.
 Chāgalāntri: Goat's Foot Creeper.⁷

CONSTITUENTS

Constituents not quoted in API.

Tetradecanyl palmitate and a disubstituted tetrahydrofuran 5, 8 oxidotetracosan-10-one were identified from the roots, as well as hexadecanyl *p*-hydroxy cinnamate, stigmasteryl *p*-hydroxy cinnamate and coumarin scopoletin. Kempferol 7-OMe-3-sulfate was also identified.⁶⁴

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Mūtrakrchra, Aruci, Hṛdruja, Ānāha, Udāvarta, Arśa, Udara, Graharbādhā, Śūla, Vātarujā, Raktapitta, Vātarakta, Āmavāta, Sōpha, Meha, Vātārśa, Svayathu, Krmī, Pāndu, Kśaya, Kāsa, Unmāda, Apasmara, Visūci, Pratītum, Ślāpada

Used in chronic obstructive jaundice, dysuria, tastelessness, angina pectoris, distention of the

abdomen, upward movement of gases, piles, diseases of the abdomen, psychotic syndrome, colic, neurological disorders, gout, rheumatism, edema, polyuria, anorectal fissures, inflammations, worms, anemia, phthisis, cough, insanity, epilepsy, gastroenteritis (*pratitum* could not be identified) and filariasis. (For the therapeutic uses of Chāgalāntri, Bastāntri and Vṛiddhadārūka, such a wide coverage is unique and needs validation.)

IMPORTANT FORMULATION/ APPLICATIONS

Chāgalāntri is the drug of Sushruta Samhita (1000 BC); Bastāntri of seventh century, and Vṛiddhadārūka belong to the later period. Mishraka Sneha (Ashtāngahridaya, seventh century), a composite herbal drug in oil and a purified butter base, contains 21 herbs in equal proportions, and Bastāntri is one of them. It was used during the classical period for “abdominal lumps” (obstructive jaundice and tympanites?), constipation, colic, abscesses, hydrocele, and diseases of nervous system (AFI). It is an obsolete drug. Vṛiddhadārūka Rasāyanam, Vṛiddhadarukasam Churna (Bhaisajya Ratnāvali) and Vṛiddhadārūkādyaṃ Ghṛitam (CCRAS)²⁰ were not quoted in the API.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–5 g.

For biological and pharmacological studies and applications, see original text of Reference 64.

***Aristolochia bracteolata* Lam.**

Kīṭamārī

BOTANICAL SOURCE(S)

Aristolochia bracteolata Lam. Syn. *A. bracteata* Retz. (Fam. Aristolochiaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Kīṭamārī (Leaf). API, Part I, Vol. VI.

Not to be confused with Kitamari yavani (equated with *Artemisia maritima* Linn.).

AYURVEDIC SYNONYMS

Śṛṅgapuspī, Kītāri, Dhūmrapatrā.

Not to be confused with Krmighna, Krmihā, Krmihara, Krmihrata and Krmiripu. These are synonyms of Vidanga (*Embelia ribes* Burm. f.).

HABITAT

In plains throughout India.

In the plains of northern India from Haryana and Uttar Pradesh, southward to peninsular India up to Maharashtra and Andhra Pradesh.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Bracteated birthwort;
Ben: Kiramar;
Guj: Kidaamaari;
Hindi: Kitmaar, Kiramar, Kitmaari, Kidaamaari;
Kan: Kathhekirubanagida;
Mal: Aduthinapalai, Atu-tinlap;
Mar: Kidaamaari, Kidemaar;
Ori: Paaniri;
Pun: Kitamar;
Tam: Aadu-tinna-paalai;
Tel: Gadida gadapa, Telia iswari.

Eng: Worm killer.²⁰⁽³⁾

CONSTITUENTS

Aristolochic acid; magnoflorine; *N*-acetylnornuciferine; aristolactam; β-sitosterol and ceryl alcohol.

The plant is harvested in March and September and yields maximum level of aristolochic acid, at 15% and 16%, respectively. The leaves contain ceryl alcohol 0.38%. The plant contains (–)-*N*-acetyl-nor nuciferine and aristolactam.^{2(c),20(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmi (worm infestation), Kāstārtava (dysmenorrhea), Sandhīśūla (joint pain), Śitapitta (urticaria),

Sotha (edema), Tvakroga (leprosy/skin disorders), Visamajvara (intermittent fever), Vicarcika (dry and weeping eczema), Vraṇa (ulcer). Used as single drug.

(Therapeutic uses based on a text of the twelfth century.)

Aristolochic acid showed chemosterilization effects against *Dysdercus koenigii*, *Aedes aegypti* and *Tribolium castaneum*.^{20(c)}

Magnoflorine decreased arterial blood pressure in rabbits and induced hypothermia in mice.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

The plant is reputed for its bitter, purgative and anthelmintic activities. Bruised leaves, mixed with castor oil, are applied externally on eczema. They are also applied on navels of children in colic and given internally with castor oil.^{2(b)}

The leaf juice along with banana is given to women for menstrual disorders.^{2(d)}

A paste of fresh leaves is applied around the ulcers of guinea worms (*Dracunculus medinensis*) to expel them.^{2(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 1 to 3 g.

The plant is reported to be poisonous to humans and livestock.^{2(b)}

The LD₅₀ of the plant extract was >1000 mg/kg i.p. in mice.^{20(c)}

Many cases of nephropathy associated with *Aristolochia* have been reported worldwide.¹³

Aristolochic acid is genotoxic and carcinogenic.¹⁴ Kidney damage was observed in rats treated with aristolochic acid. The methyl ester of aristolochic acid showed damage to the liver and kidneys.^{2(b)}

The root should be used with caution in dyspepsia, bowel problems of children and intermittent fever.

A *Aristolochia indica* Linn.

Īśvarī

BOTANICAL SOURCE(S)

Aristolochia indica Linn.
(Fam. Aristolochiaceae)

Roots of *A. bracteata* Linn. and *A. tagala* Linn. are common adulterants.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Īśvarī (Root).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Gandhnākuli, Nagadamanī.

In Ayurvedic texts, Nakuli and Gandhanakuli have been mentioned.

In the AFI, Part I, page 320, Nākuli is equated with *Aristolochia indica*, while Ayurvedic scholars are trying to equate it with *Rauvolfia serpentina* Benth. ex Kurz (Sarpagandhā). They are suggesting *A. indica* as Gandhanākuli.³

The API and AFI versions are different in the cases of Gandhanākuli and Nākuli.

HABITAT

Throughout the low hills and plains of India.

It is especially prevalent in tropical and subtropical regions.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Indian birthwort, Serpent root;
Assam: Jarvande;
Beng: Isheri;
Guj: Ruhimool, Iswarimool;
Hindi: Ishwari;
Kan: Iswari беру, Toppalu;
Mal: Karaleyan;
Mar: Sapsan;
Ori: Gopikaron;
Tam: Perumarundu, Ichchuramule;
Tel: Iswari, Nallaiswari;
Urdu: Zarawand Hindi.

CONSTITUENTS

Alkaloids, Essential oils, Bitter principles and fixed oil.

Alkaloids include *l*-curine (aristolochine), 0.05–0.07 from a Tamil Nadu sample and traces in a Bangalore sample.

The chief active principle is aristolochic acid (0.06%–0.07% dry weight), which is intensely bitter. Phenanthrene derivatives include aristolic acid (0.007%); sesquiterpenoids include isharene, ishwarol, ishwarone, and ledol; sterol glycosides are present; other compounds include *p*-coumaric acid (0.0025%). Essential oil at 0.5% dry weight consists of sesquiterpenoids; the fixed oil is 1.7%,

THERAPEUTIC AND OTHER ATTRIBUTES

Sarpaviṣa, Luta viṣa, Jalagardabha, Vṛṣcikaviṣa, Jwara, Kṛmi, Vraṇa

Used in snake poison, spider bites, erysipelas, scorpion poison, fever, worms, and ulcers (therapeutic uses based on texts from the fifteenth to the sixteenth centuries).

Properties exhibited in experimental studies—aristolochic acid: abortifacient and interceptive; *p*-coumaric acid: anti-spermatogenic; alcoholic extract of the plant: anti-inflammatory.^{2(b),2(c)}

A cytotoxic lignan, savinin, has been isolated from the root.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Mahāvishagarbha Taila (Bhaishajya Ratnāvali, seventeenth century), contains 72 herbs in equal proportion, Ishwari root is one of them. Prescribed as a massage oil in rheumatic affections.

Vishagarbha Taila of North as well as of South India does not contain Ishwari root.

Gorochanādi Gutikā (Vaidyayoga Ratnāvali, 1953) contains ox gall, amber from the intestines

of sperm whales and stag horn with 43 plant drugs, all in equal proportions. Karleka has been interpreted as Ishwari. It is an obsolete drug.

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–2 g. (For external use also.)

Many cases of nephropathy associated with *Aristolochia* have been reported worldwide.¹³ Aristolochic acid is genotoxic and carcinogenic.¹⁴ Kidney damage was observed in rats treated with aristolochic acid. The methyl ester of aristolochic acid showed damage to the liver and kidneys.^{2(b)} The root should be used with caution in dyspepsia, bowel problems of children and intermittent fever.

Artemisia absinthium L.

Dvīpāntara Damanaka

BOTANICAL SOURCE(S)

Artemisia absinthium L.
(Fam. Asteraceae)

Indian Wormwood is equated with *A. nilagirica* (Clarke) Pamp., syn. *A. vulgaris* Linn. var. *nilagarica* Clarke.

A. vulgaris Hook. f. in part non-Linn. is now identified as Damanaka (a constituent of Mahāsugandhādi Taila of Bhavaprakāsha,³ sixteenth century).

PHARMACOPOEIAL AYURVEDIC DRUG

Dvīpāntara Damanaka (Whole plant).

API, Part I, Vol. VI.

Dvīpāntara is used for herbs of non-Indian origin by Ayurvedic scholars.

It is Afsanteen of Unani medicine.

International Pharmacopoeial name: *Absinthii herba*.

AYURVEDIC SYNONYMS

Koṇākāṇḍā, Sugandhidru, Śiraḥśūlakarī.

The quoted synonyms do not belong to Ayurvedic texts. Botanical features and properties from an English text^{2(b)} have been Sanskritized. Forms are angular and ribbed (Koṇākāṇḍā), fragrant (Sugandhdāru) and Shirahshūlkari (tendency to produce headaches).

Synonyms of Damanaka: Daman, Madan, Dānta, Dama, Munisutā, Muni, Gandhōtkata, Vinita and Kulputraka.⁴

HABITAT

Kashmir and Nepal.

Kashmir at altitudes of 1500–2100 m.

REGIONAL LANGUAGE NAMES

Eng: Worm wood, Absinth;

Ben: Mastaru;

Guj: Mastaru;

Hindi: Vilayati afsantin;

Kan: Titaveen, Vravalu;

Mal: Nilampala, Tirunitripachcha;

Mar: Serpana;

Pun: Mastiyaaraa;

Tel: Moshipatri, Machipatri;

Urdu: Afsanteen.

Eng: Sage bush, Maderwood, Absenthe.^{2(b)}

CONSTITUENTS

Volatile oil (which contain α -pinene, β -pinene, β -phellandrene, thujone, azulene, sabinyl acetate, etc.) and bitter principles absinthin and iso-absinthin.

The yield of volatile oil varies from 0.12% to 0.51% on a fresh basis; a Gulmarg (Kashmir) sample yielded 0.2% (dried sample);^{2(b)} this contained mostly esters of thujyl alcohol, thujane, thujone, cadinene, and S-guaiazulene.^{20(c)}

A

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya (digestive impairment), Apasmāra (Epilepsy), Jirnajvara (chronic fever), Jalodara (ascites), Kṛmi (worm infestation), Kaṣṭārtava (dysmenorrhoea), Kaṇṇāśūla (otalgia), Mūtrak ṛcchra (dysuria), Paksāghata (Paralysis/Hemiplegia), Plihāroga (splenic disease), Sandhiśoṭha (arthritis), Śoṭha (inflammation), Udararoga (diseases of abdomen), Vātaroga (disease due to Vata dosa), Yakṛt roga (liver disorder).

It is used as a single drug.

The alcoholic extract of leaves is anti-malarial. The homoditerpene peroxides are anti-malarial.

The 24-zeta ethyl cholesta 7, 22-dien-3 beta-ol is anti-pyretic.

Artemisetin has anti-tumor properties.

Alpha-sanotonin is anti-parasitic.

The water extract of leaves is anthelmintic.^{2(c)} The essential oil (from dried leaves) at 1:1000 dilution is active against *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa* (pharmacological studies).

IMPORTANT FORMULATION/ APPLICATIONS

Clinical trials in amoebiasis and viral hepatitis gave encouraging results.^{20(c),65(a,b)}

Unani physicians prescribe Arq-e-Afsanteen (50–100 mL) in hepatitis and hepatic obstructions. Dava-ul-luk is prescribed in enlargement of the liver or spleen, as well as in renal calculus; Qurs-e-Gul is a liver tonic;³⁷ the decoction is used in dysmenorrhea, gastric problems, depression, hysteria, epilepsy, worm infestations, and fevers.⁶³

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 1 to 2 g.

Wormwood is a constituent of Aristochol, used as a cholagogue.^{2(d)}

The European herb contains at least 0.3% (v/w) volatile oil. It is used in loss of appetite, dyspepsia and biliary dyskinesia as a 2–3 g herb in water infusion.⁸

Artocarpus heterophyllus* Lamk.*Panasa**

BOTANICAL SOURCE(S)

Artocarpus heterophyllus Lamk.

Syn. *A. integrifolici* L. f.

(Fam. Moraceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Panasa (Root bark).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Mūlaphalada, Apuṣpaphalada, Atibṛhatphala.

Kantakiphala, Āmshapa,

Garbhakantaka.⁴

Āmashayaphala.^{16(b)}

Panasi (syn. Rohini, Kapikapithaka) of Shodhal Nighantu, twelfth century, is an unidentified drug. Its root was used for healing wounds.^{16(c)}

HABITAT

Common in Western Ghats, cultivated throughout India.

Found in Western Ghats at altitudes of 450–1200 m and throughout the hotter parts of India.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Jack-fruit tree, Indian jack fruit;

Assam: Kanthal;

Ben: Katal, Kantal, Kathal, Phanas;

Guj: Phanus;

Hindi: Kathar, Kathal, Katahala;
 Kan: Hebba alasu, Alasa, Halasu;
 Mal: Chakka;
 Mar: Phanasa;
 Ori: Panasa, Ponoso;
 Pun: Katahala;
 Tam: Pala;
 Tel: Panasa;
 Urdu: Katahal.

CONSTITUENTS

β -sitosterol, cycloartenone, cycloartenol; tannins.

The prenyl flavones, heterophyllin, cycloheterophyllin A and B, artonins A, B, C, D, J, K, and L; 2', 4', 6'-trioxygenated flavanone, heteroflavanone C, prenyl flavonoid, cycloartocarpin A, tridecyl docosanoate, 9-hydroxy tridecyl docosanoate; beta-sitosterol, betulin, ursolic acid, betulinic acid and a phenolic compound, heterophyllol, have been isolated from the root bark.^{2(c),66(a,b)}

The bark contains 3.3% tannins.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Atisara (diarrhoea), Dāha (burning sensation), Raktapitta (bleeding disorder), Śotha (inflammation), Tvakroga (skin diseases). Used as single drug.

The stem bark is used for application on eczema, in epilepsy, headache, glandular swellings and diarrhea, as well as in the form of a laxative

and galactogue (uses based on ethnobotanical studies).^{20(c)}

Charaka and Sushruta (1000 BC) preferred the ripe fruit as an intestinal astringent.^{27,28}

IMPORTANT FORMULATION/ APPLICATIONS

Cycloartenone, a triterpenoid found in latex, fruits, leaves and root, exhibited highly androgenic character.

More than the root bark, other parts are used in Indian medicine.

Latex: a bacteriolytic that promotes the healing of abscesses.

Unripe fruit: astringent.

Ripe fruit: cooling, laxative, anabolic and useful in biliousness.

Seeds: diuretic.

Leaves: used in skin diseases. Ash of the leaves is applied on ulcers.

Plant juice: applied on glandular swellings.^{2(b)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

In Indian medicinal systems and in Ayurvedic texts (Charaka Samhita, Shshruta Samhita, Raja Nighantu, Bhavaprakasha and Nighantu Ratnakara), unripe fruit, ripe fruit, and seeds were used.

The root bark applications have been recorded only in folk medicine.

Asarum europaeum L.

Pinḍatagara

BOTANICAL SOURCE(S)

Asarum europaeum L.
 (Fam. Aristolochiaceae)

This was imported from Afghanistan.

It does not feature in the "Reviews on Indian Medicinal Plants" series of the Indian Council of Medical Research; nor in "The Wealth of

India" series of the Council of Scientific and Industrial Research.

PHARMACOPOEIAL AYURVEDIC DRUG

Pinḍatagara (Rhizome).

API, Part I, Vol. VI.

Pinḍatagara is a controversial synonym of *Asarum*.

A

One plant, called Taggara, is reported from Garhwal.³⁰

Tagara, Tuggura, Taggar, Pindatagarā and Rochana Tagar need further review.

AYURVEDIC SYNONYMS

Dvipāntara tagara, Kaṭupatra, Pārasika tagara.

In Bhavāprakasha Nighantu (sixteenth century), two varieties of Tagara have been mentioned: Tagara and Pindatagara. These were considered to be two species of *Valariana* or two species of *Delphinium*.³

Now, Pindatagara has been identified as *Nymphoides macrospermum* Vasudevan, known as Granthika Tagara in Kannada.^{16(c)}

One more Tagara, Rochanā Tagara (Charaka Samhitā), is either a yellow variety of Tagara or *Selinum vaginatum* Wall.³⁰

HABITAT

Europe and temperate Mediterranean regions.

It is indigenous to the northern parts of Southern Europe and Central and East-Central Europe as far as the Crimea and eastward into Western Siberia. It is cultivated in the U.S.¹⁴

A. canadense Linn. is indigenous to North America.⁷ *A. himalaicum* (Eastern Himalayas) is an unconfirmed synonym of *A. canadense*.⁷

REGIONAL LANGUAGE NAMES

Eng: Common Asarbacca, Foal foot;
Hindi: Tagar ganthoda, Asaarun, Upana;
Mar: Gathi tagara;
Ori: Rukuna, Hatapochha;
Tel: Chepututaku;
Urdu: Asaarun, Asaroon.

Eng: Coltsfoot, Hazelwort, Snakeroot,
Wild ginger, Wild nard.¹⁴
Urdu: Subul-e-Barri, Nardeen-Barri.⁶³

CONSTITUENTS

α-Agrofuran, chalcone diglycoside, α-asarone, diasarone-1, diasarone-2, *trans* and *cis*-isoasarones, fixed oil and volatile oil.

Asarum europaeum contains volatile oil consisting of up to 70% alpha-asarone with asaraldehyde, methyleugenol, bornyl acetate, *trans*-isoelemicin, and sesquiterpenes; caffeic acid derivatives including chlorogenic acid; lipids including aliphatic alcohols; and flavonoids.^{14,31}

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta (rheumatism), Anārtava (amenorrhoea), Apsmāra (epilepsy), Ardita (facial palsy), Avarodhajanya kāmālā (obstructive Jaundice), Gṛdhrasi (sciatica), Jalodara (ascites), Mūtrāvarodha (urinary obstruction), Netraroga (diseases of the eye), Pakṣavādha (Paralysis/Hemiplegia), Parsvāśūla (intercostal neuralgia and pleurodynia), Pliha (splenic disease), Śula (pain/colic), Yakrtasotha (hepatitis).

It is used as a single drug.

None of these uses are recorded in the scientific literature.

The drug (*Asarum europaeum*) acts as an expectorant, bronchial spasmolytic, superficial relaxant, local anesthetic, emetic, and errhine.^{13,14,31}

Chinese species of *Asarum* are used as analgesics and antitussive agents for influenza, rheumatic pain, and asthma.⁶⁷

IMPORTANT FORMULATION/ APPLICATIONS

The constituent phenylpropanol is considered responsible for drug's effect on bronchitis and bronchial asthma. The emetic and spasmolytic effects may be due to *trans*-isoasarone, local anesthetic effect due to *trans*-isoasarone and *trans*-isomethyleugenol.¹³

Alpha-asarone showed hypolipidemic activities and anti-thrombolytic effects in mice; anti-fertility and teratogenic effects were observed in rats.³¹

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder) 1 to 3 g.

Large doses have been associated with significant side effects.¹³
110 g *trans*-isoasaron taken orally caused severe vomiting.¹⁸

Asarabacca is frequently adulterated with aristolochic acid, a nephrotoxic and carcinogenic principle.¹³

Asparagus officinalis L.

Dvīpāntara Śatāvarī

BOTANICAL SOURCE(S)

Asparagus officinalis L.
(Fam. Liliaceae)

In addition to *A. officinalis* and *A. racemosus*, four more species are found in India: *A. adscendens*, *A. filicinus*, *A. gonocladus*, and *A. curillus*.^{20(c)}

PHARMACOPOEIAL AYURVEDIC DRUG

Dvīpāntara Śatāvarī (Root).

API, Part I, Vol. VI.

(Śatāvarī of foreign origin.)

International Pharmacopocial name: *Asparagi rhizoma*.

AYURVEDIC SYNONYMS

Sūcigucchā.

A non-classical Sanskritized synonym of “Cluster of Spears” (the edible shoots are called spears).

HABITAT

Found in Europe and the U.S., introduced in India and successfully cultivated at higher elevations in Kashmir and also in parts of the plains.

The plant grows in Central and Southern Europe, the Middle East, Western Siberia, and Northern Africa.¹⁴

It grows in Indian gardens.^{20(c)}

REGIONAL LANGUAGE NAMES

Eng: Asparagus, Sperage;

Ben: Hikua, Hillua;

Hindi: Halyum;

Mar: Halyun;

Urdu: Haliyoon.

Eng: Sparrow grass.¹⁴

CONSTITUENTS

Saponin glycosides, β-sitosterol, saccharopine, 2-aminoadipic acid, asparagusic acid, dihydroasparagusic acid, *S*-acetyl dihydroasparagusic acid, spirostanol glucoside, sarsasapogenin glycoside, asparasaponin I and asparasaponin II and nine steroid glucosides named as asparagositides A, B, C, D, E, F, G, H and I.

Two glycosides (bitter principles), officinalisins

I and II, were isolated from the dried root at yields of 0.12% and 0.075%, respectively; steroidal glycosides A to I were isolated in order of increasing polarity.¹⁷

The root contained 0.011% of an essential oil with asparagine and asparagusic acid.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aśmari (calculus), Kāmalā (Jaundice), Mūtrakṛcchra (dysuria), Śoṭha (inflammation), Vātarakta (Gout). Used as single drug.

The roots are recommended in dropsy in the form of a syrup. An infusion of roots is used against jaundice.^{2(b)}

Uses of the root include applications for non-specific inflammatory diseases of the urinary tract and for the prevention of kidney and bladder stones (irrigation therapy).

Among other uses are dropsy, rheumatic conditions, liver diseases, bronchial asthma, and gout.¹⁴

A

IMPORTANT FORMULATION/
APPLICATIONS

Few quality clinical trials exist to support a therapeutic role for asparagus; data is largely limited to *in vitro* and animal studies.¹⁷
Animal studies (*in vitro*) show that asparagus extracts have diuretic, hypotensive, anti-inflammatory, anti-oxidant, anti-mutagenic, and immunostimulatory properties.¹³

DOSAGE/USAGE/CAUTIONS/
COMMENTS

Curna (powder): 3 to 6 g.
45–60 g of the cut herb in 150 ml water is used for infusion.⁸
German Commission E approved the use of the root in irrigation therapy for inflammatory diseases of the urinary tract and for the prevention of kidney stones.^{8,9}

Asparagus racemosus Willd. Śatāvarī

BOTANICAL SOURCE(S)

Asparagus racemosus Willd.
(Fam. Liliaceae)

Mahāshatāvari, mentioned in classical texts, is equated with *A. sarmentosus* Linn.³ The roots of *A. sarmentosus* are more commonly used as a substitute in South India. *A. adscendens* is also a common adulterant.^{20(c)}

altitude of 1500 m. It can be grown successfully in black cotton soil mixed with river sand.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Śatāvarī (Root).

API, Part I, Vol. IV.

The trade procures three varieties: var. *racemosus*, common in the plains and upper ghats in Hassan (Karnataka); var. *javanicus* Miq., distributed in the Deccan peninsula, Karnataka, Gujarat, and Madhya Pradesh; and var. *subacerosa* Baker, distributed in Sikkim at altitudes of 300 to 1200 m.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Asparagus;
Assam: Satmull;
Beng: Satamuli, Satmuli, Shatamuli;
Guj: Satavari;
Hindi: Satavar, Satamul;
Kan: Ashadi poeru, Halavu bau, Narayani, Makkala;
Mal: Satavari kizhangu;
Mar: Shatavari;
Punj: Satavar;
Tam: Shimai-shadvari, Nilichedi kishangu;
Tel: Sima-shatawari (Dry root), Pippipichara, Pilliteegalu (Fresh root),
Urdu: Satawari.

Eng: Shatavari.

AYURVEDIC SYNONYMS

Narayani, Vari, Abhiru, Atirasa.
Rishyaproktā, Shataviryā.³⁰

HABITAT

Throughout India.
It is found wild in tropical and subtropical parts of India, ascending in the Himalayas up to an

CONSTITUENTS

Sugar, Glycosides, Saponin and Sitosterol.
The root contains several steroidal glycosides (shatavarins). Shatavarin I is the major one. The highest content was recorded from Kalimpong, and the lowest from Cantai (West Bengal).^{20(c)} Saponins based on sarosapogenin and arasapogenin; asparagamine, a polycyclic alkaloid; and flavonoids, including rutin hyperoside and quercetin, are the biologically active constituents.^{31,20(c),2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śoṭha, Kṣaya, Parināma śūla, Gulma, Atisāra, Raktātisāra, Raktavikāra, Mūtrarakta, Amlapitta, Arśa, Vātajvara, Svāra bheda, Naktandhya, Vātarakta, Raktpitta, Viśarpa, Sūtika roga, Stanya doṣa, Stanya kṣaya

Used in inflammations, phthisis, duodenal ulcers, diarrhea (also with blood), diseases of the blood, hematuria, hyperacidity, piles, rheumatic fever, hoarseness of the voice, night blindness, gout, hemorrhagic diseases, erysipelas, puerperal diseases, and lactal disorders, depleted breasts (therapeutic uses based on texts from 1000 BC to sixteenth century).

In clinical practice, Shatāvri isoflavones are gaining importance for treating premenstrual syndrome. Diploid and tetraploid species contain sarsasapogenin (this is lower in tetraploids); diploid and hexaploid species contain diosgenin (these are higher in hexaploids).^{20(c)} Shatavarin I and asparagamine A exhibit specific anti-oxytocin activity.^{2(c,d)}

IMPORTANT FORMULATION/ APPLICATIONS

Shatāvri juice is the main drug in Shatavari Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), and Shatavari Guda (Sahasrayoga).

Prescribed for dysuria and gynecological diseases.

Brhachhāgalādyā Ghrita (Sahasrayoga) contains goat flesh, Shatavari and 52 supporting drugs. It is prescribed for epilepsy, insanity and neurological diseases.

In all other quoted compounds, Shatāvri is an important supporting drug.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug.

Standardization basis marker compound: Shatavarin IV-NLT 0.1% w/w (IP).

Asteracantha longifolia Nees. Root Kokilākṣā

BOTANICAL SOURCE(S)

Asteracantha longifolia Nees., Syn. *Hygrophila spinosa* T. Anders (Fam. Acanthaceae)

Syn. *H. auriculata* Heine; *Barleria auriculata* (Schum.) Heine.²⁰⁽¹⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Kokilākṣā (Root).

Kokilākṣā (AFI, Part I, page 317.)

API, Part I, Vol. II.

Two varieties, white-flowered and blue-flowered, have been mentioned in Shaligram Nighantu (eighteenth century). In practice, only the blue-flowered variety is used. The plant is a shrub, known as Talamakhana.

It is not to be confused with Makhāna (Makhānā), *Euryale ferox** Salisb.

The root is also the officinal part in Ayurvedic texts.

AYURVEDIC SYNONYMS

Ikṣura, Ikṣuraka, Kokilāksī, Culli.

Kākekshu, Kshuraka, Bikshu,⁷ Triksura, Vajra.²⁷

HABITAT

Common in waterlogged places throughout India.

It is a common weed in moist places, paddy fields and waterlogged areas. It is widely distributed in India.

The plant parts should be collected during October–November (the plant's flowering season).

A

REGIONAL LANGUAGE NAMES

Assam: Kulekhara;
 Guj: Ekhro;
 Hindi: Talmakhana;
 Kan: Nirmulli, Kolavulike, Kolavankae;
 Mal: Vayalculi, Nirchulli;
 Mar: Talimakhana;
 Ori: Koillekha, Koilrekha;
 Tam: Nirmulle;
 Tel: Nirugobbi, Golimidi;
 Urdu: Talmakhana.

In the National Formulary of Unani Medicine,
 Talmakhana is wrongly equated with *Euryale*
ferox.^{37*}

Eng: Long-leaved barberia.²⁷

CONSTITUENTS

Essential oil.

The root yielded hygrosterol, lupeol, lupenone,
 and beta-sitosterol.^{15,68,20(1)}

**THERAPEUTIC AND OTHER
ATTRIBUTES**

Āmavāta śoṭha, Asmari, Vātarakta, Pittātisara

Used in rheumatic swelling, calculus, gout, bilious
 diarrhea (therapeutic uses based on texts from
 1000 BC to sixteenth century).

Charaka (1000 BC) used a decoction of the leaves
 and roots alone or in prescriptions, internally,

for urinary calculus, hemothermia and as an
 aid to virility.²⁷

The aqueous extract of the root (200 mg/kg p.o.)
 showed hepatoprotective activity against CCl₄-
 induced liver damage in albino rats.

The aqueous extract of the root showed anti-oxidant
 activity comparable with vitamins E and C.

The petroleum ether extract showed significant
 anti-tumor activity experimentally.²⁰⁽¹⁾

**IMPORTANT FORMULATION/
APPLICATIONS**

Rāsnairandādi kvāṭha Churna (Sahasrayoga, a
 non-Samhitā, Kerala Materia Medica), con-
 tains 14 plant drugs including Ikshura root, all
 in equal proportion. For gout edema, neuritis.
 Vastyāmayāntaka Ghrita (Sahasrayoga) is used
 for dysuria, glycosuria, calculus and kidney
 disease. (See Kokilaksha seed.)

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

3–6 g of the drug for decoction.

A drug obtained from the roots exhibited anti-
 neoplastic effects in Swiss mice. The drug also
 inhibited tumor growth in mice with Dalton's
 lymphoma. The drug possesses low toxicity.^{2(d)}

The root is used for catarrh of urinary organs in
 the form of a decoction (50 g root to 3 pints of
 water, boiled down to 1 pint).

Dose: 15–60 mL.¹⁸

Asteracantha longifolia Nees. Seed Kokilākṣā

BOTANICAL SOURCE(S)

Asteracantha longifolia Nees.

Syn. *Hygrophila spinosa* T. Anders
 (Fam. Acanthaceae)

Syn. *H. auriculata* Heine, *Barleria auriculata*
 (Schum.) Heine.²⁰⁽¹⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Kokilākṣā (Seed).

Kokilākṣā (AFI, Part I, page 317.)

API, Part I, Vol. II.

Two varieties, white-flowered and blue-flowered,
 have been mentioned in Shaligram Nighantu
 (eighteenth century). In practice, only the

blue-flowered variety is used. The plant is a shrub, known as Talamakhana. It is not to be confused with Makhānnā (Makhānā), *Euryale ferox** Salisb. The seed is the official part in Ayurvedic texts. The fruit is thin, flat, 8 mm long, with four to eight seeds that are minute and reddish-brown with a mucilaginous coating.³

AYURVEDIC SYNONYMS

Iksura, Iksuraka, Kokilāksī, Culli.

Kākekshu, Kshuraka, Bikshu,⁷ Trikshura, Vajra.²⁷

HABITAT

Common in waterlogged places throughout India.

It is a common weed in moist places, paddy fields, and waterlogged areas. It is widely distributed in India.

The plant parts should be collected during October–November (the plant's flowering season).

REGIONAL LANGUAGE NAMES

Assam: Kulekhara;

Guj: Talimkhana;

Hindi: Talmakhana;

Kan: Kolavankae, Nirmulli, Kolavalike,

Mal: Nirchulli, Vayalchulli;

Mar: Talimakhana;

Ori: Koillekha, Koilrekha;

Tam: Nirmulle;

Tel: Nirugobbi, Nite, Gobbi;

Urdu: Talmakhana.

In the National Formulary of Unani Medicine, Talmakhana is wrongly equated with *Euryale ferox*.^{37*}

Eng: Long-leaved Barberia.²⁷

CONSTITUENTS

An yellow semi-drying oil, enzymes like Diastase, Lipase, Protease and an Alkaloid.

The seed contains a yellow semi-drying oil (sap val. 196, iod. val. 126; and linoleic acid 71%).^{2(c)}

The seeds gave the amino acids, histidine, lysine, and phenylalanine; linoleic acid 71%;^{2(c)} oleic, palmitic and stearic acids; xylose, uronic acid,

polysaccharides, xylan, lipase, protease, saponin, and sterols;¹⁵ beta-sitosterol 0.316%;⁶⁸ and asteracanthine and asteracanthicine.

The seed ash (6.4%) contains K₂O 3.3% and P₂O₅ 2.1%.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vatarakta, Sotha, Pittasmari

Used in gout, inflammation, biliary calculus (therapeutic uses based on texts from 1000 BC to sixth century).

The diuretic property of seeds is due to large amounts of mucilage and potassium salts.¹⁸

The fruits are used for treating menorrhagia.^{2(d)}

In Andhra Pradesh and Uttar Pradesh, the tribals use the seeds for spermatorrhea and gonorrhea.^{2(d)}

The methanolic extract of the seeds showed significant hepatoprotective activity experimentally.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Yakṛt shula vināshini Vatikā (Bhaishajya Ratnāvali, seventeenth century), contains ammonium chloride, sea salt, Kokilāksha seeds, Rohitaka stem bark, Yavani fruit and Chitraka, processed in the leaf juice of Chirbilva. For diseases of liver, chronic obstructive jaundice, enlargement of spleen.

For Vastyāmayāntaka Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), Gokshura fruits and the juices of six herbs form the main drug, supported by 48 other herbs, including Ikshuraka root and Ikshura seed. It is used for dysuria, glycosuria, calculus and kidney disease.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

For spermaturia, spermatorrhea and vitiation of the semen, the seeds are invariably combined with *Asparagus adscendens* root and *Tribulus terrestris* fruits, as well as with *Mucuna prurita* seeds.¹⁸

Asteracantha longifolia* Nees.*Whole plant****Kokilākṣā****BOTANICAL SOURCE(S)**

Asteracantha longifolia Nees. Syn. *Hygrophila spinosa* T. Anders
(Fam. Acanthaceae)

Syn. *H. auriculata* Heine; *Barleria auriculata* (Schum.) Heine.²⁰⁽¹⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Kokilākṣā (Whole plant).

Kokilākṣa (AFI, Part I, page 317.)

API, Part I, Vol. II.

Two varieties, white-flowered and blue-flowered, have been mentioned in Shāligrām Nighantu (eighteenth century). In practice, only the blue-flowered variety is used. The plant is a shrub, known as Talamakhana.

It is not to be confused with Makhāna (Makhānā), *Euryale ferox** Salisb.

Gregarious sub-shrub, strigose-hispid all over, purplish stem, thickened at nodes; leaves with sharp axillary spines; bluish–purple flowers.

The fruit is thin, flat, 8 mm long, with four to eight seeds that are minute and reddish–brown with a mucilaginous coating.³

AYURVEDIC SYNONYMS

Ikṣura, Ikṣuraka, Kokilākṣī.

Kākekshu, Kshuraka, Bikshu,⁷ Trikshura, Vajra.²⁷

HABITAT

Common in waterlogged places throughout India.

It is a common weed in moist places, paddy fields and waterlogged areas. It is widely distributed in India.

The plant parts should be collected during October–November (the plant's flowering season).

REGIONAL LANGUAGE NAMES

Beng: Kuliakhara, Kulekhade;

Guj: Ekharo;

Hindi: Talmakhana;

Kan: Kolavali, Kolarind, Kolavankal;

Mal: Vayalculi, Culli, Nirmuli;

Mar: Talikhana, Kalsunda;

Tam: Golmidi, Kettu, Nirguvireru, Nerugobbi;

Urdu: Talmakhana.

In the National Formulary of Unani Medicine, Talmakhana is wrongly equated with *Euryale ferox*.^{37*}

Eng: Long-leaved Barberia.²⁷

CONSTITUENTS

Alkaloids.

Alkaloids B₁ and B₂, long-chain hydrocarbons, stigmasterol;¹⁵ beta-sitosterol 0.069% (in leaf), 0.029% (in stem);⁶⁸ leupol 0.051% (in leaf) and 0.0121% (in stem);⁶⁸ leaves contain ascorbic acid, nicotinic acid; flowers gave apigenin-7-O-glucuronide and 7-O-glucoside.¹⁵

Minerals: Ca, Mg, K, Fe, Cu, Zn, Mn, Co and Cr.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta śoṭha, Trṣṇā, Vatarakta

Used in rheumatic swelling, thirst and gout (therapeutic uses based on texts from 1000 BC to sixteenth century).

Kokilāksha plant is used as a vegetable in diet or its decoction is prescribed for gout (Ashtāngahridaya, seventh century).^{16(a)}

The ash of the plant with urine or water was prescribed by Chakradatta (eleventh century) for edema.^{16(a)}

Charaka (1000 BC) identified Ikshuraka as a semen depurant,^{16(c)} using it as a decoction of leaves and root alone or in prescriptions, internally, for urinary calculus, hemothermia and as an aid to virility.²⁷

A decoction of the Kokilāksha plant was included among hypnotic and sedative herbs (Hārīta Samhita, prior to the seventh century).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Panaviralādi Bhasmakshara (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains ash of Chulli (Kokilāksha) plant and 3 other plant drugs.

It is used for edema, chronic obstructive jaundice, and ascites.

Aerial parts exhibited promising hepatoprotective activity in albino rats.^{2(d)}

Alcoholic extract of the whole plant exhibited anti-fungal activity.¹⁸

Triterpene and steroidal glycosides present in the plant inhibit the growth of ringworm fungi.^{2(d)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

A homeopathic drug isolated from *H. spinosa* is used for treating ringworm, exfoliative dermatitis and urticaria.^{2(d)}

Azadirachta indica A. Juss.

Leaf

Nimba

BOTANICAL SOURCE(S)

Azadirachta indica A. Juss.

Syn. *Melia azadirachta* Linn.

(Fam. Meliaceae)

Walsura trifoliata (A. Juss.) Harms. is used as a substitute of Nimba (*A. indica*).

Melia dubia Hiern. non-Cav. is known as Malabar neem.

Mahānimbaka is equated with *Melia azedarach* Linn., which is also of the Meliaceae family.

For the microscopic features of wood and bark of *A. indica*, *Melia dubia*, *Melia azedarach*, and *Walsura trifoliata*, see Reference 20(c).

PHARMACOPOEIAL AYURVEDIC DRUG

Nimba (leaf).

API, Part I, Vol II.

Nimba (flower).

API, Part I, Vol. V.

Nimba (fruit).

API, Part I, Vol. V.

Nimba (stem bark).

API, Part I, Vol. II.

Nimba (root bark).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Ariṣṭa, Picumarda, Pichumandah, Prabhadrah.

Arishtaka, Pichumandaka, Pichumardaka,³
Niyamana, Netā, Sutikta, Sarvabhadra.⁴

Pāribhadraka⁴ (now equated with *Erythrina indica* Lam.)³

HABITAT

Throughout India up to an elevation of 900 m.

Forty-two Neem ecotypes of India were investigated for their physico-chemical characteristics. A wide variation is recorded in the content of oil, fatty acid composition and key meliacins (azadirachtin, nimbin, and salannin).^{20(c)}

REGIONAL LANGUAGE NAMES

Eng: Margosa tree;

Assam: Mahanim;

Beng: Nim, Nimgach;

Guj: Kohumba, Limba, Limbado, Limado;

A

Hindi: Nim, Nimba;
 Kan: Nimba, Bevu, Oilevevu, Kahibevu, Bevinama;
 Mal: Veppu, Aryaveppu, Nimbam, Veppa;
 Mar: Balantanimba, Limba, Bakayan, Nim,
 Kadunimb;
 Ori: Nimba;
 Punj: Nimba, Bakan, Nim;
 Tam: Vemmu, Veppu, Arulundi, Veppan;
 Tel: Vemu, Vepa;
 Urdu: Neem.

CONSTITUENTS

Nimba dried leaf:

Triterpenoids and Sterols.

Leaves yielded beta-sitosterol and its beta-D-glucoside, quercetin, and *n*-hexacosanol; tetranortriterpenoids include meldenin diol, vilasinin, nimonol and isomeldenin.

A new isoprenylated flavone, nimbaflavone (for the first time in the Meliaceae family) and a new meliacin 2', 3'-dehydrosalanol, related to salanin (in addition to known meliacins nimbolide), were isolated. The limonoid azadirachtin A was also isolated.^{20(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Āmaśoṭha, Vraṇa, Kuṣṭha, Prameha, Netraroga, Kṛmiroga, Viṣaroga

Used in fever, acute inflammation, ulcer, obstinate skin diseases, urinary disorders/polyuria, diseases of the eye, worm infestations and poisoning (therapeutic uses based on texts from 1000 BC to sixteenth century).

Leaves: anti-periodic, anti-fungal, antiseptic, anti-viral; applied as a poultice to boils, abscesses, adenitis, eczema and ulcers; hot infusion is anodyne for fomenting bruises, sprains, and swollen glands. Tender leaves with black pepper used for intestinal helminthiasis.

Essential oil: mild fungicidal.¹⁵

Leaves used in gingivitis and periodontitis.³²

IMPORTANT FORMULATION/ APPLICATIONS

Kasisādi Ghrita (Shārangadhara Samhitā, thirteenth century), contains 32 herbal and mineral drugs, including Nimba leaves, all in equal proportion.

Used for skin diseases, non-healing ulcers and syphilis.

Jātyādi Ghrita (Ashtāṅgahridaya, seventh century) contains 12 herbal drugs including Nimba leaves and a mineral, blue vitreol, all in equal proportions. Used for non-healing ulcers.

Ārogyavardhini Gutikā (Rasatantra samucchaya), a mercury-based mineral drug, is processed in the juice of Nimba leaves. Used for jaundice, chronic fever, and skin diseases.

Nimbapatrādi upanāha, a poultice of Nimba leaves with supporting herbs, is used for edema and inflammation.

Panchaguna Taila (Siddhayoga Sangraha, non-classical and contemporary) contains Nimba leaf in a medicinal oil, which might have been used rarely for earache, joint pain, and as a disinfectant for ulcers.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

10–20 g of the drug for decoction.

An extract of the leaves (3 g single dose, orally on empty stomach) was found to be effective as an anthelmintic when potent anthelmintics had earlier failed.^{20(c)}

In one study, a Neem leaf lotion (two applications per day for 3–4 days) cured patients of ringworm and scabies.^{20(c)}

Oral administration of 5 g of an aqueous leaf paste or equivalent amount of dried leaf in a capsule enabled diabetic patients to reduce their dosage of insulin by up to 30%–50% without significant effects on their glucose levels.^{20(c)}

Flower

A

CONSTITUENTS

Nimba flower:

15-acetoxy-7-deacetoxy- dihydroazadirone (neef-lone), nonacosane (saturated hydrocarbon).

Flowers yielded a crystalline compound, nimbo-sterol, a glycoside nimbosterin, and a flavon nimbicetin;^{20(c)} fatty acids in the waxy material are mainly palmitic (13.6%) and oleic (65.3%) acids;^{2(b)} an essential oil (0.25%) contains thio-amyl alcohol (7.6%), benzyl alcohol (9.67%), benzyl acetate (8.2%), and an unidentified alcohol (3.9%).^{20(c)}

Flowers also contain beta-sitosterol and its beta-D-glycoside, kaempferol, quercetin, myricetin, and their glycosides.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Aruci, Prameha, Kṛmi, Kaphapittaja vikāra, Dāha, Jvara, Viṣamajvara, Netraroga, Raktavikāra, Phiranga, Śoṭha, Śrama, Tṛṣṇā, Kāsa, Vraṇa, Chardi, Kaṇḍu, Vraṇa, Hṛllāsa, Hṛdayavidāha

Used in obstinate skin diseases, tastelessness, urinary disorders/polyuria, worm infestations, catarrhal disorders, burning syndrome, fever, intermittent fever, diseases of the eye, blood disorders, syphilis, inflammation, lethargy, morbid thirst, cough, ulcer, emesis, pruritus, nausea, and heartburn (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta used the paste or decoction of the Nimba leaf, flower, fruit, bark, and root in internal and external prescriptions for virulent skin diseases, leprosy, malignant ulcers, intestinal parasites, poisoning, chronic fevers, urinary disorders, jaundice, ascites, hemorrhoids, edema, and inflammation.^{27,28}

IMPORTANT FORMULATION/ APPLICATIONS

Kushtha kālāmla (correct name: Kushtha kālānala) Rasa (not in AFI; Bhaishajya Ratnāvali, seventeenth century), a mercury based mineral drug processed in the decoction of Nimba *pañchāṅga* (leaf, flower, fruit, root, and bark).

For obstinate skin diseases, including leprosy. Kushtha shailendra Rasa (not in the AFI, details could not be traced).

Krmi vināshna Rasa (not in the AFI; Bhaishajya Ratnāvali) does not contain Nimba flowers. Flowers of Dhava (*Anagallis arvensis*) are a part of the herbo-mineral compound.

Krmighna Rasa (not quoted in the API; Bhaishajya Ratnāvali) also does not contain Nimba flowers, but contains Nimba fruit kernels.

Flowers are stomachic, stimulants, anthelmintic, and antibiotic. They are used in atonic dyspepsia, jaundice and as a bitter tonic.^{2(b),15,20(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–4 g Puspa curna. 10–20 ml Puspa svarasa.

Neem chemistry dates back to 1880–1890.^{20(c)}

Neem is considered a pharmacy in its own right as every part of the plant has been used medicinally since the period of Charaka and Sushruta (1000 BC).

The extract of Neem flowers, when screened for its influence on the carcinogen-detoxifying enzyme glutathione-S-transferase in Swiss mice, showed increased activity of the enzyme by more than 78% in the stomach, liver, and esophagus.^{20(c)}

A

Fruit

CONSTITUENTS

Nimbu fruit:

Fixed oil containing diterpenoids and triterpenoids (limonoids); nimbin, gedunin, azadirachtin; nimbidinin, salanin.

Fresh ripe fruits yield a new protolimonoid naheed in along with azadirachtol, 7-desacetyl-7-benzoyl-azadiradione, nimocin, nimbocinol and nimolicinol.

Fruit pulp yields 17- α -hydroxyazadiradione; arabinogalactan contains D-galactose, L-arabinose, L-rhamnose, and D-glucuronic acid.^{2(c)}

Kernels yield a bitter fixed oil (40%–48.9%); isolated compounds of the oil include azadirachtins A, B, D, H, I, and K, nimbidin (1.2%–1.6%), nimbin (0.1%), and nimbinin (0.01%).^{2(b,d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmi, Kuṣṭha, Prameha, Gulma, Arśa, Palitya, Netrarujā, Raktapitta, Kṣata kṣaya, Śīroroga, Jvara, Aruci, Dāha, Chardi, Hṛllasa, Vraṇa, Śoṭha, Viṣavikāra, Vibandha, Khālitya, Gandamālā

Used in worm infestations, obstinate skin diseases, urinary disorders/polyuria, abdominal lumps, piles, graying of the hair, pain in the eyes, bleeding disorders, emaciation due to injury, diseases of the head, fever, tastelessness, burning syndrome, emesis, nausea, ulcers, inflammation, disorders due to poison, constipation, alopecia, and cervical lymphadenitis

(therapeutic uses based on texts from 1000 BC to sixteenth century).

Fruits: anti-periodic, anthelmintic, astringent, purgative, and a bitter tonic.

Seed oil: strong anti-septic for boils, ulcers, eczema, leprosy, and urinary diseases. It is also insecticidal and spermicidal.^{20(c),15}

IMPORTANT FORMULATION/ APPLICATIONS

Arshoghnavati (Siddhayoga Sangraha, non-classical and contemporary), contains fruits of both Nimbā and Mahānimba. For bleeding piles, depleted hemorrhoids. The drug does not have a history of actual application.

Palāshabijādi Churna (Rasoddhāra Tantra by Charanatirtha Mahārāja, period not known) contains Nimbā seeds with four other plant drugs in equal proportions. It is used for worm infestations.

The original compounds belong to Bhaishajya Ratnavali, seventeenth century.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g curna. 5–10 drops of oil.

The ethanolic extract of the leaves and seeds showed *in vitro* anti-malarial activity against chloroquine-sensitive and -resistant strains of *Plasmodium falciparum*.

Neem seed fractions were found to be active not only against the parasite stages that caused the clinical infection, but also against the stages responsible for continued malaria transmission.^{20(c)}

Stem bark

CONSTITUENTS

Nimba stem bark:

Bitter principles Nimbin and Nimbiol.

Stem bark showed the presence of steroids/terpenoids, alkaloids, flavonoids, phenolics,

and saponins. Ethanolic extract yielded nimbin 0.04%, nimbinin 0.001%, and nimbidin 0.4%. Tannin content in the stem bark (50% ethanol extract) was found to be 15.76%. Trunk bark yielded 0.02% essential oil, as well as nimbosterol (0.03%) desacetyl nimbin, sugiol or

7-ketoferruginol and nimbial. The bark as well as the fruit also contain the limonoids gedunin and 7-desacetyl gedunin.^{20(c)}
The stem bark contains tannin 12%–16% and non-tannin 8%–11%.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vraṇa, Kuṣṭha, Prameha, Kaṇḍu, Krmiroga, Jvara, Dāha, Rakta pitta

Used in ulcers, obstinate skin diseases, urinary disorders/polyuria, pruritus, worm infestations, fever, burning syndrome, and bleeding disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

Stem bark: astringent, anti-periodic, alterative, bitter tonic, blood purifier, anti-emetic, anthelmintic, hypoglycemic, and is used for obstinate skin diseases, anorexia, colic, liver disorders, sprue and as a good remedy for pyresis and intermittent fevers.^{15,20(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Nimbādi Kvātha Churna (Chakradatta, eleventh century), contains 10 plant drugs including Nimba stem bark, all in equal proportion. For fever due to cough, bronchitis.

Nimbādi Churna (Bhaishajya Ratnāvali, seventeenth century) contains Nimba stem bark as one of the five main plant drugs, with

16 supporting herbs. It is used for bleeding disorders, skin diseases, anemia, and jaundice. Panchanimbādi Churna (not in the AFI; Bhaishajya Ratnāvali) contains all five plant parts of Nimba and Vrdhadārūka (*Argyrea nervosa*) in double quantities and sugar. It is used for intestinal colic and hyperacidity.

Sudarshana Churna (Bhaishajya Ratnāvali) contains 44 plant drugs, including Nimba stem bark. It is used for intermittent fever and diseases of the liver and spleen.

Pancha-tikta Guggulu Ghrita (not in the AFI. Bhaishajya Ratnāvali) contains Nimba stem bark as a supporting herb. It is used for inflammatory disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–4 g of the drug in powder form, decoction should be used externally.

The alcoholic extract of the bark was found to be more active against *Bacillus megaterium*, *Shigella sonnei*, and *Aspergillus niger* than that of the leaves. The alcoholic extract of the dried leaves and bark showed strong *in vitro* anti-bacterial activity against *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Bacillus subtilis*.^{20(c)}

Gedunin showed anti-malarial activity against *Plasmodium falciparum*.^{2(b)}

Root bark

CONSTITUENTS

Nimba root bark:

Tetranortriterpenoids, margocin, nimbiol, nim-bolicin, azadirinin.

The ethanolic extract was reported to contain nimbin, nimbidin, and nimboesterol; the chloroform extract yielded nimbiol.^{20(c)}

The tricyclic diterpenoids, margocin, margocinin, margocilin, nimolinin, and the tetranortriterpenoid nimbin were

isolated from the root bark and exhibited anti-tumor, antibiotic, and insecticidal properties.^{20(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Chardi, Kuṣṭha, Raktapitta, Prameha, Hṛllasa, Duṣṭa vraṇa, Tṛṣā, Jvara, Dāha, Kāsa, Śvasa, Śoṭha, Kaphavikāra, Kṛmiroga, Aruci, Grahaṇī, Yakṛtvikāra, Hṛdayavidāha, Vamana

A

Used for emesis, obstinate skin diseases, bleeding disorders, urinary disorders/polyuria, nausea, non-healing ulcers, morbid thirst, fever, burning syndrome, cough, asthma, inflammation, diseases of the mucus membrane, worm infestations, tastelessness, malabsorption syndrome, liver disorders, heartburn, and vomiting (therapeutic uses based on texts from 1000 BC to sixteenth century).

Root bark: bitter tonic, anti-periodic, alterative, anti-emetic, anthelmintic, astringent, hypoglycemic; used for anorexia, colic, liver disorders, sprue and intermittent fevers.^{15,20(c)}

**IMPORTANT FORMULATION/
APPLICATIONS**

Amritashtāka (not in AFI; Bhaishajya Ratnāvali, seventeenth century), contains 8 plant drugs including Nimba bark, all in equal proportion,

for decoction, to which Pippli (*Piper longum*) powder is to be added.

Used for fever due to intestinal toxemia, nausea, and emesis.

Ashtānga dashānga Lauha (not in the AFI; Bhaishajya Ratnāvali) contains 18 plant drugs including Nimba (plant part not specified) in equal proportions, and calx of iron equal to the total quantity of all of the 18 plant drugs. It is used for anemia, jaundice, urinary disorders, and skin diseases.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

3–6 g.

Nimbidin is reported to be a potential anti-cancer compound. It does not show any toxicity in albino rats, mice, and dogs. Nimbidin led to increases in liver glycogen, reductions in serum protein and slight sedation in albino rats.^{2(d)}

BOTANICAL SOURCE(S)

Bacopa monnieri (Linn.) Wettst.
Syn. *Herpestis monniera* (Linn.) H.B.&K.
(Fam. Scrophulariaceae)

Centella asiatica (L.) Urban, syn. *Hydrocotyle asiatica* Linn. and two other species, *H. rotundifolia* Roxb. and *H. javanica* Thumb, are being used in some parts of India as Brahmi. These have been identified as Mandūkarni.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Brāhmī (Whole plant).

API, Part I, Vol. II.

Centella asiatica should not be used as a substitute to *Bacopa monnieri*. Brāhmī promotes fertility and sustains implantation and pregnancy, while Mandūkarni tends to do the opposite.⁵

AYURVEDIC SYNONYMS

Saraswatī, Kapotavāmka.

Vyasthā, Surasā, Somvallari.²⁸

Suvarchala,^{28,29} Somvalka,²⁹ Bhārati, Dāruradalā.³

Aindri is a confusing synonym. It is equated with Indraravuni (*Citrullus colocynthis* Schrad).³

HABITAT

Throughout India in wet and damp places.

Ascending to an altitude of 1320 m in marshy places.

Centella asiatica is found as a weed in crop fields and other waste places.

REGIONAL LANGUAGE NAMES

Eng: Thyme leaved gratiola;

Assam: Brahmi;

Guj: Neerbrahmi, Bamanavari;

Hindi: Manduka parni;

Kan: Nirubrahmi, Valabrahmi, Ondelaga, Mandukaparni;

Mal: Brahmi;

Mar: Jalnam, Brahmi, Birami;

Ori: Brahmi;

Punj: Brahmibuti;

Tam: Nirabrahmi, Brahmi vazhukkai;

Tel: Sambarenu, Sambarani;

Urdu: Brahmi.

CONSTITUENTS

Alkaloids.

The plant contains saponins, bacosides A and B, sapogenins, bacogenins A₁, A₂, A₃, A₄, monnierin, stigmasterol, stigmastanol and beta-sitosterol. Bacosides A and B, as well as monnierin, gave glucose and arabinose, a triterpene bacosine, four new dammarane-type triterpenoid saponins, bacopasaponins A, B, C, and D and the alkaloids brahmine and herpestine.^{12,15,20(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Jwara, Śopha, Pāndu, Prameha, Mānasavikāra

Used in obstinate skin diseases, including leprosy, fever, edema, anemia, urinary disorders, and memory problems (therapeutic uses based on texts from 1000 BC to sixteenth century).

Pharmacological activity of Brāhmī is attributed to the saponin bacoside and bacopasaponins. Some evidence suggests that purified bacosides A and B may facilitate learning ability and cognitive performance. Possible mechanisms include modulation of acetylcholine release, choline acetylase activity, and muscarinic receptor binding.¹⁴

IMPORTANT FORMULATION/ APPLICATIONS

Sāraswatārishta (Bhaishajya Ratnāvali, seventeenth century); Sāraswata Churna (Bhāvaprakāsha, sixteenth century); Brāhmi Ghrita (Ashtangahridaya, seventh century); and herbomineral composite drugs: Brahmi Vati (Siddhayoga Sangraha), 9 minerals with 28 herbs; Smrita-sagara Rasa (Yogaratanākara), 5 non-herbal drugs with 3 herbs; Ratnāgiri Rasa (Bhaishajya Ratnāvali), 7 minerals with 15

herbs. All with Brāhmi as the main herb with supporting constituents.

Used for brain disorders, epilepsy, insanity, and diseases of the nervous system.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g in powder form.

For improving cognitive performance: a 300 mg capsule per day.

Standardization basis marker compound:

Bacoside A–NLT 2.5% w/w (IP).

Baliospermum montanum Muell.-Arg.

Dantī

BOTANICAL SOURCE(S)

Baliospermum montanum Muell.-Arg.
(Fam. Euphorbiaceae)

Syn. *B. axillare* Blume.

Root bark of *Croton oblongifolius* Roxb. (known as Nāgadanti) is used as a substitute, especially in South India.³⁶

Croton tiglium Linn. is used as a substitute in Tamil Nadu.⁶

Dantimūla is sold as Danti, Hastidanti and Dravanti. Hastidanti is equated with *Croton oblongifolius* and Dravanti with *Jatropha curcas*.^{20(d)}

Roots of *Ricinus communis* Linn. are common adulterants.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Dantī (Root).

API, Part I, Vol. III.

Not to be confused with Rudanti.

AYURVEDIC SYNONYMS

Dantin, Chitra,²⁸ Udumbara-parni, Kumbha, Nikumbha, Mukulaka.³⁰

HABITAT

Distributed in outer range of Himalayas from Kashmir to Assam and in moist deciduous forests elsewhere in India.

Up to an elevation of 1000 m and southwards into penninsular India, ascending to an altitude of 1800 m in the hills of Kerala.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Wild croton;

Assam: Danti;

Beng: Danti;

Guj: Danti;

Hindi: Danti;

Kan: Kadu haralu;

Mal: Neervalam, Dantti;

Mar: Danti;

Ori: Danti;

Punj: Danti;

Tam: Danti;

Tel: Konda amudamu;

Urdu: Danti.

CONSTITUENTS

Beta-Sitosterol and Triterpenoids, Resinous Glycosides, Phorbol esters.

Root yielded five phorbol esters, montanin 0.018%, baliospermin 0.003%, 12-deoxyphorbol 13-palmitate 0.021%, 12-deoxy-16-hydroxyphorbol 12-palmitate 0.001% and 12-deoxy-5 beta-hydroxyphorbol 13-myristate 0.007%.^{2(b),15(4)}

THERAPEUTIC AND OTHER ATTRIBUTES

Tvakadoṣa, Dāha, Śoṭha, Udararoga, Śūlaroga, Krimi, Arśa, Aśmari, Kaṇḍu, Kuṣṭha, Vraṇa, Pliḥā, Vṛddhi, Gulma, Kāmālā

Used for skin diseases, burning sensation, inflammations, gastrointestinal tract diseases, colic, worm infestations, piles, lithiasis, itch, leprosy, ulcers, splenomegaly and abdominal lumps (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka used sun-dried roots in prescriptions, internally, for edema, jaundice, and stomach disorders.²⁸

Sushruta prescribed the powdered root for acute constipation, abdominal lumps and dropsy, and the cooked root for jaundice.²⁹

IMPORTANT FORMULATION/ APPLICATIONS

Dantyaḍyārishta (Ashtāṅgahridaya, seventh century), contains Danti root and 14 other herbs in equal proportion.

Danti-haritaki (Ashtāṅgahridaya) contains Danti root and two other main herbs, with eight supporting herbs. It is prescribed in splenomegaly and malabsorption syndrome.

In other composite drugs quoted in the API,

Danti is included as a supportive herb for its purgative and anti-inflammatory properties.

Danti (a strong purgative drug) was also included in the group of rejuvenating herbs in classical texts.³

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Ethanollic extract of the root exhibited *in vitro* activity against P-388 lymphocytic leukemia.^{2(b)}

Phorbol ester derivatives (see Section 6) exhibited *in vitro* anti-leukemic activity.^{2(b)}

Balsamodendron caudata Mauch.

Āmrāgandhi-guggulu

BOTANICAL SOURCE(S)

Balsamodendron caudata Mauch.

Syn. *Commiphora caudata* Engl., *Protium caudatum* W.&A.

(Fam. Burseraceae)

Commiphora caudata (Wight & Arn.) Engl.

Syn. *Protium caudatum* W. & A. var.

roxburghianum.^{20(g)}

PHARMACOPOEIAL AYURVEDIC DRUG

Āmrāgandhi-guggulu (Leaf).

API, Part I, Vol. VI.

A non-classical synonym.

The leaves and bark have the odor of mangoes.

The fruit is of the size of a pea.^{2(a)}

The oleo-gum resin is used as incense. Its effect on lipids has not been investigated. It is difficult to recognize it as one of the guggulu of herbal medicine.

AYURVEDIC SYNONYMS

Ayurvedic synonyms not found.

HABITAT

Dry forests in the region of the Eastern Ghats, mostly in plains.

Also found in the Western Ghat regions of Karnataka and Kerala.

It is common in Cuddapah, Mysore, and South Arcot.

REGIONAL LANGUAGE NAMES

Assam: Devadhup,*

Kan: Kundamaavu, Kaimaavu;

Mal: Kilimarum;

Tam: Centiluvai ilai;

Tel: Kondamamidi.

Eng: Hill Mango.^{2(a)} (Pea-sized fruit is pickled.)

Tamil: Pachai kiluvai.

CONSTITUENTS

Guggulsterones. (Could not be rechecked.)

Carbohydrates, phytosterols, saponins, proteins, amino acids, flavonoids, gums, resins, tannins, and mucilage were present. Alkaloids were absent.⁶⁹

Further investigations are yet to be undertaken.

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta (rheumatism), Angamarda (body ache), Gandamālā (cervical lymphadenitis), Kuṣṭha, (leprosy/diseases of skin), Pādādāri (chaffed/cracked

* Devadhup is a wrong synonym. It is a synonym of *Commiphora mukul* gum-resin (Guggulu).^{2(a)}

soles/rhagades), Prameha (metabolic disorder), Sandhiśoṭha (arthritis), Śoṭha (inflammation), Vātarakta (Gout), Vātaroga (disease due to Vata dosa), Visarpa (Erysipelas), Vraṇa (ulcer). Used as single drug.

Classical references and uses could not be traced. Used only in ethnomedicine: in Tamil Nadu and Kerala. The leaf is used for its anti-spasmodic, hypothermic, anti-inflammatory, liver-protective, and cytotoxic properties. In Tamil Nadu, crushed leaves, mixed with lime juice, are given twice a day for 2 days to treat dysentery. In Southwestern Ghats, the leaf and bark are used in rheumatism and diabetes.

IMPORTANT FORMULATION/ APPLICATIONS

Anti-inflammatory, analgesic, and anti-lipid peroxidation activities of ethanol extract of leaves in animal studies have been demonstrated.⁷⁰

Experimentally, the leaves also showed a potent ability to scavenge free radicals in a dose-dependent manner.⁷⁰

A composite drug, having *C. caudata* leaf as one of the ingredients, exhibited hepatoprotective potential.⁷⁰

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Svarasa (juice): 5 to 10 mL.

Barleria prionitis Linn.

Sahacara

BOTANICAL SOURCE(S)

Barleria prionitis Linn.
(Fam. Acanthaceae)

Three species of *Barleria* are used in Ayurvedic medicine: *B. prionitis* with yellow flowers (Pita Saireyaka); *B. cristata* Linn. with both red and white flower forms (Rakta and Shveta); and *B. strigosa* Linn. with blue flowers (Nila or Krishna). All are known as Jhinti and Katasaraiya.³⁰

In Kerala, other *Acanthaceae* sp. are used as Sahachara: *Nilgirianthus ciliatus* (Nees) Bremek., *Ecaballium viride* (Forsk.) Alston and *Justicia betonica* Linn.

PHARMACOPOEIAL AYURVEDIC DRUG

Sahacara (Whole plant).

API, Part I, Vol. III.

Himalayan sp. have also been suggested as Saireyaka: *Rhododendron arboreum* Sm.,

R. barbatum Wall, ex Don., *Osmanthus fragrans* Lour. and *Erythrina indica* Linn., as well as seashore sp. *Avicenna* or *Rhizophora*.^{3,30}

AYURVEDIC SYNONYMS

Kuraṇṭaka, Koranḍa, Keraṇḍaka.

Saireyaka, Saireya, Kurantaka, Rujākara, Ārtagala, Bāṇa, Sahā, Mahā-sahā.³⁰
Kuruvaka (red-flowered sp.), Kurantaka (yellow-flowered sp.) and Ārtagala and Vāna undana vāki (blue-flowered sp.)⁴

HABITAT

Throughout hotter parts of India, also cultivated.

Commonly grown as a hedge plant.

REGIONAL LANGUAGE NAMES

Assam: Shinti;
Guj: Kanta-saerio, kantasalio;
Hindi: Sahacara;
Kan: Sahacara;
Mar: Koranta, Koranti;
Mal: Kirimkurunji, Karim kurunni;
Ori: Dasakeranda;
Punj: Sahacar;
Tam: Sammulli;
Tel: Mulugorinta chettu;
Urdu: Pila bansa, Piya bansa.

CONSTITUENTS

Alkaloids, β-Sitosterol, Potassium.

Plant yielded iridoid glucosides, acetyl barlerin, barlerin, and shanzhiside methyl ester, as well as rhamnosidal and glucopyranosidal iridoids.

Flowers were reported to contain a flavone glycoside.

Leaves show the presence of saponins, and the plant contains beta-sitosterol.

Leaves and flowering tops are rich in potassium salts.^{2(b,c),20(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Kaṇḍu, Vātarakta, Palit

Used in obstinate skin diseases, itch, gout/hyperuremia, and graying of the hair (therapeutic uses based on fifteenth to sixteenth century texts).

Charaka (1000 BC) incorporated a paste of the leaves in hot poultices for treating stiffness of the limbs and sciatica.²⁸ Sushruta (1000 BC) prescribed the flowers internally in hemoptysis, edema, migraine and internal abscesses.²⁹

The aqueous extract of leaves is used as a diuretic. Leaf juice, mixed with honey, is given to children with fevers and catarrh. Crushed leaves are used for rheumatic pains. The juice is applied to lacerated soles of the feet in the wet season, as well as on the face for pimples.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Sahacharādi Taila (Ashtāngahridaya, seventh century), contains Sahachara plant as the main drug with 10 other herbs and 18 supporting herbs. It is prescribed for neurological diseases.

Nilikādyā Taila (Shārangadhara Samhita, thirteenth century) contains 18 herbs in equal proportions. The oil is for promoting hair growth and preventing graying.

Ashtavarga Kwāth Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains eight herbs (none related to the Eight Tonic Herbs) in equal proportions. It is for diseases of the nervous system.

Rāsanādi Kwāth Churna (Sahasrayoga) contains 28 herbs in equal proportions. It is for diseases of the nervous system.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50–100 g of the drug for decoction.

Barleria strigosa* Willd.*Nīlajhinṭī****B****BOTANICAL SOURCE(S)**

Barleria strigosa Willd.
(Fam. Acanthaceae)

Three species of *Barleria* are used in Ayurvedic medicine: *B. prionitis* with yellow flowers (Pita Saireyaka); *B. cristata* Linn. with both red and white flower forms (Rakta and Shveta); and *B. strigosa* Linn. with blue flowers (Nila or Krishna). All are known as Jhinṭi and Kaṭasaraia.³⁰

In Kerala, other *Acanthaceae* sp. are used as Sahachara: *Nilgirianthus ciliatus* (Nees) Bremek., *Ecballium viride* (Forsk.) Alston and *Justicia betonica* Linn.

PHARMACOPOEIAL AYURVEDIC DRUG

Nīlajhinṭī (Root).

API, Part I, Vol. V.

Himalayan sp. have also been suggested as Saireyaka: *Rhododendron arboreum* Sm., *R. barbatum* Wall, ex Don., *Osmanthus fragrans* Lour. and *Erythrina indica* Linn., as well as a seashore sp. *Avicenna* or *Rhizophora*.^{3,30}

AYURVEDIC SYNONYMS

Dāsī, Būṇa, Kṛṣṇa, Saireyakah, Nīlasaireyakah.

Saireyaka, Saireya, Kurantaka, Rujākara, Ārtagala, Būṇā, Sahā, Mahā-sahā.³⁰

Kuruvaka (red-flowered sp.), Kurantaka (yellow-flowered sp.) and Ārtagala (blue-flowered sp.)⁴

HABITAT

Throughout the upper Gangetic plain and Southern parts of India.

In the Himalayas from Uttar Pradesh to West Bengal, in all eastern states, up to an altitude of 1200 m, and in Bihar, Odisha, Maharashtra, and Andhra Pradesh. It is cultivated in gardens.

REGIONAL LANGUAGE NAMES

Beng: Jhaati, Kaaraajaati;
Guj: Kaataseriyo;

Hindi: Nili, Katsaraiya;
Mal: Nilakurnni;
Mar: Koraanti, Wahiti;
Tam: Shemmuli;
Tel: Mullugorant, Nilambaramu.

CONSTITUENTS

Constituents not quoted in API.

The plant contains beta- and gamma-sitosterol,^{2(b)} a small amount of triterpenic acid and tannins.²⁰

Root of *B. prionitis* yielded luteolin-7-O-beta-D-glycopyranoside.¹⁵ Root of *B. cristata* contains anthraquinones.

Chemical constituents of *B. strigosa* root are not available.

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Vātarakta, Kaṇḍu, Mūtrakṛcchra, Raktavikāra, Vātajanyakṣaya, Mūṣikaviṣa, Śiragranthī, Dantaroga, Kāsa, Śoṭha

Used in obstinate skin diseases, gout, itch, dysuria, blood disorders, neurological emaciation, rat bites, aneurysms, dental diseases, cough and inflammation (therapeutic uses based on texts from the seventh to the sixteenth centuries).

Root: bechic and anti-anemic,³² prescribed in anemia, spasmodic cough,^{2(b)} common colds, and inflammations.¹⁵

Juice of leaves is applied on insect bites.²⁰

IMPORTANT FORMULATION/ APPLICATIONS

Mānikya Rasa (Bhaishajya Ratnāvali, seventeenth century), a herbomineral drug, contains orpiment, sulfur, realgar, and mercury as main drugs, with 12 supporting herbs.

Used for gout and obstinate skin diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 mL swarasa. 50–100 mL kvatha.

Barringtonia acutangula (Linn.) Gaertn.**Nicula****B****BOTANICAL SOURCE(S)**

Barringtonia acutangula (Linn.) Gaertn.
(Fam. Lecythidaceae)

In “Standard Nomenclature of Ayurvedic Medicinal Plants” (CCRAS), Hijjal, Nichula and Vidula have been wrongly quoted as synonyms of *Argyreia nervosa* under the Samudra-palaka entry.

PHARMACOPOEIAL AYURVEDIC DRUG

Nicula (Fruit).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Hijjala, Vidula.

Ijjala,^{3,4} Samudraphala.

HABITAT

Sub-Himalayan tracts Bihar, Orissa, Bengal, Assam, Central and South India.

REGIONAL LANGUAGE NAMES

Assam: Hindole;

Beng: Hijjala;

Guj: Samudraphala;

Hindi: Hijjala, Samudraphala;

Kan: Nerruganegalu, Holegonvamara;

Mal: Manjal kadamba, Manjal kadam;

Mar: Samudraphala;

Ori: Kijolo;

Punj: Samuderphal;

Tam: Samudrapullarni, Samutrapalam;

Tel: Kanapu, Kadaps;

Urdu: Hijjal.

Eng: Indian Oak.^{2(b)}

CONSTITUENTS

Saponins and Sapogenins.

The fruits contain three neutral sapogenols: barringtonol B, C, and D. Two triterpenoid acid

saponins were isolated as their methyl esters. Barringtonol B and D are the same as the previously reported compounds, acutagenol A and B. A new triterpene acid, barrigenic acid, has been isolated from the fruits.^{20(d)}

The seeds yielded two sapogenins, acutagenol A and B, and methyl esters from the sapogenin fraction.^{20(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Āmātisāra, Cakṣusrāva, Galganda, Bhūtabadhā, Grahabādhā, Premeha

Used in hemorrhagic diseases, diarrhea, ophthalmia, goiters, seizures, psychotic syndromes, and urinary disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

The phosphate buffer extract of the fruit showed anti-bacterial activity against *Staphylococcus aureus* and *Escherichia coli*.

The seed extract exhibited hemolytic activity against human erythrocytes.^{20(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Mahāpanchagavya Ghrita (Ashtāngahridaya, seventh century), a composite drug contains cow's milk, curd, ghee, dung extract, and urine with 42 herbs. Nichula is a minor component.

Lakshmilasa Rasa (Bhaishajya Ratnāvali, seventeenth century), a herbo-mineral drug, contains Nichula seeds as a minor component. It is prescribed for anemia, epilepsy, and internal lumps.

Nyagrodhādi Kwāth (Ashtāngahridaya) contains Viralā (*Diospyros tomentosa*), not Vidula.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

Fruit powder: 3–6 g for inducing vomiting; otherwise 500 mg–1 g.^{16(c)}

Fresh juice: 10–20 mL (CSIR).

Bauhinia racemosa* Lamk.*Pīta-kāñcanāra****B****BOTANICAL SOURCE(S)**

Bauhinia racemosa Lamk.
(Fam. Caesalpiniaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Pīta-kāñcanāra (Bud).

API, Part I, Vol. VI.

Yellow *Bauhinia* is equated with *B. tomentosa*.

The bud is lemon to butter yellow. The Sanskrit synonym of *B. racemosa* is documented as Sveta-kanchana, and that of *B. variegata* as Rakta-kanchana.^{20(d)}

Kanchana is also interpreted as Dhattura, Nagakeshara, Shati and a variety of Shali (paddy).³

AYURVEDIC SYNONYMS

Pītapuṣpaka.

Correct synonym: Śveta-kāñchana.

HABITAT

Sub-Himalayan tract from the Ravi eastwards to Bengal, Central and South India.

REGIONAL LANGUAGE NAMES

Beng: Bauraj, Sada kanchana;

Guj: Aasotaro, Asundro, Apta;

Hindi: Asanta, Ashta;

Kan: Banne, Kadu manthara, Arelu, Mandara, Akilu;

Mal: Mandarum;

Mar: Apataa, Ashtaa;

Ori: Kanchana;

Pun: Kosundra, Taur;

Tam: Atthi, Malai-atti, Malai-mandarai;

Tel: Ari, Are, Pacchare;

Urdu: Kachnal.

Hindi: Jhinjeri, Kachnal.

Eng: Dwarf white orchid.

CONSTITUENTS

Flavonoids like quercetin, isoquercetin.

Yellow *Bauhinia* (Pita Kāñchnāra) flowers contain isoquercitrin 6.0%, rutin 4.6%, and a small amount of quercetin.^{2(b)}

Pale-violet flowers contain cyanidin 3-glucoside, malvidin 3-glucoside, malvidin 3-diglucoside, peonidin 3-glucoside, and peonidin 3-diglucoside.^{2(b)}

White flowers contain kaempferol 3-galactoside and kaempferol 3-rhamnoglucoside.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Bhūtavikara (psychotic syndrome), Dāha (burning sensation), Galaganda (Goitre), Gandamāla (cervical lymphadenitis), Prameha (metabolic disorder), Raktavikāra (disorders of blood), Trṣṇā (thirst), Vidāha (burning sensation), Viṣamjvara (intermittent fever).

It is used as single drug.

(Ayurvedic classical texts not quoted.)

Its uses are based on ethnobotanical studies:

the flowers are used as a hemostatic, laxative, in hemorrhoids, for coughs and in viral fevers.

The bark is used as an anti-ulcerogenic, anti-goitrogenic, in skin diseases, in glandular inflammation, in fistulae, as an anti-pyretic, as an alexipharmic, in leucorrhea and as a blood purifier.²⁰

IMPORTANT FORMULATION/ APPLICATIONS

Methanolic extract of *B. racemosa* flower buds decreased the ulcer index significantly in aspirin-ulcerated rats.⁷¹

Ethanollic extract of the stem bark (no study is available on the flower buds) revealed effects on cardiovascular system in dogs/cats, hypothermia and gross behavioral effects in mice and anti-cancer activity against human

epidermoid carcinoma of the nasopharynx in tissue culture.^{20(d)}

Bark is highly astringent, anti-inflammatory, and a cholagogue.^{2(b)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (powder) 1 to 3 g.

B

Bauhinia variegata Blume

Kāñcanāra

BOTANICAL SOURCE(S)

Bauhinia variegata Blume
(Fam. Leguminosae)

PHARMACOPOEIAL AYURVEDIC DRUG

Kāñcanāra (Stem bark).

API, Part I, Vol. I.

White-flowered var. is known as Kāñchnara and red-flowered var. as Kovīdar.^{16(c)}

AYURVEDIC SYNONYMS

Kāncanāka.

Kānchana, Ashmantaka,³ Pākāri.⁴

HABITAT

Sub-Himalayan tract extending eastwards of Assam, Eastern, Central and South India.

REGIONAL LANGUAGE NAMES

Eng: Mountain Ebony;
Assam: Kuncan, Kanchan;
Beng: kanchana, Rakta Kanchana;
Guj: Champakati, Kanchnar, Kachnar;
Hindi: Kachanar, Kanchanar, Kachnar;
Kan: Keyu mandar, Kanchavala;
Kash: Kalad;
Mal: Chuvanna Mandharam;
Mar: Kanchana, Raktakancana;
Ori: Kachana, Kaniara;
Punj: Kanchnar;
Tam: Sigappu mandarai, Sihappu mantarai;
Tel: Deva, Kanchanam.

Eng: Buddhist *Bauhinia*, Orchid Tree.^{2(b)}

CONSTITUENTS

Tannins.

The bark contains 9.61% tannins and 4.27% non-tannins.^{2(b)}

The stem bark showed the presence of hentriacontane, octacosanol, stigmasterol, glycosides, reducing sugars and nitrogenous substances.^{20(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmīroga, Gandamālā, Apaci, Gudābraṃsa, Vrana

Used in worm infestations, scrofula, cervical lymphadenitis, prolapsus-ani and wounds (therapeutic uses based on Bhavaprakasha, sixteenth century).

Fresh bark of Kāñchnār mixed with dried ginger and pounded with sour gruel or a decoction of the bark with dried ginger powder was given for goiters (Vrindamādhava, eighth century; Bhāvaprakāsha, sixteenth century).

IMPORTANT FORMULATION/APPLICATIONS

Kāñchanāra Guggulu (Shārangadhara Samhitā, seventh century), contains Guggulu oleo-gum resin and Kāñchanār stem bark as main drugs (2:1) with 10 supporting herbs.

It is prescribed for chronic lymphadenopathy/sacrofula, tumors, ulcers, and dropsy.

It has shown encouraging results in lymphadenopathy.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

20–30 g of the drug for decoction

Decoction: 50–100 mL.
Decoction of bark is given with dried ginger powder or with the three Myrobalans (*Triphala*).

***Benincasa hispida* (Thunb.) Cogn. Kūsmānda**

BOTANICAL SOURCE(S)

Benincasa hispida (Thunb.) Cogn.
(Fam. Cucurbitaceae)

Syn. *B. cerifera* Savi.

A distinct variety, locally known as “Vaidya kumbhalam”, is grown in parts of Malabar (Kerala) for use in Kūshmānda Lehyam.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kūsmānda (Fruit).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Pushpaphalam, Brihatphalam.

Karakāruka,²⁹ Kushmāndakā, Kūshmāndi.

HABITAT

Cultivated throughout the plains of India and on hills up to 1,200 m altitude, as a vegetable.

Ash gourd is supposed to have originated in the Indo-Malaysian region. Its geographical range of distribution is from China, Japan, Polynesia, Eastern Australia, Malaysia, and India to Malagasy.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: White gourd melon;
Assam: Kumra;
Beng: Chal kumra;
Guj: Safed kohalu, Bhuru, Kohalu, Bhuru kolu;
Hindi: Kushmand, Petha;
Kan: Boodi humbala;
Mal: Kumbalang;

Mar: Kohala;
Ori: Kakharu, Panikakharu;
Punj: Petha;
Tam: Pooshanikkai;
Tel: Boodida gummadi;
Urdu: Petha.

Eng: Ash gourd, Wax gourd.^{2(b)}

CONSTITUENTS

Fatty oil.

Ash gourd, a garden produce, contains iodine 0.38 ppm and fluorine 3.5 ppm (dry edible matter); calcium 821.4 mg% and phosphorus 544.0 mg% (dry weight); and zinc content 16.6 ppm (dry edible matter).^{20(d)}
(Only the pulp is used in herbal confections, after removing the skin and seeds.)
Fruits contain lupeol, alpha-sitosterol and their acetates, adenine, trigonelline and histidine.^{2(c)}

**THERAPEUTIC AND OTHER
ATTRIBUTES**

Mūtraghāta, Prameha, Mūtrakṛcchra, Asmari, Trsa, Manasa vikara, Malabandh

Used in retention of urine, polyuria, dysuria, calculus, thirst, mental diseases and constipation (therapeutic uses based on classical texts from 1000 BC to sixteenth century).

A decoction of the fruit is a popular anti-mercurial and an antidote for alcoholic poisoning; it is given for internal hemorrhages and diseases of the respiratory tract and neurological disorders.

The ash of the fruit rind is applied on painful swellings.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Kūshmāndaka Rasāyana (Bhaishajya Ratnāvali, seventeenth century), is a popular confection for cough, asthma, respiratory diseases, also for epilepsy and nervous diseases.

Dhātryādi Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains pulp juices of Vidāri (*Pueraria tuberosa*) and Kūshmānda among the main drugs. It is prescribed for alcoholism, over-intoxication, unconscious state, and for leucorrhea, infertility and bleeding disorders (AFI text).

Vastyāmayāntaka Ghrita (Sahasrayoga) contains Kūshmāndaka pulp juice among the six

main herbs, with 51 supporting drugs. It is prescribed for dysuria, polyuria, and diseases of the urinary bladder.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

For further research: a comparative study of *Pueraria tuberosa* and *Benincasa hispida* with *Pueraria lobata*, which is already in use for alcohol abuse in Western herbal medicine, and a comparative study of the North Indian variety of *Benincasa hispida* and the “Vaidya kumbhalam” variety of Malabar, should be undertaken.

Berberis aristata DC.

Stem

Dāruharidrā

BOTANICAL SOURCE(S)

Berberis aristata DC.
(Fam. Berberidaceae)

Species used as Daruharidra: *B. aristata* Hook. f. & Thomson (non-DC.), *B. asiatica* Roxb. and *B. chitria* Lindl.

Root and root bark of *B. lycium* Royle is the usual adulterant.³⁶

The stem bark of *Coscinium fenestratum* Colebr. is used as a substitute in Kerala and Tamil Nadu.^{36,3} It is considered better than *Berberis*.⁶ It is known as Ceylon Calamba or False Calamba.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Dāruharidrā (Stem).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Dārvī, Katamkateri.

Dārunishā, Panchampachā.³

Species: Kāshmalā, Kingorā, Kilmorā, Chitrā.³⁰
(Dāru is equated with *Cedrus deodara*.)

HABITAT

The Himalayan ranges at an elevation of 1000–3000 m, and in the Nilgiri hills in South India.

Native to Nepal.

B. aristata DC. var. *aristata* is found in the Himalayas from Garhwal to Bhutan at altitudes of 1800–3000 m; *B. chitria* is found from Kashmir to Bhutan; *B. lycium* is found from Kashmir to Bhutan; *B. asiatica* is found from Himachal Pradesh to Bhutan and Assam, on Parsnath hills in Bihar, Panchmarhi in Madhya Pradesh, and Mount Abu in Rajasthan.^{20(d)}

REGIONAL LANGUAGE NAMES

Eng: Indian barberry;

Beng: Daruharidra;

Guj: Daruharidra, Daruhuladur;

Hindi: Daruhaldi, Darhald;

Kan: Maradarishana, Maradarishina, Daruhaladi;

Mal: Maramannal, Maramanjnal;

Mar: Daruhalad;

Ori: Daruharidra, Daruhalidi;

Punj: Sumalu;

Tam: Gangeti, Varatiu manjal;

B

Tel: Manupasupu;
Urdu: Darhald.

Eng: Tree turmeric.

CONSTITUENTS

Alkaloids.

The stem bark yielded 2.76% berberine; the bark and root bark contain berberine, berbamine, aromoline, karachine, palmatine, oxyberberine, taxilamine^{2(b)} and jatrorrhizine.^{20(d)}

Coscinum fenestratum (a substitute in Kerala and Tamil Nadu) contains berberine up to 3.5%, saponin, ceryl alcohol, sitosterol, hentriacontane, palmitic and oleic acids, glucosides and resinous matter.⁶

THERAPEUTIC AND OTHER ATTRIBUTES

Āmātisara, Medoroga, Urustambha, Kapharoga, Kaṇnaroga, Mukharoga, Netraroga, Kaṇḍu, Vraṇa, Meha

Used in diarrhea, obesity, stiffness or loss of movement of the legs, diseases due to excessive phlegm, diseases of the ear, diseases of the oral cavity, ophthalmic diseases, itch, wounds and diabetes (therapeutic uses based on texts from 1000 BC to sixteenth century).

In important formulations, quoted in the API, Dāruharidra is not the main constituent. The following formulations (not quoted in the API) contain Dāruharidrā bark and

its extracts: Dārvyadi Kwāth (Bhaishajya Ratnāvali; AFI, Vol. II), Dārvyādi Leha and Dārvyādi Taila (Bhaishajya Ratnāvali; not in the AFI) and the composite drugs of Sahasrayoga—Dāravādi Kwāth, Dārviguduchyādi Kashāya, Dārvikapitthniryāsādi Kashāya and Dārūsaireyadi Kāshāya.

IMPORTANT FORMULATION/ APPLICATIONS

Charaka and Sushruta (1000 BC) used Dāruharidrā bark and its extract in prescriptions, internally, for hemorrhages, piles, skin diseases, dysentery, uterine, vaginal, and lactal disorders; externally for wounds.^{28,29} Dārvi Ghrita (Charaka Samhitā) was prescribed for anemia and jaundice. Dārvi Kwāth was given in vaginal disorders; a decoction of bark mixed with honey, was administered with rice water for leucorrhea (Vrṇdamādhava, eighth century, Gadānigraha, twelfth century). The condensed extract (*Rasaranjana*) was used for skin diseases and leprosy, as well as for diseases of the mouth and gums.^{16(a),18}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 mL of the drug in Kvatha form.

Clinical studies were conducted for gastroenteritis, giardiasis, viral hepatitis, malarial fever, oriental sores, and trachoma lesions.^{20(d)}

<i>Berberis aristata</i> DC.	Fruit	Dāruharidrā
BOTANICAL SOURCE(S)	AYURVEDIC SYNONYMS	
<i>Berberis aristata</i> DC. (Fam. Berberidaceae)	Dārvī, Dāruniśā.	
Species used as Daruharidra: <i>B. aristata</i> Hook. f. & Thomson (non-DC.), <i>B. asiatica</i> Roxb. and <i>B. chitria</i> Lindl.	Dārūnīshā, Panchampachā. ³ Species: Kāshmala, Kingorā, Kilmorā, Chitrā. ³⁰ (Dāru is equated with <i>Cedrus deodara</i> .)	
PHARMACOPOEIAL AYURVEDIC DRUG	HABITAT	
Dāruharidrā (Fruit).	The Himalayas between 2000 to 3000 m, also in Nilgiri hills.	
API, Part I, Vol. VI.	Native in Nepal.	

B. aristata DC. var. *aristata* is found in the Himalayas from Garhwal to Bhutan at altitudes of 1800–3000 m; *B. chitria* is found from Kashmir to Bhutan; *B. lycium* is found from Kashmir to Bhutan; *B. asiatica* is found from Himachal Pradesh to Bhutan and Assam, on Parsnath hills in Bihar, Panchmarhi in Madhya Pradesh and Mount Abu in Rajasthan.^{20(d)}

REGIONAL LANGUAGE NAMES

Eng: Indian barberry;
Ben: Darhaldi, Daaruharidraa;
Guj: Daaruhaldar;
Hindi: Daaruhaldi, Darhald,
Zarishka (Fruit), Chittraa;
Mal: Maradarisina, Maramaanjal;
Mar: Daaruhalada;
Ori: Daaruhaldi;
Pun: Chitra, Kasmal, Simlu, Sumlu, Daarhaldi;
Tel: Manupasupu;
Urdu: Zarishk.

Barberry is equated with *Berberis vulgaris* Linn.

CONSTITUENTS

Alkaloids: berberine, oxyberberine, berbamine, palmatine, jatrorrhizine, tetrahydropalmitine etc.

0.033% berberine content has been reported in the fruit of *Berberis aristata*.⁷² Barberry fruit of central Asia (*Berberis vulgaris*) contains isoquinoline alkaloids (traces), anthocyanin, chlorogenic acid, malic acid, acetic acid, and vitamin C.¹⁴

THERAPEUTIC AND OTHER ATTRIBUTES

Āmātisāra (diarrhea due to indigestion), Aruci (tastelessness), Hṛillāsa (nausea), Jvara (fever), Pittaja-atisara (diarrhea due to Pitta dosa),

Raktavikāra (disorders of blood), Trṣṇā (thirst), Vamana (emesis), Viṣavikāra (disorders due to poison), Yakṛtodara (enlargement of liver/ hepatomegaly). Used as single drug.

Liver damage caused by CCl₄ as well as paracetamol-induced liver toxicity were prevented and cured in mice by using extracts of the fruits of *Berberis aristata*, partly through MDME (microsomal drug metabolizing enzyme) inhibitory action.⁷³

The fruit is used as a tonic for the liver and heart. In isolated cardiac tissues, the fruit extract (N-butanolic fraction) exhibited a positive inotropic action with little effect on heart rate.^{13,74} Further research may lead to the identification of a new cardiogenic agent from the *Berberis aristata* fruit.⁷⁴

IMPORTANT FORMULATION/ APPLICATIONS

Fresh berries are laxative and antiscorbutic and useful in piles, sores, eye diseases, particularly conjunctivitis.

Mixed with *Cinnamomum tamala* bark and honey, the berries are prescribed in leucorrhea.

A decoction is used as a mouthwash for treating swollen gums and toothache.^{2(b)}

The berries are used in prescriptions for liver diseases and hypercholesterolemia.⁶³

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 5 g.

Berberis aristata fruit dry extract (42.4 mg capsule, Herbion Pakistan) is used in liver therapy.

Pāṣāṇabheda

REGIONAL LANGUAGE NAMES

Assam: Patharkuchi;
Beng: Patharkuchi, Himasagara, Patrankur;
Guj: Pashanbheda, Pakhanbheda;
Hindi: Pakhanabheda, Silphara, Patharcua,
Pakanabheda, Silpbheda;
Kan: Alepgaya, Pahanbhedi, Hittaga, Pasanaberu,
Hittulaka;
Kash: Pashanbheda;
Mal: Kallurvanchi, Kallurvanni, Kallorvanchi;
Mar: Pashanbheda;
Ori: Pashanbhedi, Pashanabheda;
Punj: Kachalu, Pashanbheda;
Tam: Sirupilai;
Tel: Kondapindi.

CONSTITUENTS

Tannic acid, gallic acid, and glucose.

Bioactive constituents: bergenin and gallic acid.

B. ligulata root: a C-glycoside bergenin (2.419%)⁷⁵ and beta-sitosterol; gallic acid, tannic acid (tannins 14.2%–16.3%), glucose; (+)-afzelechin; and the amino acids isoleucine, leucine, methionine, phenylalanine, threonine, and tryptophan.^{25,2(b)}

B. ciliata root: beta-sitosterol, bergenin (3.275%)⁷⁵ and galloylated leuco-anthocynidin-4-glycoside; quercetin and kaempferol.²⁵

B. stracheyi root: a new catechin derivative, (+)-catechin-3-gallate (tannins 25%), beta-sitosterol and bergenin (3.277%).^{2(b),25,75}

THERAPEUTIC AND OTHER ATTRIBUTES

Meha, Mūtrakrcchra, Aśmari

Used in urinary disorders/polyuria, dysuria and calculus (therapeutic uses based on Bhāvaprakāsha, sixteenth century).

In lower doses, the acetone extract of the rhizomes is mildly diuretic; in higher doses,

Bergenia: also from West Pakistan to Southwest Nepal. Six to eight species exist in temperate and subtropical regions.¹

it is anti-diuretic. It is also cardiotoxic and a central nervous system depressant.^{2(b)}
Anti-inflammatory activity also decreases with increasing doses.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Ashmarihara kashāya churna (by a contemporary physician), contains 15 herbs in equal proportion.

Mutravirechaniya kashāya churna (Charaka Samhitā, 1000 BC) contains ten roots of the diuretic group, in equal proportions.

Both are anti-lithic composite drugs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

20–30 g of the drug for decoction.

Dose: 0.5–1.5 g.⁵²

B. ciliata: LD₅₀ of the ethanolic extract was found to be 750 mg/kg i.p. in mice.^{20(d)} *B. stracheyi*: LD₅₀ of the ethanolic extract was found to be 681 mg/kg i.p. in mice.^{20(d)} Plant extract >1000 mg/kg i.p. in mice.^{20(d)}

B. ciliata and *B. stracheyi* are better sources of bergenin than *B. ligulata*⁷⁵

A Chinese sp., *B. emeiensis* C.Y. Wu ex J.T. Pan, is used to treat brain disorders.¹

Betula utilis D. Don

Bhurjaḥ

BOTANICAL SOURCE(S)

Betula utilis D. Don
Syn. *B. bhojpattra* Wall.
(Fam. Betulaceae)

Syn. *B. jacquemontii* Spach.^{20(d)}
B. alnoides Buch-Ham. ex D. Don is also used as Bhurjapatra.^{20(d)}

PHARMACOPOEIAL AYURVEDIC DRUG

Bhurjaḥ (Stem bark).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Bhurja patrah, Mrducchada, Bahulavalkala, Bhūujagrathi, Carmī, Lekhyapatrakah.

Chitra tvaka.²⁸

HABITAT

The main Himalayan range ascending to an altitude of 4200 m.

Throughout the Himalayan range from Bhutan westwards.^{20(d)}

REGIONAL LANGUAGE NAMES

Eng: Himalayan silver birch;
Beng: Bhoojpatra, Bhujipatra;
Guj: Bhojpatra;
Hindi: Bhojapatra;
Mal: Bhurjamaram;
Mar: Bhoorjapatra;
Tam: Bhojapatram;
Tel: Bhurjapatri

Eng: Indian paper birch.

CONSTITUENTS

Betulin, lupeol and 3 β-aetoxy-12-oleanen-28-oic acid.

Inner bark is rich in leuco-anthocyanidins.

The bark also yielded lupenone, methyl betulonate, methyl betulate, sitosterol, and karachic acid.^{20(d),2(b)}

The essential oil of *B. alnoides* bark contained methyl salicylate as the major component.^{20(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Karṇaroga, Raktapitta, Kuṣṭharoga, Rakṣoghnadhupana Vraṇa, Aparapatana, Garbhasaṅga, Granthivisarpa, Balagraha

B

Used for ear diseases, hemorrhagic diseases, obstinate skin diseases, burns from cauterization, for the evacuation of the placenta, erysipelas and fear psychosis in children (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka used the nodes and bark, compounded into an ointment for ringworm, acute spreading suppurations, and ulcers;²⁷ Sushruta prescribed it for urethral discharges and chronic skin diseases.²⁸

Bark is used in hysteria, as an anti-convulsant,^{20(d)} and in skin diseases as an anti-leprotic and antiseptic.

IMPORTANT FORMULATION/ APPLICATIONS

Ayaskriti (Ashtāngahridaya, seventh century), contains Bhurja stem bark as a main herb with

22 other herbs in equal proportion, and 25 supporting herbs. A self-generated alcoholic product contains iron filings as a major constituent. Prescribed as a hematinic, hypoglycemic and astringent iron tonic.

Bhurja bark is used in diseases of the blood and jaundice.³²

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

Infusion of bark and leaves: used in hysteria.^{20(d)}
LD₅₀ of the ethanolic extract: 681 mg/kg i.p. in mice.^{20(d)}

B. alnoides: LD₅₀ of the ethanolic extract: 500 mg/kg i.p. in mice.^{20(d)}

Research potential: bark extracts for the treatment of melanoma.

Blepharis persica (Burm.f.) O. Kuntze.

Utingana

BOTANICAL SOURCE(S)

Blepharis persica (Burm.f.) O. Kuntze.

Syn. *B. edulis* Pers.

(Fam. Acanthaceae)

Seeds of *Blepharis linariaefolia* Pers.³ and *B. boerhaavifolia* Pers. are also used.^{3,16(c),63}

Seeds of Anjura are also sold as Uttangana (a different drug equated with *Urtica pilulifera*).

Anjura seeds are used for diseases of the liver and urinary disorders.⁶³

PHARMACOPOEIAL AYURVEDIC DRUG

Utingana (Seed).

API, Part I, Vol. IV.

Originally, this was an Unani drug.

A Sanskrit *shloka* has been composed by a contemporary Ayurvedic scholar describing the therapeutic properties of the drug.^{16(b)}

Utingana was included in a polyherbal formulation of Sharangadhara Samhita (thirteenth

century), for use in dysmenorrhea and urinary and liver disorders. This was the period of Turkish invasions and the entry of Unani drugs in India.

AYURVEDIC SYNONYMS

Uttangan (Common name).

The classical herbs—Uchattā (Charaka Samhitā, Sushruta Samhitā, 1000 BC; Ashtāngahridaya, seventh century) and Ushtrakandi and Kamavridhi (Rajānighantu, fourteenth century) are being equated with the Unani herb Uttangana. Uchatta roots (not seeds) were used.^{3,15(c),30}

Uchattā of the classical period was previously equated with *Scirpus* or *Cyperus* sp. It was also equated with Shveta gunjā, (*Abrus* sp.) during the medieval period.⁷

HABITAT

Occurring in Punjab.

Also found in Western Rajasthan and the Malwa region of Madhya Pradesh. The genus is distributed in the Palaeotropics, the Mediterranean region, South Africa, and Malagasy.^{2(b)}

REGIONAL LANGUAGE NAMES

Beng: Ucchata;
Guj: Utingun, Chopunivel;
Hindi: Utangan;
Kan: Utangana;
Mal: Utigana, Utungana;
Mar: Utangan;
Ori: Utigana;
Punj: Uttangan;
Tam: Uttanjana;
Tel: Uttangan;
Urdu: Utangan.

CONSTITUENTS

Glycosides and Tannin.

Glycoside blepharin (yield: 0.0% Chennai sample; 0.7% Muzaffarpur sample; 1.2% Allahabad sample); blepharin yielded blepharigenin; Chennai sample yielded beta-sitosterol-beta-D-glycopyranoside; Allahabad sample yielded D,L-allantoin (2.1%), fatty oil (3.8%), catechol and tannins, glucose (large amounts), diastase, a saponin yielding lupeol glucose (large amounts) and diastase, in addition to blepharin.^{20(d),2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Mūtrākṛcchra, Kṛaiṇya

Used in dysuria and impotency (therapeutic uses based on texts from the thirteenth and fourteenth centuries).

In Unani medicine, the seeds are inspissating to semen, spermatogenic, retentive, and prescribed in sexual debility, impotency, anuria, dysuria, and urinary tract infections.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Kumaryasava (Sharangadhara Samhita, thirteenth century. In AFI, Yogaratanakara, sixteenth century, formulation is also quoted), contains Aloe vera leaf juice as the main drug. The thirteenth century formulation contains 40 and sixteenth century formulation 11 supporting herbs. Both contain two calcined minerals. The only common link is *Aloe vera* juice.

The first one contains Utingana seeds. In the latter one, all of the constituents were revised and Kababchini (*Piper cubeba*) of Unani medicine entered as Kababaka fruit along with Kankola (also equated with *Piper cubeba*). Utingana was excluded.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Boerhaavia diffusa Linn.

Root

Raktapunarnavā

BOTANICAL SOURCE(S)

Boerhaavia diffusa Linn.
(Fam. Nyctaginaceae)

Boerhavia diffusa Linn.^{20(d)} (AFI)

Syn. *B. repens* Linn.^{2(b)}

Trianthema portulacastrum Linn.

Fam. Aizoaceae, a substitute in the south,^{5,6} sold as Svetapunarnavā.

Trianthema portulacastrum syn. *T. monogyna* is also equated with Kaṭhilla (a synonym of Punarnavā) of Ayurveda.^{20(d)}

A white variety of Punarnavā was Svetamūlā (having white roots) and Rakta punarnavā was Raktapushpā (having red flowers). Species with red and white flowers exist in both *Boerhavia* and *Trianthema* genera.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Raktapunarnavā (Root).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Śothaghnī, Rakta puṣpā.

Punarnavā arunā, Varshābhū (API, Vol. III).

HABITAT

Throughout the plains of India.

Six species of *Boerhavia* are mentioned in Indian flora.^{20(d)}

Boerhavia: 50 species in the tropics and Old World.¹ Found in Sri Lanka, Australia, Sudan and the Malayan Peninsula, extending to China, Africa, America, and the Pacific Islands.

REGIONAL LANGUAGE NAMES

Eng: Hog weed;

Assam: Ronga punarnabha;

Beng: Rakta punarnava;

Guj: Saturdi;

Hindi: Gadapurna, Lalpunarnava;

Kan: Kommeberu;

Mal: Chuvanna tazhutama;

Mar: Rakta punarnava;

Ori: Laalapuiruni;

Punj: Iteit (lal), Khattan;

Tam: Mookarattai (shihappu);

Tel: Atikamamidi, Erragalijeru;

Urdu: Surkh punarnava.

Eng: Spreading Hogweed.^{2(b)}

CONSTITUENTS

Alkaloid, Hentriacontane, beta-Sitosterol, Ursolic acid.

Alkaloids (0.054%–0.196% in different samples): punarnavine I and II. Compounds include: rotenoids, boeravinones A1, B1, C2, D, E, and F, punarnavoside, a phenolic glycoside, beta-ecdysone, glucose, fructose, sucrose, hypoxanthine-9-L-arbinoside, borhavone (a C-methyl flavone) and borhavine (a dihydroisofuranoxanthone).

New compounds include boerhavisterol, boerhad-iffusene, diffusarotenoid, and boerhavanosteryl benzoate.^{2(b),20(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śopha, Pāṇḍu, Hṛdroga, Kāsa, Arśa, Vraṇa, Urahkṣataśūla, Śōtha

Used in swelling, anemia, heart disease, cough, piles, wounds, pulmonary cavitation and inflammation (therapeutic uses based on texts from 1000 BC to sixteenth century). The root is not specifically mentioned in the texts quoted in the API.

The flavonoid, arbinofuranoside, was found to lower serum uric acid in experimental animals.^{2(b)} Rotanoids are reported to have increased serum protein levels and reduced urinary protein in nephrotic syndrome.^{2(c)}

Anti-heptotoxic activity is attributed to rotenoids.^{2(c)} Punarnavoside is also an anti-fibrotic agent.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Kumaryāsava (Shārangadhara Samhitā, thirteenth century; Yogaratnākara, sixteenth century), both contains Aloe vera leaf juice as main drug with 41 and 12 supporting herbs respectively, and 2 minerals. Roots of both Rakta and Shveta Punarnavā feature only in the first one. For dysmenorrhea and dysuria.

Dadhika Ghrita (Ashtāngahridaya, seventh century) contains 75 constituents, including roots of both Rakta and Shveta Punarnavā.

Dhanvantara Ghrita (Ashtāngahridaya) contains 40 constituents, including roots of both Rakta and Shveta Punarnavā. It is used for diabetes, epilepsy, and neurological disorders.

Punarnavādyārishta (Bhaishajya Ratnāvali, seventeenth century) contains roots of both Punarnavas, which are among the nine main herbs. It is used for anemia, skin diseases, and edema.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of powder. 10–20 mL (Fresh juice).

Standardization basis marker compound for root: Boeravinone B-NLT 0.005% w/w (IP).

Boerhaavia diffusa Linn.**Whole plant****Punarnavā (Rakta)****B****BOTANICAL SOURCE(S)**

Boerhaavia diffusa Linn.
(Fam. Nyctaginaceae)

Boerhavia diffusa Linn. Syn. *B. repens* Linn.^{2(b)}
Trianthema portulacastrum Linn. (Fam. Aizoaceae), a substitute in the South,^{5,6} is sold as Svetapunarnavā.

Trianthema portulacastrum Syn. *T. monogyna* is also equated with Kaṭhilla* (a synonym of Punarnavā) of Ayurveda.^{20(d)}

PHARMACOPOEIAL AYURVEDIC DRUG

Punarnavā (Rakta) (Dried matured whole plant).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Kaṭhilla*, Śophaghñī, Śothaghñī, Varṣābhu.

Vrishchira, Vrishchiraka.³

HABITAT

A trailing herb found throughout India, collected after rainy season.

Six species of *Boerhavia* are mentioned in Indian flora.^{20(d)}

Boerhavia: 50 species in the tropics and Old World.¹

Found in Sri Lanka, Australia, Sudan, and the Malayan Peninsula, extending to China, Africa, America, and the Pacific Islands.

REGIONAL LANGUAGE NAMES

Eng: Horse pursle, Hog weed;

Assam: Ranga punarnabha;

Beng: Rakta punarnava;

Guj: Dholisaturdi, Motosatodo;

Hindi: Gadapurna, Lalpunarnava;

Kan: Sanadika, Kommeberu, Komma;

Kash: Vanjula punarnava;

Mal: Chuvanna tazhutawa;

Mar: Ghetuli, Vasuchimuli, Satodimula, Punarnava, Khaparkhuti;

Ori: Lalapuiruni, Nalipuruni;

Punj: Itcit (lal), Khattan;

Tam: Mukurattai (shihappu);

Tel: Atikamamidi, Erra galijeru

Eng: Spreading Hogweed.^{2(b)}

CONSTITUENTS

Alkaloid (Punarnavine).

The plant, besides the alkaloid punarnavine (0.04%), contains large quantities of potassium nitrate and other potassium salts (6.5%), beta-sitosterol (phytosterols), liriiodendrin (lignans), punarnavoside (rotenoids), boerhavine (xanthones), free and combined aminoacids (phenylalanine, tyrosine and glutamic acid), a steroid (androst-5-ene), a flavone and hypoxanthine-9-L-arbinofuranoside.^{2(b),15,20(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Pāṇḍu, Śōtha

Used in anemia and inflammation (therapeutic uses based on texts from 1000 BC and fourteenth century).

The whole plant, fresh or dried, is the source of the drug Punarnava, which is officially used in IP as a diuretic.^{2(b)}

Used for inflammatory renal diseases, nephrotic syndrome, edema and ascites resulting from early cirrhosis of the liver, and chronic peritonitis.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

For edema, anemia, jaundice, ascites, and diseases of the liver and spleen:

Punarnavāshtaka Kwāth Churna (Chakradata, eleventh century) contains eight herbs, including the Rakta-punarnavā plant, in equal proportions.

B

Punarnavāsava (Bhaishajya Ratnāvali, seventeenth century) contains 22 herbs in equal proportions. Contains Shothaghni (Punarnavā) root, but not the plant.

Punarnavādi Mandura (Charaka Samhitā, 1000 BC), a mineral drug containing calx of dross iron at twice the quantity of all 20 herbs, is processed in cow's urine. Contains Rakta-punarnava root, but not the plant.

Sukumara Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Punarnava

root as the major drug, with ten supporting herbs. It is prescribed as a parturifacient in South India.

Shothāghna lepa (Shārangadhara Samhitā, seventh century) is a paste for external application in edema. Contains the root, but not the plant.

DOSAGE/USAGE/CAUTIONS/COMMENTS

20–30 g of the drug for decoction.

Boerhavia verticillata Poir.

Śvetapunarnavā

BOTANICAL SOURCE(S)

Boerhavia verticillata Poir.
(Fam. Adiantaceae/Polypodiaceae)

Syn. *B. stellata* Wight.^{20(d)}
Trianthema portulacastrum Linn. is sold as Svetapunarnavā (as an adulterant).²⁰

The white variety of Punarnavā was Svetamūlā (having white roots), while Rakta punarnavā was Raktapushpā (having red flowers). Species with red and white flowers exist in both *Boerhavia* and *Trianthema* genera.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Śvetapunarnavā (Root).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Vṛscīva

Vṛshchiva, Vṛshchika and Vṛshchīra refer to the same plant drug, which was used most often together with either Punarnava or Varshābhu.

HABITAT

As a weed in the plains throughout India during rainy season.

Varshābhū (*Trianthema portulacastrum*) is a rainy season annual, while *Boerhavia* species (Punarnavā) are perennial.³⁰

Six species of *Boerhavia* are mentioned in Indian flora.^{20(d)}

Boerhavia: 50 species exist in the tropics and Old World.¹

Found in Sri Lanka, Australia, Sudan and the Malayan Peninsula, extending to China, Africa, America, and the Pacific Islands.

REGIONAL LANGUAGE NAMES

Eng: Horse purslane, Blunt leaved hogweed;

Beng: Shatapunyaa;

Guj: Vasedo, Vasedee

Hindi: Safed punarnavaa, Gada poornaa;

Kan: Maachchugoni, Vinleey duvelladkilu;

Mar: Pundharighentuli;

Punj: Itsita;

Tam: Sharunnai, Mukkarattai-kirai.

CONSTITUENTS

Constituents not quoted in API.

Quantitative estimation of phytoconstituents % w/w in *B. diffusa* and *B. verticillata*: alkaloids 2.74 and 3.11; total reducing sugars 6.04 and 5.26; glycosides 7.42 and 5.80. Both contain phenols, sterols, flavonoids, and aminoacids.⁷⁶

THERAPEUTIC AND OTHER ATTRIBUTES

Pāṇḍu, Viṣavikāra, Śoṭha, Śopha, Udararoga, Hṛdroga, Kāsa, Urahkṣata, Śūla, Rakta vikāra, Paittika jvara, Cāturthikajvara, Śrāva, Plihāroga,

Vātakantaka, Vidradhi, Alarkaviṣa, Vṛścikaviṣa, Sarpaviṣa, Mūṣakaviṣa

Used in anemia, toxic manifestations, inflammation, edema, diseases of the abdomen, cardiac diseases, cough, chest infections, colic, disorders of the blood, biliary fever, malarial fever, discharges, splenomegaly, sprains of the ankle, abscesses and poisonous bites (therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Kumaryāsava (Shārangadhara Samhitā, thirteenth century; Yogaratnākara, sixteenth century), both contains Aloe vera leaf juice as

main drug with 41 and 12 supporting herbs respectively, and 2 minerals. Roots of both Rakta and Shveta Punarnavā feature only in the first one. For dysmenorrhea and dysuria. Dadhika Ghrita (Ashtāngahridaya, seventh century) contains 75 constituents, including roots of both Rakta and Shveta Punarnavā. Dhanvantara Ghrita (Ashtāngahridaya) contains 40 constituents, including roots of both Rakta and Shveta Punarnavā. It is used for diabetes, epilepsy, and neurological disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–15 g.

Bombax ceiba Linn.

Śālmali

BOTANICAL SOURCE(S)

Bombax ceiba Linn.

Syn. *B. malabaricum* DC.

Salmaalina malabarica Schott. & Endl.^{20(d)}

(Fam. Bombacaceae)

Gossampinus malabarica (DC.)

Merril.^{2(b)}

Bombax heptaphylla Cav.²⁹

Bombax insigne Wall.

Syn. *Salmaalina insignis* (Wall.) Scott & Endl.

(Assam, Western Ghats, and the Andamans; known as Semul).⁷

Mūnadruma.³⁰

Kukkuti, Nirgandha-pushpi.²⁸

HABITAT

Throughout the hotter parts of India up to 1500 m or more.

Also found in the Andmans. Generally scarce in the hills.

A nearly spineless var. from Madhya Pradesh and a yellow-flowered tree from Navapāra, eastern Madhya Pradesh, have been reported.^{2(b)}

PHARMACOPEIAL AYURVEDIC DRUG

Śālmali (Stem bark).

API, Part I, Vol. III.

Shālmalaka is a synonym of Rohitaka.³⁰ The while-flowered Kuta-shālmali is provisionally equated with *Ceiba pentandra* (L.) Gaertn, Syn. *Bombax pentandrum* L.

AYURVEDIC SYNONYMS

Moca, Picchila, Raktapuṣpa, Kaṇṭajādhyā, Tūlini.

Mochāhva, Sthirāyu, Tūlini.⁷

REGIONAL LANGUAGE NAMES

Eng: Silk-cotton tree;

Assam: Semul;

Beng: Shimul, Simul;

Guj: Shemalo;

Hindi: Semal, Semar;

Kan: Kempuburuga;

Mal: Mullilavu;

Mar: Sanvar, Katesavar;

Punj: Simble;

Tam: Elavam;

Tel: Buruga;

Urdu: Sembhal.

CONSTITUENTS

B

Saponins, Tannins and Gums.

Tannins 3.01%, non-tannins 6.91%;
and lupeol, beta-sitosterol and
beta-sitosterol-beta-D-glycoside.

Gum (bark exudate) contains catechol tannin and
tannic and gallic acids; it yields a mixture of
L-arabinose, D-galactose, D-galacturonic acid
and traces of rhamnose.^{2(b),15}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Vraṇa, Dāha, Yuvānapidikā

Used in hemorrhagic disorders, wounds, burning
sensation, and pimples/acne (therapeutic uses
based on Bhavaprakāsha, sixteenth century).

Charaka (1000 BC) incorporated the bark exudate
in prescriptions for bleeding piles, diarrhea,
dysentery, prolapse of the anus, dysuria,
menorrhagia, and leucorrhea.

Sushruta used a paste of the bark as a styptic.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

(Classical formulations not quoted in API,
Vol. III.)

Shālmali Churna (Bhāvaprakasha, sixteenth
century) contains the powdered gum exudate
of the bark. It is used as a hemostatic and
astringent.

Triphalādi Kwāth (Bhāvaprakāsha) contains the
“Three Myrobalans”, Shālmali bark and two
more herbs.³

Shālmali Ghrita (Bangasena) is available in
South India. It is used for urethral and vaginal
discharges.¹⁸

Bark gum is used in confections for atony of the
uterus, polymenorrhagia and leucorrhea.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g (Powder).

Borassus flabellifer Linn.

Tāla

BOTANICAL SOURCE(S)

Borassus flabellifer Linn.
(Fam. Arecaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Tāla (Dried male inflorescences).

API, Part I, Vol. III.

Flowers: unisexual; male spadix branched, female
spadix simple.

The sugary sap, obtained from young inflorescences,
can be fermented to make a toddy beverage.

In male trees, flowering shoots are tapped for sap;
in female trees, fruiting branches are tapped.
Sap ferments into toddy within 8–9 hours.^{2(b)}

AYURVEDIC SYNONYMS

Lekhyapatra.

Dhvaja, Dwāroha, Trṇa rāja, Maha drumā.⁴

HABITAT

Cultivated, also wild throughout India in the
Peninsular coastal areas and in fields.

Especially prevalent in West Bengal and Bihar.

Cultivated in dry or sandy areas of Andhra
Pradesh, Karnataka, Kerala, Tamil Nadu,
Madhya Pradesh, Odisha, Bihar and West
Bengal.^{2(b)}

Native to South and Southeast Asia.

REGIONAL LANGUAGE NAMES

Eng: Palmyra palm;

Beng: Tala;

Guj: Tada, Tad;

Hindi: Tal;

Kan: Talimera, Oleyagida, Nelatalea talimara,

Mal: Panavirala;

Mar: Tada, Toad;

Punj: Tad;

Tam: Panaimaram, Panai;
Tel: Tadi, Tati;
Urdu: Taad.

Eng: Brab tree.^{2(b)}

CONSTITUENTS

Kernels contain Galactomannan (Polysaccharide).

(In the API, the constituents of the palmyra palm nut have been quoted.)

Male inflorescence yielded six new spirostane-type steroid saponins (borassosides A–F and dioscin), flabelliferrins and a bitter compound of steroidal saponins. Spirosterol is a dominant aglycone in the inflorescence.⁷⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Urahkṣata, Śwāsa, Dāha, Kṛmi, Mūtrakṛcchra, Śophaghna, Vandhyakara

Used in hemorrhagic disorders, pulmonary cavitation, dyspnea, burning sensation, dysuria, swelling and anti-fertility (therapeutic uses based on texts from 1000 BC to sixteenth century).

Ethanollic extract of male inflorescences exhibited significant anti-inflammatory activity in acute and chronic inflammation in experimental animals. Methanolic extract was found to inhibit the increase of serum glucose levels in glucose-loaded rats. This activity has been attributed to the presence of

the spirostane-type steroid saponin dioscin. Immunosuppressant activity has also been documented.⁷⁸

IMPORTANT FORMULATION/ APPLICATIONS

Avlṭtolādi Bhasma/Kshāra (Sahasrayoga, a non-Samhitā, Kerala Matria Medica), contains ashes of 11 herbs including Panviral (Tāla) inflorescences, in equal proportion. Prescribed for abdominal lump, abdominal diseases, and edema.

Panviralādi Bhasma (Sahasrayoga) contains the ashes of three herbs, including Panviral (Tāla) inflorescences. It is prescribed for abdominal lumps, abdominal diseases, edema, and ascites.

Guda Pippli (Bhaishajya Ratnāvali, seventeenth century) is a confection that contains 23 herbs, including the ash of Tāla flowers, in equal proportions. It is prescribed for diseases of the liver and spleen, chronic fever, and inflammation.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

Fresh sap is used as a coolant, stimulant, diuretic, anti-phlegmatic and laxative drink. It is used as a tonic for asthmatic and anemic patients.^{2(b)}

B

Boswellia serrata Roxb.

Kundurur

BOTANICAL SOURCE(S)

Boswellia serrata Roxb.
(Fam. Burseraceae)

Boswellia serrata Roxb. ex Colebr. syn. *B. serrata* Roxb. ex Colebr. var. *glabra* (Roxb.) Bennet
B. glabra Roxb.

Substantial quantities of the oleo-gum resin is imported from Gulf countries and North Africa, obtained from *B. carteri* and *B. frereana*.

Indian material is found to be adulterated with the gum of *Garuga pinnata* Roxb.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Kundurur (Exudate).

API, Part I, Vol. IV.

International Pharmacopoeial name: *Olibanum indicum*.^{11(b)} *Gummi boswellia*.¹⁰⁽⁴⁾

AYURVEDIC SYNONYMS

Sallaki.

Kunduruki, Susravā, Surabhi, Gajabhakshyā,
Nimbapatrā.²⁰
Kunduruka.³⁰

HABITAT

Dry forests from Punjab to West Bengal and in peninsular India.

REGIONAL LANGUAGE NAMES

Assam: Sallaki;
Beng: Luban, Salai, Salgai;
Guj: Shaledum, Saleda, Saladi, Gugal, Saledhi;
Hindi: Salai, Lubana;
Kan: Madimar, Chilakdupa, Tallaki, Maddi;
Mal: Kunturukkam, Samprani;
Mar: Salai cha dink;
Punj: Salai gonda;
Tam: Parangi sambrani;
Tel: Parangi sambrani, Anduga, Kondagugi tamu;
Urdu: Kundur.

Common name: Salai guggulu, Kundur.
Eng: Indian olibanum.

CONSTITUENTS

Oleo-gum-resins.

Contains 5%–9% essential oil (alpha-thujene 51%–61%, sabinene 5%, alpha-pinene 8%, alpha-phellandrene 2%),¹⁰⁽⁴⁾ pentacyclic triterpenic acids, including acetyl-beta-boswellic acid, acetyl-11-keto-beta-boswellic acid (AKBA), alpha-beta-boswellic acid, 11-keto-boswellic acid (KBA), tetracyclic triterpenic acids (tirucallenic acids), and lupane pentacyclic triterpenes.^{11(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Swasa, Pittabhisyanda, Pradara, Jwara, Sarkaramaha, Vrsana sula, Mukha roga, Uka

Used in asthma, conjunctivitis, vaginal discharges, fever, glycosuria/polyuria, scrotum pain, diseases of the mouth, *Uka* (could not be correlated with

any physical condition) (therapeutic uses based on texts from 1000 BC to sixteenth century).

Uses supported by clinical data: orally for the management of arthritis, bronchial asthma, Crohn's disease and ulcerative colitis (World Health Organization).¹⁰⁽⁴⁾

The oleo-gum-resin exhibited encouraging results in collagenous colitis, chronic colitis (grade II and III), and ulcerative colitis (grade II and III), osteoarthritis of the knee, chronic polyarthritis, rheumatoid arthritis and juvenile rheumatoid arthritis, cerebral edema associated with brain tumors (European Scientific Cooperative on Phytotherapy).^{11(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Karpurādyārka (Arka Prakash, Ravana, period not known), contains volatile constituents of camphor and 47 herbs, also deer musk and semen of civet cat. An obsolete drug. OTC drug contains only camphor and Ajowan seeds. Used as a digestive and carminative.

Jirakādi modaka (Bhaishajya Ratnāvali, seventeenth century) contains cumin seeds and cannabis sativa as the main drugs, 2 calcined minerals and 40 supporting herbs in equal proportions. It is used for hyperacidity, ulcerative colitis, and sprue.

Kundur exudate is included among the supporting herbs of Balā Taila (Ashtāngahridaya, seventh century) and Balā-guduchādi Taila (Sahasrayoga). Both are prescribed for inflammatory and rheumatic afflictions.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

The gum-resin should not contain less than 25% of pentacyclic and tetracyclic triterpenic acids, calculated as beta-boswellic acid.^{11(b)}

For osteoarthritis: 250–1200 mg (alcoholic dry extract, in three separate doses).

For inflammatory bowel disease: 900–3600 mg (alcoholic dry extract, in three separate doses). (Drug to extract ratio: 4.2:5.9 L.)^{11(b)}

Preparations should be taken with food.^{11(b)}

Standardization basis marker compound: total KBA AKBA NLT 1.0% w/w (IP).

Brassica campestris Linn.**Sarṣapa****B****BOTANICAL SOURCE(S)**

Brassica campestris Linn
(Fam. Brassicaceae)

Syn. *B. rapa* Linn.

B. campestris is divided into two races: the European (Mediterranean) and the Asian.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Sarṣapa (Seed).

API, Part I, Vol. III.

(Asita-sarsapa, Gaur-sarṣapa, Siddhartha, Rakta-sarṣapa, Rakshoghna and Rājikā are used in Ayurvedic prescriptions.)³⁰

AYURVEDIC SYNONYMS

Kaṭusneha, Siddhārtha

Sarshapa, Rakshoghna, Siddhārtha, Siddhārthaka.^{2(a),20(d)}

Siddhartha-sita is equated with *Brassica campestris* Hook. f. & Jhoms. var. *sarson* Prain.³

Sarshapa-gaura is equated with *Brassica alba* Boiss.³ *Brassica juncea* (Linn.) Czern & Coss. is equated with Rājikā.³

HABITAT

Commonly cultivated in Bengal, Bihar, Uttar Pradesh and Punjab, also found occasionally as an escape in waste places and fields.

B. alba, native to Europe and West Asia, is cultivated in North India.

Brown mustard (*B. juncea* [L.] Czern & Coss.) is cultivated in Punjab, Uttar Pradesh, West Bengal, and Gujarat.

REGIONAL LANGUAGE NAMES

Eng: Mustard;
Beng: Sarisa;
Guj: Sarasad, Rai;

Hindi: Saraso;

Kan: Sasuve, Sasuvae, Sasive;

Mal: Katuka;

Mar: Mohari;

Punj: Sarayo, Sarson;

Tam: Kadugu;

Tel: Avalu;

Urdu: Sarson.

Eng: Field mustard, Indian colza.

CONSTITUENTS

Fixed oil.

The range of variation as percentages in the seeds of 20 strains: oil (37.00%–44.75%), palmitic acid (2.18%–5.38%), stearic acid (1.19%–2.70%), oleic acid (10.28%–16.30%), linolenic acid (11.31%–19.98%) and eicosenoic acid (0.28%–1.86%), and comparatively wide ranges in linoleic acid (8.21%–20.09%) and erucic acid (45.82%–58.52%).^{20(d)}

Other constituents include sinigrin, glucosinolates (gluconapin 6.4–18.2 mg/g), glucobras-sicanapin, gluconasturtiin; brassicastrol and other phytosterols, triterpenes, progoitrin, and gluconapoleiferin.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Kaṇḍu, Kuṣṭha, Koṣṭhakrmī, Grahabādhā

Used in itching, obstinate skin diseases, worm infestations and seizures (therapeutic uses based on thirteenth and fifteenth century texts).

Mustard oil-rich diet, given for prolonged periods, exhibited myocardial fibrosis (due to erucic acids) in monkeys.

Rats fed on diets containing mustard oil for 150 days showed significant increases in serum lipid content.^{20(d)}

Extract (of seeds) in 10% alcohol significantly enhanced insulin secretion from the mouse pancreas.^{20(d)}

B

IMPORTANT FORMULATION/ APPLICATIONS

Mahā Yogarāja Guggulu (Shārangadhara Samhitā, thirteenth century); Kārapāsasthyādi Taila (Sahasrayoga, a non-Samhitā, Kerala Material Medica); Kumkumādi Taila (Yogaratnākara, sixteenth century); Prabhanjana vimar-dana Taila (Sahasrayoga) and Vajraka Taila (Ashtāngahridaya, seventh century): Sarṣapa seeds are included among supporting herbs as a minor constituent.

Uses: crushed seeds as a poultice in rheumatic affections; oil for massage in muscular rheumatism and stiff neck; paste of seeds topically in cutaneous affections; as a rub with camphor in bronchial catarrh and influenza.¹⁵

DOSAGE/USAGE/CAUTIONS/ COMMENTS

0.5-1 g in paste form.

<i>Buchanania lanzan</i> Spreng.	Fruit	Priyāla
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BOTANICAL SOURCE(S)

Buchanania lanzan Spreng.
Syn. *B. latifolia* Roxb.
(Fam. Anacardiaceae)

B. lanzan and *B. latifolia* are also listed as independent species.¹⁹

PHARMACOPEIAL AYURVEDIC DRUG

Priyāla (Seed).

API, Part I, Vol. II.

The kernels are used.

The kernels are frequently infected by different species of microorganisms, including *Aspergillus*, *Penicillium*, *Rhizopus*, *Chaetomium*, and *Cocci*.^{2(c)}

Aflatoxin has been reported in dry fruits.^{2(c)}

The tree flowers during January–March; the fruits ripen during April–June.^{2(b)}

AYURVEDIC SYNONYMS

Piyālaka, Bahulavalkala.

Piyāra, Chāra,³⁰ Kharaskandha, Tāpaseṣṭa, Sannakadru, Dhanushpata.²⁰

HABITAT

Throughout India in dry deciduous forests.

Up to an altitude of 1200 m and in the sub-Himalayan tract up to 900 m.

B. lanzan is distributed in the Indian subcontinent and Malesia.

B. latifolia is distributed in the Indian subcontinent, Indo-China and China.¹⁹

REGIONAL LANGUAGE NAMES

Beng: Chirangi, Chowl, Satdhan;

Guj: Charal, Shalichokha;

Hindi: Piyal, Piyar, Chiraungi;

Kan: Nurlaal;

Mal: Mural, Priyalam, Mural maram;

Mar: Charoli;

Tam: Muolaima, Korka, Saraparuppu;

Tel: Sara, Sarapappu;

Urdu: Chironji.

Eng: Cuddapah almonds, Almondette tree, Cheronjee, Buchanan's mango.

Habb-us-Samena of Unani medicine is equated with *Buchanania angustifolia* Roxb.³⁷

CONSTITUENTS

Albuminoids, Oil and Starch.

The kernel lipids (65.6%) are comprised mainly of neutral lipids (90.4%), consisting mostly of triacylglycerols (82.2%) and fatty acids (7.8%)

and small amounts of diacylglycerols, monoacylglycerols and sterols.^{2(c)}

Kernels yield a sweet oil (35.4%–47.2%), composed of the fatty acids myristic acid 0.14%, palmitic acid 28.9%, stearic acid 8.1%, oleic acid 57.4%, and linoleic acid 5.5%.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Dāha, Kṣata, Kṣaya

Used in hemorrhagic disorders, external injuries an emaciation (therapeutic uses based on texts from 1000 BC to sixteenth century).

Milk boiled with Priyāla kernels and lico-rice was given for checking hemorrhage (Bhāvaprakāsha).¹⁶⁽³⁾

A sweet bolus prepared with Priyāla kernels was given to children in the post-breast milk period.^{16(a)}

An ointment of kernels is used for treating itching of the skin and blemishes of the face.^{20(d)}

Fruits are employed as a cardi tonic, as an anti-leprotic in skin diseases and in anorexia.^{20(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Pūgakhandā (Bhaisajya Ratnāvali, seventeenth century), contains *Areca catechu* nuts, *Asparagus*

racemosus and *Emblica* fruits as main components with 26 supporting herbs, including Priyāla kernels, all in equal proportion.

It is a uterine tonic.

Priyāla Taila is not a composite drug and not included in the AFI, Parts I and II and the API, Vol. VI. The oil is used as a substitute for olive and almond oils in indigenous medicine.^{2(b),20}

Charaka (1000 BC) prescribed the oil of the kernel in rheumatism, glandular swellings and skin diseases.^{27s}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g of the drug in powder form.

The kernels are used as a dry fruit. They contain protein 19.0, fat 59.1, carbohydrates 12.1, and minerals 3.0 g/100 g; calcium 279.0, phosphorus 528.0, iron 8.5, oxalic acid 2.0 mg/100 g; magnesium 373.0 mg/100 g, sodium 10.2 mg/100 g, potassium 436.0 mg/100 g, copper 0.86 mg/100 g, sulfur 186.0 mg/100 g, chlorine 25.0 mg/100 g, thiamin 0.69 mg/100 g, riboflavin 0.53 mg/100 g, niacin 1.5 mg/100 g, and vitamin C 5.0 mg/100 g.^{2(b)}

The fruit paste is used for prickly heat, itching, and pimples.¹⁵

Buchanania lanzan Spreng.

Stem bark

Priyāla

BOTANICAL SOURCE(S)

Buchanania lanzan Spreng.

Syn. *B. latifolia* Roxb.

(Fam. Anacardiaceae)

B. lanzan and *B. latifolia* are also listed as independent species.¹⁹

PHARMACOPOEIAL AYURVEDIC DRUG

Priyāla (Stem bark).

API, Part I, Vol. IV.

The wood and bark are attacked by various borers.

The tree is a host for the *Kusumi* strain of the lac insect. The settlement of the larvae on the twigs is reported to be uniform.^{2(b)}

AYURVEDIC SYNONYMS

Priyāla, Carah, Kharaskandhah.

Piyāra,³⁰ Tāpaseṣṭa, Sannakadru, Dhanushpata.²⁰

HABITAT

Throughout India in dry deciduous forests.

Up to an altitude of 1200 m and in the sub-Himalayan tract up to 900 m.

B

B. lanzan is distributed in the Indian subcontinent and Malesia.
B. latifolia is distributed in the Indian subcontinent, Indo-China, and China.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Calumpang nut tree;
Beng: Chironji, Pial;
Guj: Chaaroli;
Hindi: Chiraunji, Piyaar, Chironji;
Kan: Kolatmavu, Chalaali;
Mal: Priyaalam, Mural maram;
Mar: Chaaroli jhaada;
Ori: Char, Charakoli, Priyal;
Punj: Chironji;
Tam: Saarapparuppu;
Tel: Sarapappu chettu, Chinna morilli mori, Saara;
Urdu: Habb-us-samena.

Eng: Cuddapah almonds, Almondette tree,
Cheronjee, Buchanan’s mango.
Habb-us-Samena of Unani medicine is equated
with *Buchanania angustifolia* Roxb.³⁷

CONSTITUENTS

Alkaloids, Tannins, Saponins, reducing Sugars,
Triterpenoids and Flavonoids.

Gallotannins, triterpenoids, alkaloids, flavonoids,
saponins and reducing sugars are reported
from the bark. The stem exudate contains
13.40% tannins.^{2(b),15,20(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Trsa, Raktatisara, Raktapitta

Used in fever, thirst, blood dysentery, and hemorrhagic disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).
The bark was included in prescriptions for hemorrhages and diarrhea with blood (Chakradata, eleventh century).
The bark is used as a hemostatic, anti-diarrheal, and cardiotonic agent, in mouth sores, menorrhagia, urinary diseases and for burn and wound healing.^{20(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Nyagrodhādi Kwāth Churna (Ashtāngahridaya, seventh century), contains stem barks of 19 trees in equal proportion. Priyal stem bark is one of them.
It is used for diarrhea and dysentery.
Ashoka Ghrita (Bhaishajya Ratnāvali, seventeenth century) contains *Saraca asoca* bark, cumin seeds, and *Eclipta alba* as the main drugs, with 20 supporting herbs, including the Priyāl kernel, all in equal quantities. It is a uterine tonic for leucorrhea and menorrhagia.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5-10 g.
The stem on its bark surface exudes a gum that contains tannins (13.40%), reducing sugars and alkaloids, and is used for diarrhea and inter-coastal pains.^{2(b)}

Butea monosperma (Lam.) Kuntze. Stem bark
Palāśa

BOTANICAL SOURCE(S)

Butea monosperma (Lam.) Kuntze.
(Fam. Fabaceae)
Syn: *B. frondosa* Koenig ex Roxb.
Palāshi is a different drug, equated with
Hedychium spicatum Ham. ex Smith.

PHARMACOPOEIAL AYURVEDIC DRUG

Palaśa (Stem bark).
API Part I, Vol. II.
The color of the bark powder is pale red in normal light and olive brown under ultraviolet light.²⁰

AYURVEDIC SYNONYMS

Kimśuka, Raktapuṣpaka.

Brahma vrksha, Brahma pādapa, Triparna,
Trivrta, kirmi, Kshārashreshtha, Samiduttum,
Samidvara.^{4,16(c)}

HABITAT

Throughout greater parts of India, up to about 915 m, except in very arid parts.

REGIONAL LANGUAGE NAMES

Eng: Bastard teak;
Beng: Palash, Palas, Palash gachha;
Guj: Kesudo, Khakharo, Khakhapado;
Hindi: Dhak, Tesu;
Kan: Muttug, Muttuga, Muttala;
Mal: Plasu, Camata, Plas, Chama tha;
Mar: Palas; Punj: Palash, Dhak, Tesu;
Tam: Purasu, Paras;
Tel: Moduga, Modugu, Chettu;
Urdu: Dhak, Palaspapda.

Eng: Bengal kino tree, Flame of the forest.
Urdu: Dhaak, Tesu.

CONSTITUENTS

Kinotannic acid and Gallic acid.

The bark contains kinotannic, gallic acid, and pyrocatechin. it also contains palasitrin and major glycosides, such as butrin, alanine, allophanic acid, butolic acid, cyanidin, histidine, lupenone, lupeol, (–)-medicarpin, miroestrol, palasimide, and shellolic acid.

Two compounds, 3, 9-dimethoxypterocarpan and the triterpenoid ester 3-hydroxyeuph-25-enyl heptacosanoate, have been isolated.^{79,20(d)}

Tannins represent 5.82% and non-tannins represent 7.98% of the compound.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Grahaṇi, Gulma, Arśa, Vraṇa, Kṛmiroga

Used in sprue, abdominal lumps, piles, ulcers and worm infestations (therapeutic uses based on texts from 1000 BC to sixteenth century).

The stem bark contains an anti-fungal compound, (–)-medicarpin, which is active against *Cladosporium cladosporioides*.^{2(c)}

An alcoholic extract is reported to inhibit the activity of *Escherichia coli* and *Micrococcus pyogenes* var. *aureus*.^{2(b)}

Stigmasterol, isolated from the bark, reduced the T₃, T₄, and glucose concentration, as well as the activity of hepatic glucose-6-phosphatase, with a increase in insulin (2.6 mg/kg/day for 20 days) in mice.⁷⁹

Topical application of an alcoholic extract increased cellular proliferation and collagen synthesis at wound sites in rats.⁷⁹

IMPORTANT FORMULATION/ APPLICATIONS

Palāsha kshāra (Sushruta Samhitā, 1000 BC), a single drug, for diseases of the liver and spleen, dysuria, diarrhea, and dysentery.

Nyagrodhādi Kwāthi Churna (Ashtāngahridaya, seventh century) contains the stem barks of 19 trees, including the Palāsha tree, in equal proportions. It is used for diarrhea and dysentery.

Mahānārayāna Taila (Bhaishajya Ratnāvali, seventeenth century) contains 13 main herbs, *Asparagus racemosus* root juice and 41 supporting herbs, including Palasha stem bark, in equal proportions (each one-tenth of one main herb). Deer musk is also one of the ingredients. It is used as a massage oil for sciatica and rheumatic afflictions.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g of the drug in powder form for decoction.

A decoction of the bark is prescribed in bleeding piles, hemorrhages, menstrual disorders and in cough, cold and fever.^{2(b)}

Butea monosperma (Lam.) Kuntze

Gum

Palāśa

BOTANICAL SOURCE(S)

Butea monosperma (Lam.) Kuntze
Syn. *B. frondosa* Koeing ex Roxb.
(Fam. Fabaceae)

Palāshi is a different drug, equated with
Hedychium spicatum Ham. ex Smith.
The genuine gum kino is obtained from
Pterocarpus marsupium Roxb.

PHARMACOPOEIAL AYURVEDIC DRUG

Palaśa (gum).

API, Part I, Vol. IV.

A red juice exudes from natural cracks, as well as
from incisions in the bark. Fresh juice is ruby-
red and transparent. It dries to form the gum
(Butea gum or Bengal kino).^{2(b)}

AYURVEDIC SYNONYMS

Kimsuka, Triparna.

Brahma virksha, Brahma pādapa, Triparna,
Trivṛta, kirmi,¹ Kshārashreshtha, Samiduttum,
Samidvara.^{4,16(c)}

HABITAT

Throughout the greater parts of India up to about
915 m altitude.

REGIONAL LANGUAGE NAMES

Eng: Flame of forest, Bengal kino;
Assam: Palash;
Beng: Palas;
Guj: Khakharo, Kesudo;
Hindi: Dhak, Palas, Teshu;
Kan: Mattuga, Muthuga;
Mal: Palashu;
Mar: Palas;
Punj: Dhak;
Tam: Purasu;
Tel: Moduga, Modugu;
Urdu: Dhak (Tesu).

Eng: Bengal kino tree, Flame of the forest.
Urdu: Dhaak, Tesu.

CONSTITUENTS

Anthocyanins and Tannins.

The gum (Butea or Bengal kino) contains leucocy-
anidin, its tetramers, procyanidin, gallic acid,
pyrocatechin, and mucilaginous material. It
is rich in riboflavin (138 µg/g) and thiamin
(4.3 µg/g).^{2(b),20(d),79}

**THERAPEUTIC AND OTHER
ATTRIBUTES**

Grahani, Gulma, Arśa, Krmi roga, Gudaroga,
Asthibhaga, Vraṇa, Plīha roga

Used in sprue, abdominal lumps, piles, worm
infestations, rectal diseases, bone fractures,
ulcers, and diseases of the spleen (therapeutic
uses based on texts from 1000 BC to sixteenth
century).

The gum is a powerful astringent in chronic
diarrhea, and also decreases bilirubin levels.⁷⁹
Given internally in hemorrhages from the
stomach and bladder; a solution is applied to
bruises and erysipelatous inflammations and
ringworm,^{2(b),79} as well as to disperse boils,
pimples and buboes.¹⁸

**IMPORTANT FORMULATION/
APPLICATIONS**

Balā Taila (Ashtāngahridaya, seventh cen-
tury), contains *Sida cordifolia* root as the
main herb; Palash exudate is among 45
supporting herbs, all in equal proportion.
Massage oil for rheumatic and neurological
affections.

The gum is an ingredient in confections for
leucorrhea and premature ejaculation. It is also
available as a powdered composite drug for
hematemesis, hemptysis, bleeding piles, and
bacillary dysentery.¹⁸

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

0.5 to 1.5 g.

Butea monosperma (Lam.) Kuntze. Seed Palāśah

B

BOTANICAL SOURCE(S)

Butea monosperma (Lam.) Kuntze.
Syn. *B. frondosa* Roxb.
(Fam. Fabaceae)

Syn.: *B. frondosa* Koenig ex Roxb.
Palāshi is a different drug, equated with
Hedychium spicatum Ham. ex Smith.

PHARMACOPOEIAL AYURVEDIC DRUG

Palāśah (Seed).

API, Part I, Vol. V. (Palāśah seed)
API Vol. IV also carried a monograph on Palāśa
dried seed.

Seeds are large, kidney-shaped, about 3 cm long,
2 cm wide and 2 mm thick, compressed and
reddish-brown in color.²⁰

AYURVEDIC SYNONYMS

Kiṁśukah, Raktapuṣpakah, Kshara-shrestha,
Brahma Vrksa, Vātapotha.

Brahma virksha, Brahma padapa, Triparna,
Trivrta, kirmi, Kshārashreshtha, Samiduttum,
Samidvara.^{4,16(c)}

HABITAT

Throughout the greater parts of India into a height
of 1250 m, except in the arid zones.

REGIONAL LANGUAGE NAMES

Eng: Butea seed, Flame of the forest, Bastard teak;
Beng: Palaash;
Guj: Khakharo;
Hindi: Dhak, Palash, Tesoo;
Kan: Muttagamara, Muttug;
Mal: Plashu;
Mar: Palas, Palash paapada;
Tam: Purasu;
Tel: Moduga.

Eng: Bengal kino tree, Flame of the forest.
Urdu: Dhaak, Tesu.

CONSTITUENTS

Fatty oil, amino acids, API, Vol. V; fixed oil,
enzymes and small quantities of resins and alka-
loids, API, Vol. IV.

Fatty oil 15.5%–20% (Moodooga or Kino oil) with
fatty acids of the seed, beta-D-glycoside and
alpha-amyrin.

Seeds contain proteolytic enzymes; yielded alkaloid
monospermin, plasonin, its derivative L-beta-
phenylalanine; a new lactone of N-heneicosanoic
acid, monospermoside and somonospermoside;
butin, alpha-amyrin, beta-sitosterol, its beta-
D-glucoside, sucrose and fatty acids (myristic,
palmitic, stearic, arachidic, behenic, lignoceric,
oleic, linoleic and linolenic).^{2(b),20(d),79}

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmi, Vṛṇa, Gulma, Gudajaroga, Arśa,
Raktavikāra, Vata-rakta, Udararoga, Kāsa, Kaṇḍu,
Tvakroga, Prameha, Yonidoṣa, Sukradoṣa, Mūtrak
ṛcchra, Kuṣṭha, Pāmā, Dadru, Dāha, Pliharoga,
Atisāra, Netraśukra, Sūla, Medoroga, Pāndu,
Aśmari, Vṛṣcikaviṣa

Used for worm infestations, ulcers, abdominal
lumps, rectal diseases, piles, disorders of the
blood, gout, diseases of the abdomen, cough,
itch, skin diseases, urinary disorders, disorders
of the female genital tract, vitiation of semen,
dysuria, obstinate skin diseases, eczema, ring-
worm, diseases of the spleen, acute diarrhea,
diseases of the eye, colic, obesity, anemia,
calculus, and scorpion bites (therapeutic uses
based on texts from the eighth–sixteenth
centuries).

(The Monographs on *Butea monosperma* seed in
Vol. IV, and Vol V should be reviewed.)

IMPORTANT FORMULATION/ APPLICATIONS

Krmimudgara Rasa (Yogaratanākara, sixteenth
century), contains purified mercury and
sulphur with Palāśha seeds and three other
supporting herbs.

Prescribed for ascariasis.

Ayaskriti (Ashtāngahridaya, seventh century);

Palāsh seed is among the 23 main herbs and iron filings. There are 24 supporting herbs.

Used as a hematinic tonic for anemia, chronic dysentery, and diabetes.

Seeds exhibited anti-diabetic, hypolipemic, anti-ovulatory and anti-plantation activities; there is anthelmintic activity of the alkaloids against *Ascaridia galli*, *Ascaris lumbricoides*, *Toxocara canis*, *oxyurids*, *Dipylidium caninum*, earthworms, and *Taenia*.^{20(d),79}

DOSAGE/USAGE/CAUTIONS/COMMENTS

API, Vol. V dose: 0.5 to 1 g.

API, Vol. IV dose: 3 g drug in powder form. (Basis of recommended doses could not be checked.)

Piperazine salt was found to be less toxic than palasonin itself in anthelmintic activity (*in vitro*).^{20(d)}

Seed powder, pounded with lemon juice, is applied on herpes and ringworm.^{16(a)}

Butea monosperma (Lam.) Kuntze.

Flower

Palāśah

BOTANICAL SOURCE(S)

Butea monosperma (Lam.) Kuntze.

Syn. *B. frondosa* Roxb.

(Fam. Fabaceae)

Syn.: *B. frondosa* Koenig ex Roxb.

Palāshi is a different drug, equated with

Hedychium spicatum Ham. ex Smith.

PHARMACOPOEIAL AYURVEDIC DRUG

Palāśah (Flower).

API, Part I, Vol. V. (Palāśah flower)

API. Vol. IV also carried a monograph on Palāśha flower.

The flowers are large, 4–6 cm long, bright and yellowish–red to orange–red. Petals are of varying lengths and circular or oval.^{20(d)}

AYURVEDIC SYNONYMS

Kimśuka, Brahma Vriksha, Raktapuṣpaka, Ksārśeṣṭha.

Brahma pādapa, Triparna, Trivr̥ta, kirmi, Kshārashreshtha, Samiduttum, Samidvara.^{4,16(c)}

HABITAT

Throughout greater part of India into a height of 1250 m, except in the arid zones.

REGIONAL LANGUAGE NAMES

Eng: Butea seed, Flame of the forest, Bastard teak;

Beng: Palaash;

Guj: Khakharo;

Hindi: Dhak, Palash, Tesoo;

Kan: Muttagamara, Muttug;

Mal: Plashu;

Mar: Palas, Palash paapada;

Tam: Purasu;

Tel: Moduga;

Urdu: Dhak (Tesu).

Eng: Bengal kino tree, Flame of the forest.

Urdu: Dhaak, Tesu.

CONSTITUENTS

Glycosides and flavonoids (API, Vol. IV); Coumarins and glycosides, cumaranone glycosides, butrin, isobutrin, monospermoside, isomonospermoside, carbomethoxy-3, 6-dioxo-5-hydro-1, 2, 4-triazine, coreopsin, isocoreopsin (API, Vol. V).

Flowers yield seven flavonoid glycosides, butrin, isobutrin, coreopsin, isocoreopsin, sulphurein, monospermoside, and isomonospermoside.

Four free amino acids, histidine, aspartic acid, alanine, and beta-alanine; and beta-sitosterol.^{20(d),79} The major glycoside is butrin.

Flowers yield a wax (0.35%–0.75%); fatty acids of the wax are palmitic, stearic, arachidic, behenic, lignoceric, and cerotic.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktavikāra, Mūtrakrcchra, Dāha, Vātarakta, Kuṣṭha, Trṣṇā, Raktapitta, Plīharoga, Gulma, Grahāṇi, Kṛmi, Kaṇḍu, Arśa, Pittabhisyanda, Netrasukra

Used for disorders of blood, dysuria, burning sensation, gout, obstinate skin diseases, thirst, bleeding disorders, diseases of the spleen, abdominal lumps, malabsorption syndrome, worm infestations, itch, piles, conjunctivitis, and diseases of the eye (therapeutic uses based on texts from 1000 BC to sixteenth century).

(The Monograph on *Butea monosperma* flower appeared in Vol. IV, and Vol V should be reviewed.)

Flowers contain anti-hepatotoxic flavonoids, isobutrin, and butrin; butanol fractions showed potent free radical-scavenging activity.

Petroleum ether extract (acetone-soluble part) showed anti-convulsion activity and raised GABA and serotonin contents; alcoholic extract exhibited anti-estrogenic activity; ethanolic extract reduced blood glucose levels in diabetic rats.^(2b,79)

IMPORTANT FORMULATION/ APPLICATIONS

Kumkumādi Taila (Yogarātnākara, sixteenth century), contains 25 herbs, including Palāsh flowers, also a mineral, red ochre and solid bile of ox.

For pimples, skin blemishes and hyper pigmentation.

Vaṅga Bhasma (Jhārana-b, AFI) (Rasatarangini) contains Palāsh flower powder as an optional drug with *Achyranthes aspera* plant powder. Palāsh flowers are not used in OTC Vanga Bhasma (Vaidya Chintamani), which is prescribed as a diuretic, expectorant, and anti-microbial.

Flowers are used in intrinsic hemorrhage, diarrhea, and as an astringent, diuretic and depurative.

An Ayurvedic drug, Pippali Rasayana, prepared from *Piper longum* and the ash of the Palāsh stem, flower, leaves, and root, exhibited up to 98% recovery from giardiasis.⁸⁰

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of drug in powder form.

BOTANICAL SOURCE(S)

Caesalpinia bonduc (L.) Roxb.
(Fam. Caesalpinaceae)

C. bonducella (L.) Flem., a spiny climber, is reported as an anti-periodic and shares some of the reported properties of Kāntākaranja.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Latākarañja (Seed)

API, Part I, Vol. V.

Three plant species are being used as Karanja or similar because the flowers impart color to water. *Pongamia pinnata* Pierre, a tree, is equated with Karanja, Karanjaka, Naktamāla (AFI synonyms) and Udakirya; *Holoptelea integrifolia* (Roxb.) Planch., also a tree, is equated with Chirbilva, Pūtika, Pūtikaranja, Putikaranja (AFI synonyms) and Prakiryā; *Caesalpinia bonduc*, a shrub, has been identified as Latākaranja (AFI synonym), Kantaki karanja and Karanji.^{3,30,7}

AYURVEDIC SYNONYMS

Kuberākṣa, Kaṇṭakī Karañja.

Karanji.^{16(c)}

Nātākaranja, Kāntākaranja.³⁰

Kuberāksha is accepted as the seed of Kantaki karanja (Latākaranja), while Kuberākshi is considered a different drug in Bhāvaprakasha, Nighantu section; it was equated with Pātālā (*Stereospermum suaveolens* DC.).³

HABITAT

An extensive, shrubby, wild, perennial climber, throughout tropical parts of India.

An armed liana, up to 15 m in height, found wild throughout the plains of India up to an altitude of 1000 m in the Himalayas; also found in deltaic regions of Western, Eastern, and Southern India.

The flowers are fragrant.

REGIONAL LANGUAGE NAMES

Eng: Bonduc nut, Fever nut;
Beng: Kaantaa karanjaa, Naataa, Naataa karanjaa;
Guj: Kaanchakaa, Kaanka;
Hindi: Karanja, Karanjuaa, Kaantaa karanj;
Kan: Gajjike kaayi, Gajkai;
Mal: Kalamchikuru, Kaalanchi, Kazhinch-kai;
Mar: Saagar gotaa, Gajarghotaa, Gaajagaa;
Ori: Kotokolejaa;
Tam: Kajha shikke, Kalichchikkaai;
Tel: Gachchakaay;
Urdu: Akitmakit.

Eng: Physic nut,^{2(b)} Divi divi.¹³

CONSTITUENTS

Seeds contain bitter substance phytosterenin, bonducin, saponin, phytosterol, fixed oil, starch and surcrose. Seeds also contain α , β , γ , δ and ζ caesalpins.

Defatted seeds contain caesalpins, caesalpin F, and a homoisoflavone, bonducellin.^{2(b)}

Cassane deterpenes and neocaesalpin A and B have been isolated.

Triglycerides of seed kernel fatty acids and palmitic, stearic, octadeca-4-enoic, and octadeca 2,4-dienoic acids have been identified as macro-filaricidal principles.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Visamajvara, Sūtikājvara, Śūla, Gulma, Kāsa, Meha, Vātavikāra, Tvakroga, Śoṭha, Vraṇa, Udaraśūla, Śvāsa, Raktātisāra, Kuṣṭha, Āmavāta, Sandhivāta, Agnimāndya, Pravāhikā, Arśa, Yakṛtphihāroga, Chardi, Kṛmi

Used in intermittent fever, puerperal fever, colic, abdominal lumps, cough, urinary disorders, skin diseases, inflammation, ulcers, abdominal pain, dyspnea, diarrhea with blood, leprosy, rheumatic afflictions, joint pain, impaired digestion, sprue, piles, diseases of the liver and spleen, emesis and worm infestations (therapeutic uses based on texts from 1000 BC to sixteenth century).

C

Bonduc nuts are anti-periodic, anti-pyretic, diuretic and anti-diarrheal; made into an ointment used for hydrocele; an infusion is used for infantile convulsions.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Āragvadhādi Kwāth Churna (Ashtāngahridaya, seventh century), contains 20 herbs including Karanja (equated with *Pongamia pinnata* by AFI) root and Chirbilva (equated with *Holoptelea integrifolia* by AFI) leaf. (Latākaranja, Kuberāksha or Kantaki-karanja is not included in the compound.)

Kuberākshādi Vati not included in AFI Parts I and II and Bhaishajya Ratnāvali.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

The seeds are one of the ingredients in Ayush-64 (CCRAS), for treating malarial fever.

Capsules of dry powder of seeds—3 g, two capsules, three times a day for 10 days—were used in a clinical trial.^{20(c)}

Seeds are reported to be abortifacient.^{2(b)}

LD₅₀ of the extract of the seeds was found to be 1000 mg/kg i.p. in mice.^{20(e)}

Caesalpinia crista Linn.

Pūtikarañja

BOTANICAL SOURCE(S)

Caesalpinia crista Linn.
(Fam. Caesalpiniaceae)

C. Crista L. emend. Dandy & Exell, syn. *C. Nuga* Ait., *Guilandina paniculata* Lam., *G. Nuga* L., *Caesalpinia paniculata* (Lam.) Roxb. Not to be confused with *C. bonduc* due to close resemblance.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Pūtikarañja (Stem bark).

API, Part I, Vol. V.

Caesalpinia crista Linn. is equated with Lata karanja (AFI, Part I, page 332).

AYURVEDIC SYNONYMS

Cirabilvah, Pūtikah, Prakiryah.

AFI (Part I, Second Revised edition) equated Pūtikaranja, Pūtika, Pūtigandhā and Chirbilva with *Holoptelea integrifolia* Planch. (pages 310, 323 and 335).

HABITAT

A prickly, shrubby climber, found throughout India up to an altitude of 1200 m.

C. crista: a large woody climber chiefly growing on the banks of rivers and tidal forests (roots, leaves, seed, and seed oil are used).^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Indian elm;^{*}
Guj: Kanajho, Charela;
Hindi: Chilbil, Kanju, Banchillaa, Paapari;
Kan: Tapasigida;
Mal: Avil, Nettavil;
Mar: Baavala;
Punj: Chirbil;
Tam: Avali, Aapa;
Tel: Tapasi, Nemalinara.

Eng: Fever nut,^{2(b)} Crusted fever nut. *Holoptelea integrifolia* (common name): Kanju, Karanji.^{2(a)}

CONSTITUENTS

Flavonoid, Saponins and Alkaloids.

Holoptelea integrifolia stem bark gave triterpenoidal fatty acid esters, holoptelin A and B, friedelin and epi-friedelinol.^{2(c)}

* Indian elm is a tree equated with *Holoptelea integrifolia* (Roxb.) Planch.^{2(a)} *Ulmus fulva*, known as Indian elm, does not occur in India. It is an American tree.^{2(a)}

Bark contains lignin (36.2%) and pentosans (12.5%) and is mucilaginous.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Prameha, Arśa, Kaisṇḍu, Pakvśopha, Vraṇa, Tvakroga, Slipada, Vāṭaja śūla, Udara, Gulma, Śūla, Masurikā, Amlapitta, Śvitra, Śarira-durgandha

Used for leprosy, polyuria and other urinary diseases, piles, itch, edema, ulcers, skin diseases, filariasis, rheumatic pain, abdominal pain, abdominal lumps, colic, smallpox, hyperacidity, leucoderma, and foul body odor (therapeutic uses based on Sushruta Samhitā, 1000 BC, for Pūtikaranja leaf, and Bhāvaprakāsha, sixteenth century, for Karanja, Naktamāla, Chirbilva and Pūtikaranj; plant parts not mentioned).

(Bhāvaprakāsha Sanskrit *shloka*, quoted in API, Vol. V, page 346, and the *shloka* composed by a contemporary scholar, are absolutely identical.)^{16(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Indukānta Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains Pūṭika (Chirbilva) stem bark with *Cedrus dodara* heartwood as main herbs, with *Dashmool* and 8 other supporting herbs, in equal proportion. An antitoxic and antiperiodic drug.

Vishnu Taila (Bhaishajya Ratnāvali, seventeenth century) contains ten herbs, including Pūṭika (Pūtikaranja) stem bark, in equal proportions. Used internally for cardiac pain, gout, facial paralysis, calculus, phthisis, and impotency.

Pramehamihira Taila (Bhaishajya Ratnāvali) contains 41 herbs, including Pūṭika stem bark, in equal proportions. Used for intermittent fever, rheumatic afflictions, polyuria (internally) and as a massage oil.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50–100 mL in the form of decoction.

Caesalpinia sappan Linn.

Pattanga

BOTANICAL SOURCE(S)

Caesalpinia sappan Linn.
(Fam. Caesalpinaceae)

HABITAT

Found in South India and Bengal, usual cultivated as a hedge plant.

Also found wild in Odisha and Madhya Pradesh.

PHARMACOPOEIAL AYURVEDIC DRUG

Pattanga (heartwood).

API, Part I, Vol. IV.

Pattanga of Charaka Samhitā and

Ashtāngahridaya is a different drug, equated with an *Oryza sativa* species.³⁰

AYURVEDIC SYNONYMS

Patranga.

Pattaranjaka.^{16(c)}

Kuchandana, Raktasara, Suranga, Ranjana.^{20(c)}

REGIONAL LANGUAGE NAMES

Eng: Sappan wood;

Assam: Baggam, Bakam;

Beng: Bokom;

Guj: Patang;

Hindi: Pagang, Bakam;

Kan: Patang;

Mar: Patang;

Tam: Anaikuntramani;

Tel: Bukkapuchettu;

Urdu: Pattang.

Eng: Brazil wood.^{2(b)}

CONSTITUENTS

Brazlin, Essential oils, Saponin Glycoside, Amino acids and Sugars.

C

The heart wood contains aromatic compounds, brazilin, sappanchalcone, caesalpin J and P, protsappanin A and B and compounds related to brazilin; beta-sitosterol; alpha- and beta-amyrin and the sugar part is D-glucose. Presence of monohydroxybrazilin and benzyl-dihydrobenzofuran derivatives and homoisoflavonoids are also reported. Heart wood gave 1.15% of a fixed oil having palmitic acid 27.62%, stearic acid 44.15%, linoleic acid 25.94%, and oleic acid 2.23%. Alanine, aspartic acid, glycine, proline, valine, leucine, threonine, and nor-valine were found as free amino acids.^{2(b),20(e)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vraṇa, Dāha, Rakta doṣa, Pradara, Mukharoga

Used for ulcers, burning sensation, vitiated blood, vaginal discharges and diseases of the mouth (therapeutic uses based on texts from the twelfth–sixteenth centuries).

An infusion of the wood is astringent and an emmenagogue, prescribed in atonic diarrhea and dysentery; its paste is prescribed in rheumatism, hemorrhages and to treat wounds.

Brazilin dye is anti-inflammatory,^{2(b)} and it also exhibited hypoglycemic activity in rats.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Arimedādi Taila (Ashtāṅgahridaya, seventh century), contains *Acacia catechu* and *A. farnesiana* barks (2:1) as main drugs, with 37 supporting herbs, including Pattange heartwood, all in equal proportion. Used as a gum paint for diseases of the teeth and gum.

Karpurādyārka (Arkprakāsha, Ravana, period not known) is a distilled drug containing camphor and 50 herbs. Used for digestive disorders, halitosis and cardiac problems. Commercial products contain only distilled camphor and ajowan seeds.

Kumkumādi Taila (Yogaratanakara, sixteenth century) contains 25 herbs in equal proportions, as well as a mineral, red ochre, and the solidified bile of the ox. Used for pimples, skin blemishes, and hyper-pigmentation.

Patrāṅgāsava (Bhaishajya Ratnāvali), not quoted in the API, was a valued drug for leucorrhea and metrorrhagia.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

LD₅₀ of the stem extract was found to be 750 mg/kg i.p. in mice.^{20(e)}

Cajanus cajan (Linn.) Millsp.

Āḍhaki

BOTANICAL SOURCE(S)

Cajanus cajan (Linn.) Millsp.
(Fam. Fabaceae)

Syn. *C. indicus* Spreng.

PHARMACOPOEIAL AYURVEDIC DRUG

Āḍhaki (Root)

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Tuvarī.

Tuvara, Shanpushpikā,⁷ Tuvaraka.²⁸

HABITAT

Cultivated almost throughout as a pulse crop, mainly in Uttar Pradesh, Madhya Pradesh, Bihar, Maharashtra and Tamil Nadu, up to an altitude of 1,830 m in the Himalayas.

Other countries growing Pigeon pea are Myanmar, Uganda, Kenya, Dominican Republic, Panama, Puerto Rico, and the West Indies.

REGIONAL LANGUAGE NAMES

Eng: Pigeon pea, Red gram;
Assam: Ruharmah;
Beng: Adar, Aaharee, Arhar;
Guj: Tuvar, Tuvera, Tur, Tuver;
Hindi: Aarahad, Aarahar;
Kan: Togari, Tovaree, Togari, Kari uddu, Togaribele;
Mal: Thuvara, Tuvara;
Mar: Toor, Toori, Tura;
Ori: Harada, Kandulagachha;
Punj: Arhar;
Tam: Tovarai, Thovary, Adagi tuvari, Thuvarai, Tuvarai, Thovarai;
Tel: Kandulu, Kadulu;
Urdu: Arhar.

Eng: Congo pea, Red gram.^{2(b)}

CONSTITUENTS

Saponins and reducing sugars.

The root contains anti-fungal isoflavone, cajanone cajaflavone, methyl cajanone, cajiisoflavone, an isoflavone glycoside, genistein, genistin, an anthraquinone derivative, cajaquinone, sitosterol and its glucosides, lupeol and amyrins, pinostrobin, longistylin A and C and hexadecanoic acid. An anthraquinone derivative, cajaquinone, has also been reported.^{20(e),81}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktavikāra

Used for diseases due to vitiated blood (properties of seeds have been quoted from texts from 1000 BC to sixteenth century).

Anti-plasmodial activities have been confirmed in betulinic acid.

Pinostrobin is anti-inflammatory; genistein and genistin possess anti-oxidant activities and cajanol possesses anti-cancer activity (activity towards MCF-7 human breast cancer cells).^{81,82}

The pharmacological profile of pinostrobin resembles that of anti-depressant drugs that block sodium channels.

In ethnomedicine, the roots and mature leaves are prescribed for sinus fistulae.^{20(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Mahāpanchagavya Ghrita (Ashtāngahridaya, seventh century) contains cow's milk, curd, ghee, urine and dung extract with 24 herbs, in equal proportions, for decoction and 18 supplementary herbs for additional support. Used for malarial and other fevers, edema, epilepsy, abdominal lumps, and fistula-in-ano.

Kankāyana Gutikā (Bhaishajya Ratnāvali, seventeenth century) contains *Ferula foetida* gum-resin, barley ash and *Garcinia pedunculata* fruit, along with eight other herbs, including Āḍhaki root, and six supporting herbs, processed in *Citrus medica* juice. Used for hyperacidity, abdominal lumps, worm infestations, and piles.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–6 g of the drug in powder form.

C

Cajanus cajan Linn.

Seed

Āḍhaki

BOTANICAL SOURCE(S)

Cajanus cajan Linn.
(Fam. Fabaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Āḍhaki (seed).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Tuvari.

Tuvara, Shanpushpika,⁷
Tuvarka.²⁸

HABITAT

Cultivated almost throughout as a pulse crop, mainly in Uttar Pradesh, Madhya Pradesh, Bihar, Maharashtra and Tamil Nadu, up to an altitude of 1,830 m in the Himalayas.

Other countries growing Pigeon pea are Myanmar, Uganda, Kenya, Dominican Republic, Panama, Puerto Rico, and the West Indies.

REGIONAL LANGUAGE NAMES

Eng: Pigeon pea;
Assam: Ruharmah;
Beng: Arhar;
Guj: Tuver;
Hindi: Arhar;
Kan: Togari;
Mal: Thuvara;
Mar: Toor;
Ori: Harada, Kandulagachha;
Punj: Arhar;
Tam: Adagi tuvari, Thuvarai, Tuvarai;
Tel: Kandulu;
Urdu: Arhar.

Eng: Congo pea, Red gram.^{2(b)}

CONSTITUENTS

Not quoted in API.

Seeds yielded isoflavones, formononetin (9.2%), and diadzein (26.4%); average tannin content was 996 mg/100 g; 83%–97% loss of tannins occurred after decortication; vicilin; sitosterol is the main sterol.

Protein and lysine contents were reported to be 22.0% and 7.3%, respectively. The concentration of urase was maximal in dry seeds (resting 165.9 units/mg of protein).

Fatty acids in fixed oil: linolenic 5.56%, linoleic 51.41%, oleic 6.33%, and saturated acids 36.70%.

Iodine and fluorine content: 0.27 and 3.7 ppm of dry edible matter.^{20(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Atisthauilya, Raktavikāra, Raktapitta, Viṣaroga, Sthauilya, Medoroga, Arśa

Used for abnormal obesity, vitiated blood, bleeding disorders, toxemia, obesity, hyperliposis and piles (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka used pods (cooked) in prescriptions for obesity, abdominal diseases, poisoning and rheumatism,²⁷ and as a soup with *ghee* for gout.^{16(a)}

Sushruta gave expressed oil of ripe fruits internally for diabetes, urinary diseases, and malignant skin diseases.²⁸

The stilbenes containing the extract fraction of *C. cajan* reduced the atherogenic properties of dietary cholesterol in mice.⁸²

IMPORTANT FORMULATION/ APPLICATIONS

Kaṅkāyaṇa Gutikā (Bhaishajya Ratnāvali, seventeenth century), contains *Ferula foetida* gum-resin, barley ash and *Garcinia pedunculata* fruit with 8 other herbs, including Āḍhaki root and 6 supporting herbs, processed in *Citrus medica* juice.

Used for hyperacidity, abdominal lumps, worm infestations and piles.

In ethnomedicine, the seeds and leaves, ground into paste and warmed, are applied over mammary glands to check secretion of milk. Leaves and seeds are used in jaundice and in skin diseases.

A poultice made with the seeds is used for reducing swelling.^{20(e)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

As directed by the physician.

Raw seeds taken in large quantities produce a soporific effect.^{20(c)}

Arhar forms an ingredient of a preparation used as an abortifacient.^{20(c)}

Calamus rotang L.

Vetra

C

BOTANICAL SOURCE(S)

Calamus rotang L.
(Fam. Arecaceae)
Syn. *C. roxburghii* Griff.

PHARMACOPOEIAL AYURVEDIC DRUG

Vetra (Rhizome).
API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Vetraka, Romaśara, Tejana.
Abhrapusha.⁷ (Romaśara and Tejana could not be rechecked.)

HABITAT

Central and southern India. Restricted to the plains along the backwaters and coasts.
About 38 wild species are distributed in the Western Himalayas, throughout Eastern India and peninsular India.
Calamus spp.: distributed in Asia, Australia, and Africa.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Cane, Common rattan;
Ben: Chaachi bet;
Guj: Netar;
Hindi: Beta, Vet, Bent;
Kan: Betasu;
Mal: Chural;
Mar: Veta, Thor veta;
Ori: Beta;
Tam: Pirampu;
Tel: Sanna bettamu, Pemu.
Eng: Rotang.

CONSTITUENTS

Saponins, alkaloids and flavonoids.
Rhizomes afforded beta-sitosterol, beta-sitosterol-3-beta-D-glucopyranoside, and (+)-afzelechin.²⁶¹

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa (piles), Aruci (tastelessness), Aśmarī (calculus), Dāha (burning sensation), Jvara (fever), Kāsa (cough), Kuṣṭha (leprosy/diseases of skin), Mūtrak ṛcchra (dysuria), Prameha (metabolic disorder), Pravāhikā (dysentery), Raktapitta (bleeding disorder), Śoṭha (inflammation), Tṛṣṇā (thirst), Tvakroga (skin diseases), Visarpa (Erysipelas), Yoniroga (disease of female genital tract). Used as single drug

Relevant classical texts in support of therapeutic uses of the rhizome are not quoted.

Quoted texts of Charaka Samhitā, Sushruta Samhitā (1000 BC) and Kaiyadeva Nighantu (fifteenth century) are related to *Vetāgra* (the tip of Vetra), not the rhizome. The portion of Bhāvaprakāsha text is related to *Vetas* (*Salix caprea*), not Vetra.

IMPORTANT FORMULATION/ APPLICATIONS

During the classical period, the tip or tender leaves of the plant were used for emesis during fever, edema, intrinsic hemorrhage, and anorexia. (Charaka Samhitā, Sushruta Samhitā (1000 BC); Ashtāngahridaya, seventh century.)^{16(a)}
In Kampuchia, a decoction of the root is used for fever, dysentery, and biliousness.^{2(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Kvātha (decoction): 50 to 100 mL. Cūrṇa (powder): 5 to 10 g.

Calamus thwaitesii Becc.

Kumārīvetra

C

BOTANICAL SOURCE(S)

Calamus thwaitesii Becc.
(Fam. Arecaceae)

Vetra is equated with *Calamus tenuis* Roxb.^{3,30}

PHARMACOPOEIAL AYURVEDIC DRUG

Kumārīvetra (Rhizome).

API, Part I, Vol. VI.
(A recently added non-classical Sanskritized name.)
A non-classical Sanskritized adaptation of
kumaari betta (Kannada).

AYURVEDIC SYNONYMS

Suśira kāṇḍaḥ.

HABITAT

Cane Palm: common in evergreen forests of Western Ghats.

Found in Coorg (Karnataka).^{20(c)}
About 30 Indian species of *Calamus* are distributed in the Himalayans, Assam, Malabar, Travancore, Coorg, and Sri Lanka.^{2(a)}

REGIONAL LANGUAGE NAMES

Kan: Jeddu betta, Kumaari betta;
Mal: Valiya chural;
Mar: Veta;
Tam: Vanchi.

Eng: Cane palm.

CONSTITUENTS

Constituents not quoted in API.

A flavonoid is reported in the root of a related species, *Calamus rotang*.

C. thwaitesii: 50% ethanolic extract showed effects on cardiovascular system in dogs and cats. Aerial parts of *C. floribundus*, *C. rotang* and *C. thwaitesii* exhibit spasmogenic, hypotensive, anticonvulsant and CNS-depressant activities. No report is available on the root.^{20(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra (diarrhoea), Jvara (fever), Kuṣṭha (leprosy/ diseases of skin), Prameha (metabolic disorder), Raktapitta (bleeding disorder), Visarpa (erysipelas), Vraṇa (ulcer). Used as single drug.

C. thwaitesii: in ethnomedicine, stem sap is used to prevent conception. Leaves are used in diseases of the blood and in biliousness. Wood is a vermifuge. Root is given in chronic fever.^{20(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Charaka used vetrāgra (tender leaves), Sushruta used the fruit, vetāgra and kareera (young shoots or tops).³⁰ Use of rhizome during classical period could not be traced.

In Cambodia, the root of *Calamus* spp. is used as a febrifuge, as well as for dysentery and biliousness; in veterinary practice, it is used as an aperient.^{2(a)} In Kampuchia, a decoction of the root is used in chronic fever, dysentery, and biliousness.^{2(b)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

Callicarpa macrophylla Vahl.

Priyaṅgu

BOTANICAL SOURCE(S)

Callicarpa macrophylla Vahl.
(Fam. Verbenaceae)

Callicarpa macrophylla var. *sinensis*. Cl.
Syn. *C. nudiflora* Hook & A., *C. acuminata* Roxb.,
C. reevesii Wall. ex Schaver.¹⁵
The Central Council for Research in Ayurveda
and Siddha, in its monograph on Priyangu,
covered both *Callicarpa macrophylla* and
Aglaia roxburghiana (1990).²⁵
In Kerala, dried male flowers of *Myristica fragrans*
Houtt. are sold as Priyangu. It is reported that
the flower buds of *M. malabarica* Lam. and
Orchocarpus longifolius Benth. & Hook are
sold in Chennai (Tamil Nadu) and the fruits
of *Zanthoxylum budrunga* Wall. are sold in
Kerala.³

PHARMACOPOEIAL AYURVEDIC DRUG

Priyaṅgu (Inflorescence).

API, Part I, Vol. II.

Priyangu of classical texts is equated with
Setaria italica Beauv., a cereal, as well as with
flowers and fruits of a tree or shrub, Phool
Priyangu and Gandha Priyangu. Aromatic
buds of *C. macrophylla* are accepted by many
scholars as Phool Priyangu, and the aromatic
kernels of *Prunus mahaleb* fruits as Gandha
Priyangu.
Fruits of *Aglaia roxburghiana* Miq. are also sold in
North India as Priyangu.^{3,30}

AYURVEDIC SYNONYMS

Phalinī, Vanitā.

Gandha-Prinyangu, Kāntā, Kāntāhwā, Priyāhwa,
Shyāma, Nandini,^{4,30} Gandaphali.
Priyangu belongs to the *Elādi* group of herbs,
which promotes improved complexion and
cures itches, pimples and rashes.
Priyangu also belongs to the *Anjanādi* group of
herbs, specific for curing poisoning and hem-
orrhagic conditions.¹⁸

HABITAT

The West Himalayas from Kashmir to Assam,
ascending to 1800 m and throughout North and East
India.

Also distributed in Nepal, Bhutan, Myanmar, Sri
Lanka, Thailand, Vietnam, and China.
Aglaia roxburghiana is found in evergreen forests
of Andhra Pradesh, Karnataka, and Kerala.^{2(b)}

REGIONAL LANGUAGE NAMES

Assam: Priyangu;
Beng: Priyangu;
Guj: Lata priyangu;
Hindi: Priyangu;
Kan: Priyangu, Gandhapriyangu;
Mal: Njazhal;
Mar: Priyangu, Gavhala;
Ori: Priyangu;
Punj: Priyangu;
Tam: Gnazhal, Gnazalpoo;
Tel: Prakhanam, Prenkanamu.

Eng: Perfume cherry, Beautyberry.
Aglaia roxburghiana: Beng: Priyangu; Hindi:
Priyangu; Mai: Punyava; Tam: Chokkala; Tel:
Yerraaduga²⁰; Urdu: Habb-ul-Mihlb.¹⁸

CONSTITUENTS

Glycosides, Terpenes, Phenolic compound, Resin
and Saponin.

Deterpenoid constituents, calliterpenone and
calliterpenone monoacetate; cytotoxic acyclic
triterpene callicarpenol; volatiles rich in seli-
nene isomers; luteolin and apigenin; oleanolic
and betulinic acids. A diterpenoid, 16- α ,
17-isopropylideno-3 oxo-phyllocladane, was
also isolated.^{20(c),84}
Aglaia roxburghiana flowers: contain quercetin,
myricetin, rutin, and meratin.^{2(d),25}

THERAPEUTIC AND OTHER
ATTRIBUTES

Dāha, Jvara, Rakta-pitta, Pakvātisāra, Svedādhikya

C

Used for burning sensation, fever, hemorrhagic diseases, later stages of diarrhea, and excessive sweating (therapeutic uses based on text quotations, not specific to the flower).

Flowers are used in the management of fever, diabetes, arthritis, inflammations, and asthma. Charaka prescribed flowers in prescriptions for intrinsic hemorrhage.^{16(a)}

Callicarpa flower extract (100 and 200 mg/kg bw) significantly decreased blood glucose levels; the extract also reduced elevated lipid profiles in diabetic models.⁸³

IMPORTANT FORMULATION/ APPLICATIONS

Khadirādi Gutika (Charaka Samhitā, 1000 BC), contains *Acacia* as main drugs, with 30 supporting herbs, including Phalini flowers. Elādi Churna (Bhaishajya Ratnāvali, seventeenth century) contains cardamoms and seven other

herbs, including Priyangu flowers, in equal proportions. Used for cough and asthma. Kanaka Taila (Bhaishajya Ratnāvali) contains licorice as the main drug with five supporting herbs, including Priyangu flowers, in equal proportions.

Used topically for hyperpigmentation and pimples, Kumkumādi Taila (Yogarātnākara, sixteenth century) contains 25 herbs, including Priyangu flowers, in equal proportions.

Nilikādyā Taila (Shārangadhara Samhitā, thirteenth century) contains *Triphala* (the “Three Myrobalans”) extract and *Eclipta alba* plant juice with 16 supporting herbs, including Priyangu flowers, and calcined iron. Used for alopecia.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-3 g of the drug in powder form.

Callicarpa macrophylla Vahl.

Fruit

Priyaṅgu

BOTANICAL SOURCE(S)

Callicarpa macrophylla Vahl.
(Fam. Verbenaceae)

The Central Council for Research in Ayurveda and Siddha, in its monograph on Priyangu, covered both *Callicarpa macrophylla* and *Aglaia roxburghiana* (1990).²⁵

In Kerala, dried male flowers of *Myristica fragrans* Houtt. are sold as Priyangu. It is reported that the flower buds of *M. malabarica* Lam. and *Orchocarpus longifolius* Benth. & Hook are sold in Chennai (Tamil Nadu) and the fruits of *Zanthoxylum budrunga* Wall. are sold in Kerala.³

PHARMAPOEIAL AYURVEDIC DRUG

Priyangu (Fruit).

API, Part I, Vol. IV.

Priyangu of classical texts is equated with *Setaria italica* Beauv., a cereal, as well as with

flowers and fruits of a tree or shrub, Phool Priyangu and Gandha Priyangu. Aromatic buds of *C. macrophylla* are accepted by many scholars as Phool Priyangu, and the aromatic kernels of *Prunus mahaleb* fruits as Gandha Priyangu.

Fruits of *Aglaia roxburghiana* Miq. are also sold in North India as Priyangu.^{3,30}

AYURVEDIC SYNONYMS

Phalini, Vanita.

Gandha-Prinyangu, Kāntā, Kāntāhwā, Priyāhwā, Shyāma, Nandini,^{4,30} Gandaphali.

Priyangu belongs to the *Elādi* group of herbs, which promotes improved complexion and cures itches, pimples, and rashes.

Priyangu also belongs to the *Anjanādi* group of herbs, specific for curing poisoning and hemorrhagic conditions.¹⁸

HABITAT

Sub-Himalayan tracts from Hazara eastwards to Assam up to 1800 m, in Upper Gangetic and West Bengal plains.

Also distributed in Nepal, Bhutan, Myanmar, Sri Lanka, Thailand, Vietnam and China. *Aglaia roxburghiana* is found in evergreen forests of Andhra Pradesh, Karnataka, and Kerala.^{2(b)}

REGIONAL LANGUAGE NAMES

Beng: Priyangu;
Guj: Ghaunla, Priyango;
Hindi: Priyangu;
Kan: Kadu-edī, Sannanathdagida, Proyangu, Navane;
Mal: Nazhal, Kadurohini, Njazhal, Inazhal;
Mar: Gauhala, Gahula, Priyangu;
Ori: Priyangu;
Punj: Priyangu;
Tam: Gnazalpoo;
Tel: Prenkhanamu.

Eng: Perfume cherry, Beautyberry.
Aglaia roxburghiana: Beng: Priyangu; Hindi: Priyangu; Mai: Punyava; Tam: Chokkala; Tel: Yerraaduga;^{20(e)} Urdu: Habb-ul-Mihlb.¹⁸

CONSTITUENTS

Fixed oil.

- C. macrophylla*: the fruit oil is composed of 6% alpha-selinine and 41.6% beta-selinine. Dendrolasin, a perfumary natural furanoid sesquiterpenoid, is a characteristic of the fruit's essential oil.⁸³ Fruit showed the presence of alkaloids, flavonoids, glycosides, saponins, sterols, and terpenoids.^{20(e)}
- A. roxburghiana*: contains bisamide alkaloids. Triterpenes, 14-alpha-methylsterols and roxburghiadiol A and B have been isolated from the fruit and leaves.^{2(c),20(e),25}

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Dāha, Chardi, Raktadosa, Bhrama, Vataroga, Vaktrajadya

Used for fever, burning sensation, emesis, vitiated blood, giddiness/vertigo, nervous system disorders, and lockjaw (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta prescribed the fruits in fever, homiothermia, piles, dermatosis, eruptions, blood poisoning, hemoptysis, toxic conditions, and as a styptic and intestinal astringent.

In Ayurvedic skin preparations, Gandha Priyangu fruits were used to treat skin affections, freckles, and blemishes.^{16(a),18,27,28}

IMPORTANT FORMULATION/ APPLICATIONS

Jirakādi Modaka (Bhaishjya Ratnāvali, seventeenth century) contains cumin seeds and cannabis leaves as main drugs, 42 supporting herbs include Priyanguka (a cereal, not related to Priyangu).³⁰

Brihat Phala Ghrita (Shārangadhara Samhitā, thirteenth century) contains 23 herbs, including Priyangukā (a cereal, not related to Priyangu).³⁰

Vyāghrādi Taila (Bhaishjya Ratnāvali) contains 4 plant juices as the main drug, with 22 supporting herbs, including Priyangu fruit.

Brhchhāgalādyā Ghrita (Bhaishjya Ratnāvali) contains goat's meat and 52 herbs; Priyangu fruits are among the 40 secondary herbs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-2 g of the drug in powder form.

LD₅₀ of the plant extract was found to be >1000 mg/kg i.p. in mice.^{20(e)}

Calotropis procera (Ait.) R. Br. Root, stem bark Arka

C

BOTANICAL SOURCE(S)

Calotropis procera (Ait.) R. Br.
(Fam. Asclepiadaceae)

C. procera (Ait.) Ait. f. subsp. *hamilttonii* (Wright)
S. J. Ali.

Syn. *C. procera* Auct. non-(Ait.) At. f. is found in
India, Pakistan, and Afghanistan.

Subsp. *procera* occurs in Africa, extending into
the Mediterranean belt, Jordan, Arabia,
Palestine, Abu Dhabi, the West Indies and
South and Central America.^{2(b),20(e)}

C. procera is not available in South India.

C. gigantea (Linn.) R. Br. ex Ait. is used.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Arka (Root).

API, Part I, Vol. I.

Stem bark.

API, Part I, Vol. III.

(In Classical Ayurvedic medicine, the leaf, leaf
bud, dried leaf, latex of the stem, flower, seed,
root, and root bark were used in prescriptions;
there is no reference of stem bark usage.)

AYURVEDIC SYNONYMS

Ravi, Bhānu, Tapanā. Sūrya.

Bhāsvanamula, Dinesh, Mandara, Prabhakara,
Ravi, Vasuk,³ Sūryāharaya, Vikirana, Vasuka.⁴
C. procera spp. is identified as Raktārka and
C. gigantea (L.) R. Br. ex Ait. as Swetārka or
Alarka of Ayurvedic medicine.³⁰

HABITAT

Wild throughout India.

Three species are found in India and Africa.¹

REGIONAL LANGUAGE NAMES

Eng: Madar Tree;
Assam: Akand, Akan;
Beng: Akanda, Akone;

Guj: Aakado;

Hindi: Aak, Madar, Akavana;

Kan: Ekka, Ekkadagida, Ekkegida;

Kash: Acka;

Mal: Erikku;

Mar: Rui;

Ori: Arakha;

Punj: Ak;

Tam: Vellerukku, Erukku;

Tel: Jilledu;

Urdu: Madar, Aak.

Eng: Apple of Sodom,¹ Dead Sea apple, Milk weed,
Swallow-wort,^{2(b)} Mudar.¹³

Urdu: Ashar.

CONSTITUENTS

Root: Glycoside (calotropin)

Dried root and root bark yield cardioactive steroids
(cardenolids), including calotropin, calcatin, and
uscharidin,¹⁴ four ursane-type triterpenes and
three oleanene-type triterpenes.^{2(a),20(e)}

A new calotropterpenyl ester and two pentacyclic
triterpenoids were also isolated from the root
bark.^{20(e)}

Stem bark: alpha- and beta-calotropeol, beta-
amyrin, giganteol, a colorless wax, small amounts
of tetracyclic terbenes and traces of sterols.

Stem bark: chemical constituents could not be found
in standard reference works,^{2(a,b,c,d),15,20(e)} only
found in Alarka (*C. gigantea*) monograph²⁵ of
CCRAS, based on a 1944 reference.

THERAPEUTIC AND OTHER ATTRIBUTES

Root: Kaṇḍu, Kuṣṭha, Kṛaiiroga, Gulma, Udararoga,
Vraṇa, Śvāsa

Used in itch, leprosy, worm infestations, abdominal
lumps, diseases of the abdomen, wounds and
dyspnea/asthma (therapeutic uses based on two
texts of the thirteenth to fourteenth centuries;
quoted attributes apply to both the root and leaf).
Stem bark: uses based on texts already quoted for
the leaf and root.

Animal studies have shown anti-inflammatory, anti-pyretic, analgesic, neuromuscular-blocking, anti-ulcer and anti-bacterial activities. The anti-ulcer activity is attributed to the inhibition of 5-lipoxygenase.^{13,14}
 Root bark powder (250 mg thrice daily) gave encouraging results in diarrhea and watery stools (67.1% and 44.7%). Powdered root bark also checked mucus in stool.^{20(e)}
 Ethanolic extract of the root exhibited cytotoxic activity.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Root: Mahāvishagarbha Taila (Bhaishajya Ratnāvali, seventeenth century), contains 46 herbs, including Arka root, in equal proportion, 20 supporting herbs, 5 salts and a mineral, blue vitreol.

Used as a massage oil for inflammatory conditions.
 Dhanvantara Ghrita (Ashtāngahridaya, seventh century) contains water extracts of 27 and powders of 11 herbs. Arka root is among the main herbs. Used for abscesses, piles, skin diseases, gout, urinogenital diseases.
 Stem bark: Arka lavana (also quoted in the leaf monograph) and Abhaya lavana (Bhaishajya Ratnāvali) do not contain Arka stem bark.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-3 g of the drug for decoction

As an expectorant and diuretic: 200–600 mg daily; as an emetic: 2–4 g daily.^{13,14}
 LD₅₀ of the ethanolic extract of the leaf and root was found to be 550 mg/kg i.p. in mice.^{20(e)}

Calotropis procera (Ait.) R. Br. Leaf Arka

BOTANICAL SOURCE(S)

Calotropis procera (Ait.) R. Br.
 (Fam. Asclepiadaceae)

C. procera (Ait.) Ait. f. subsp. *hamiltonii* (Wright) S. J. Ali syn. *C. procera* Auct. non- (Ait.) At. f. is found in India, Pakistan, and Afghanistan.

Subsp. *procera* occurs in Africa, extending into the Mediterranean belt, Jordan, Arabia, Palestine, Abu Dhabi, the West Indies, and South and Central America.^{2(b),20(c)}

C. procera is not available in South India.

C. gigantea (L.) R. Br. ex Ait. is used.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Arka (Leaf).

API, Part I, Vol. I.

Not to be confused with Arkaparni, equated with *Tylophora indica* (Burn. f.) Merr.
 Arkapushpi is equated with *Gynandropsis pentaphylla* DC.

AYURVEDIC SYNONYMS

Ravi, Bhānu, Tapana.

Dinesh, Mandāra, Prabhakara, Ravi, Vasuk,³
 Sūryāharaya, Vikirana, Vasuka.⁴

C. procera spp. is identified as Raktarka and *C. gigantea* (L.) R. Br. ex Ait. as Swetarka or Alarka of Ayurvedic medicine.³⁰

HABITAT

Wild throughout India.

Three species are found in India and Africa.¹

REGIONAL LANGUAGE NAMES

Eng: Madar Tree;

Assam: Akand, Akan;

Beng: Akanda, Akone;

Guj: Aakado;

Hindi: Aak, Madar, Akavana;

Kan: Ekka, Ekkadagida, Ekkegida;

Kash: Acka;

Mal: Erikku;

Mar: Rui;
Ori: Arakha;
Punj: Ak;
Tam: Vellerukku, Erukku;
Tel: Jilledu;
Urdu: Madar, Aak.

Eng: Apple of Sodom,¹ Dead Sea apple, Milk weed,
Swallow-wort,^{2(b)} Mudar.¹³
Urdu: Ashar.

CONSTITUENTS

Glycoside (calotropin)

Leaves contain calactin, calotoxin, calotropagenin and calotropin; alpha- and beta-amyrins; polysaccharides containing D-arabinose, D-glucose and D-glucosamine; L-rhamnose; 3-proteinase; an alkaline phosphatase, cyclosadol and multiflorenol; mineral contents include zinc and lead; and O-pyrocatechuic acid.^{2(b),15,20(e)}

Leaf extract is fungitoxic.^{20(e)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śoṭha, Kaṇḍu, Kuṣṭha, Vraṇa, Kṛmiroga, Gulma, Slesmodara roga, Plihāroga, Arśa, Śvāsa

Used for edema, itch, leprosy, worm infestations, wounds, abdominal lumps, diseases of the abdomen, splenic disorders, piles and dyspnea/asthma (therapeutic uses based on two texts of the thirteenth to fourteenth centuries; quoted attributes apply to both the leaf and root).

Fresh terminal leaf bud, given internally on an empty stomach before sunrise, is reported to cure migraine.^{2(b)} In a clinical study, cure rate

in a 3-day therapy was 100%.^{20(e)} Tender fresh leaves are used for fits and convulsions in children; as a poultice on rheumatic joints; and for destroying lice; a powder of dried leaves is dusted on wounds.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Arka lavaṇa (Bhaishajya Ratnāvali, seventeenth century, alkaline ash). A single drug preparation. Layers of Arka leaves, covered with sea-salt, are fired inside an earthen pot. Powdered drug is prescribed with water or butter milk for abdominal tumors (tympanites), diseases of the abdomen, splenomegaly, hepatomegaly, and piles. (Vrṇdamadhava, eighth century, Bhāavaprakash, sixteenth century and Bangasena, eighteenth century.)^{16(a)}

Sushruta used the alkaline ash for stopping surgical bleeding;²⁸ also prescribed gruel of parched barley mixed with the leaf buds of Arka and honey in bronchial asthma.^{16(a)}

Mustard oil cooked in the juice of Arka leaves with turmeric paste was used for treating scabies and eczema (Vrṇdamadhava, eighth century).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

250-750 mg of the drug in powder form

LD₅₀ of the ethanolic extract of the leaf and root was found to be 550 mg/kg i.p. in mice.^{20(e)}

For further research: leaves as a single drug for migraine (see clinical study in Reference 20[e]).

Calycopteris floribunda Lam.

Pullānī

BOTANICAL SOURCE(S)

Calycopteris floribunda Lam.
(Fam. Combretaceae)

Old name: *Getonia floribunda* Roxb.¹

Sushavi is a plant drug of Charaka Samhitā,
Sushruta Samhitā (1000 BC) and

Ashtāngahridaya (seventh century). Sushavi, Kāravellikā and Kāravellaka were equated with *Momordica* species.²⁸ During the sixteenth century, Sushavi was also equated with Kāravi (*Nigella sativa*).³ Thus, Sushavi (or Uksi) and Kāravelli of Sahasrayoga has no link with any classical text of Ayurveda.

PHARMACOPOEIAL AYURVEDIC DRUG

Pullānī (Leaf, stem, root).

API, Part I, Vol. V.

Pullani is a Malayalam name.

AYURVEDIC SYNONYMS

Toyavalli, Kāravelli.

A Materia Medica of Kerala (IMP, Kottakkal) equated Uksi with Pāniyavalli as its stem store water.

Vitex latifolia Roxb. is equated with Pāniyavalli in North India.

Toyavalli and Kāravelli are non-classical Sanskritized names.

HABITAT

Distributed in the deciduous forests of western Peninsula.

Common in Western Ghats and in Kavus ("Sacred Groves of Kerala"). Commonly known as Uksi.

REGIONAL LANGUAGE NAMES

Hindi: Kokkarai;

Kan: Marsadabaguli, Enjarige kubsā;

Mal: Pullaani, Varavalli;

Mar: Ukshi, Bogull;

Tam: Minnaarukoti, Pillani, Therulankodi;

Tel: Bandimurududu.

Eng: Paper flower.

CONSTITUENTS

Octacesanol, sitosterol, calycopterin, 3-O-Methylcalycopterin, 4-O-methylcalycopterin, ellagic acid (leaf, stem, root); quercetin and proanthocyanidin (leaf); quercetin and gossoypol (root).

Calycopterin was found to be a dihydroxytetramethoxy flavone.^{20(e)} Mature leaves are better sources of calycopterin.^{2(a)} Dried leaves yield neocalycopterone and its methyl ether, along with flavonoids and calyflorenones A and B. The monoflavonoid penduletin was isolated

as a minor compound. Tannin content of leaves: 7%.

Stem sap contains organic and volatile matter 0.05% and mineral matter 0.02% (chlorides, sulfates, traces of nitrates, lime, and ferric oxide.^{2(a,b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmi, Pāndu, Kuṣṭha, Jvara

Used for worm infestations, anemia, obstinate skin diseases and fever (therapeutic uses of leaf, stem, and root). Quoted classical references for leaf, stem and root refer to Jalaja Kārvella and Kāravelli. Jalaja Kārvella is equated with *Momordica tuberosa* Roxb.

Leaf extract showed significant hepatoprotective,⁸⁶ anti-diabetic⁸⁷ and anti-microbial activities in experimental animals.⁸⁸

IMPORTANT FORMULATION/ APPLICATIONS

Marma Gutikā (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), thrice impregnated compound, contains 45 herbs, 18 main herbs and 27 supporting herbs including Pullānī (AFI text)/Sushavi (CCRAS text). Prescribed in trauma.

Stem extract also exhibited hepatoprotective potential.⁸⁹

Calycopterin was found to be more toxic to earthworms than santonin.^{20(e)}

Flavone pachypodol inhibited the growth of Caco colon cancer *in vitro*.⁹⁰ In ethnomedicine, the root is used for poisonous bites and the stem sap is used for indigestion.^{20(e)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

In a toxicity study, morbidity and mortality was observed in rats and rabbits.⁹¹

Calycopterin and its 4'-methyl ether derivative exhibited marked toxicity to fish.^{20(e)}

Cannabis sativa Linn.

Vijayā

C

BOTANICAL SOURCE(S)

Cannabis sativa Linn.
(Fam. Cannabinaceae)

The male plant should be distinguished from the female plant. Chemical compounds responsible for the euphoric effect of cannabis are present in the resin covering the female flowers and adjacent leaves.

The leaves of female plants are longer than those of male plants.^{20(c)}

PHARMACOPOEIAL AYURVEDIC DRUG

Vijayā (Dried leaf).

API, Part I, Vol. I.

Not be confused with Vijaya, also a synonym of Haritaki (*Terminalia chebula* Retz. Fam: Combretaceae).^{3,4}

Dried herb contains flowering tops, female flowers, and upper leaves.

International Pharmacopoeial name: Cannabis herba.

AYURVEDIC SYNONYMS

Bhaṅgā, Mādani.

Mātulāni, Mohini, Jayā,⁴ Triloka-vijayā, Tribhuvana-vijayā:³

HABITAT

Naturalised in the Sub-Himalayan tracts found in waste lands from Punjab eastwards to Bengal and extending Southwards.

Cultivated in the warm valleys of the Himalayas in Himachal Pradesh and in adjoining plains from Kashmir eastwards to Assam.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Indian hemp;
Assam: Bhan, Bhang;
Beng: Bhang, Sidhi;
Guj: Bhang;
Hindi: Bhaang, Bhanga;

Kan: Bhangigida, Ganjagida;
Kash: Pang, Bangi;
Mal: Kanchavu;
Mar: Bhang, Ganja;
Ori: Bhanga, Ganjei;
Punj: Bhang;
Tam: Ganja;
Tel: Ganjayi;
Urdu: Qinaab, Bhang.

Eng: Soft hemp, True hemp.^{2(b)}

CONSTITUENTS

Resin (Cannabinols, particularly tetrahydrocannabinol):

Chief active constituent is 9-tetrahydrocannabinol (9-THC), among 60 cannabinoids. Flavonoid glycosides include canniflavone-1 and -2.¹⁴

In the fresh plant, 95% of cannabidiol and 9-THC exists as cannabidiolic acid.^{2(b)}

Leaves contain an anti-inflammatory principle, cannflavm.^{2(c)}

The cannabinoid content is maximal in bracts (up to 11.04%) and lowest in seeds.^{2(b)} U.S. varieties contain cannabidiol as the major component.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Atisāra, Grahaṇiroga, Klaibya, Anidrā

Used for digestive impairments, diarrhea, malabsorption syndrome, sexual debility, and insomnia (therapeutic uses based on a text of the twelfth century).

Fried Bhaṅgā powder, with honey, was prescribed for insomnia, diarrhea, malabsorption syndrome, and digestive impairment (Bhavaprakāsha, sixteenth century).^{16(a)}

Bhaṅgā, packed in a cloth piece and kept within the vagina for 3 hours, contracts and firms the vagina.^{16(a)}

Leaves of Bhaṅgā with *Argyrea speciosa* root and *Albizia lebeck* leaf as a paste removes

freckles.^{16(a)} Juice of the leaves is applied to the head for removing dandruff and vermin.^{20(c)}

IMPORTANT FORMULATION/
APPLICATIONS

Jātiphalādi Churna (Shārangadhara Samhitā, thirteenth century), contains cannabis leaf 20 times in proportion to 20 supporting herbs (each). For diarrhea, dysentery, cough, asthma.

Madanānda Modaka (not included in the AFI), Madana Modaka and Kāmeshwara Modaka (Bhaishajya Ratnāvali, seventeenth century) are herbal confections with cannabis leaves as their main ingredients. Used for sexual debility and emaciation.

For pharmacological, biological, clinical, and toxicological studies, see Reference 20(e).

DOSAGE/USAGE/CAUTIONS/
COMMENTS

125-250 mg of the drug in powder form.

The crude drug and its preparations lose potency on storage.^{2(b)}

The cannabinoid constituent, dronabinol (Marinol) is a FDI-approved prescription drug in the U.S. for AIDS-related anorexia and chemotherapy-induced nausea and vomiting.¹³ In the U.S., it is a schedule 1 controlled substance.¹³

Toxic constituents cross the placenta. High doses in animals damaged developing embryos and resulted in birth defects.⁷

Research potential: developing receptor-specific cannabinoid drugs.



Capparis sepiaria Linn.

Vyāghranakha

BOTANICAL SOURCE(S)

Capparis sepiaria Linn.
Syn. C. zeylanica Linn. f.
(Fam. Capparidaceae)

Syn. C. horrida Linn, f.³

PHARMACOPOEIAL AYURVEDIC DRUG

Vyāghranakha (Fruit).

API, Part I, Vol. V.

Not to be confused with Vyāghri, equated with Solanum xanthocarpum S. & W.

Vyāghra-puccha is equated with the Ricinus communis L. plant.

Vyāghranakha is also an animal product obtained from the oral covering of a sea snail; different types are sold as Nakha, Nakhi or Vyāghranakha. It is used in oil preparations for aromatic effect.³

AYURVEDIC SYNONYMS

Ahimsrā, Vyāghrāyudha.

Vyāghranakhi.³ (Root was used.) Gridhanakhi.³⁰

Himsrā and Ahimsrā are synonyms in classical texts.³⁰

Kākādani¹⁵ is a wrong synonym.

HABITAT

A climbing shrub with hooked stipular spines, distributed throughout India, in the plains.

Found in dry regions of Northern India and throughout Deccan peninsula.^{20(c)}

REGIONAL LANGUAGE NAMES

Hindi: Kareruaa, Baghanai, Kanthari;
Kan: Mulhukallari, Kathiramullu;
Mar: Wag, Wagati, Vyāghranakh, Ardanti;
Tam: Atandai, Marandan, Thoratti, Kattukathiri;
Tel: Nalla uppi.

Eng: Ceylon caper.^{2(b)}

CONSTITUENTS

Thioglucoside glucocapparin, n-triacontane, α-amyrin and fixed oil.

- C. zeylinca*: Fruits gave protein 6.1%, fat 3.8%, carbohydrates 11.5%, fiber 9.6%, and minerals 2%, calcium 64 mg/100 g and phosphorus 81 mg/100 g, and energy 105 kcal/100 g.^{2(b)}
- C. sepiaria*: The plant contains betulin-28-acetate, alpha- and beta-amyrins, beta-sitosterol and its glycoside, taraxasterol, octacosanol, erythrodial, and a terpene alcohol.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Visavikāra, Sarpaviṣa, Kaṇḍu, Pīdaka, Koṭha, Bhrama, Pravāhikā, Raktapradāra, Kuṣṭha, Vraṇa, Jvara, Graharoga, Vātavikāra, Mukhadurgandha

Used for poisoning, snake bites, itch, carbuncle, urticaria, vertigo, dysentery, menorrhagia, metrorrhagia, leprosy, wounds, fever, psychotic syndromes, neurological disorders, and halitosis (therapeutic uses of the quoted texts

do not cover Vishavikara, Sarpavisha, Bhrama and Grharoga; Bhāvaprakāśh attributes are for Nakh-dwya [the two Nakhs]). Apple snail operculum is used as Nakha in South India.³

IMPORTANT FORMULATION/ APPLICATIONS

Balā Taila (Ashtāngahridaya, seventh century), contains *Sida cordifolia* root as the main herb, with 45 supporting herbs, in equal proportion, including Vyāghranakha fruit. For edema, internally and externally. The plant is febrifuge and alterative. The fruits are used in typhoid fever.^{20(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–6 g.

Capparis spinosa Linn.

Himśrā

BOTANICAL SOURCE(S)

Capparis spinosa Linn.
(Fam. Capparidaceae)

Syn. *C. rupestris*.¹⁴

PHARMACOPOEIAL AYURVEDIC DRUG

Himśrā (Root).

API, Part I, Vol V.

AYURVEDIC SYNONYMS

Ahimsrā, Kanthārī, Tikṣṇa, Kaṇṭakā, Tikṣṇagandhā.

Himsra and Ahimsra are synonyms in classical texts.³⁰

HABITAT

A thorny shrub distributed in the plains, lower Himalayas, and Western Ghats.

Found in dry rocky soils of Northwestern India, through Punjab, Rajasthan to the Deccan peninsula.^{2(b)}

C. spinosa var. *himalayensis* (Jafri) Jacobs is found in the Western Himalayas, from Kashmir to Western Nepal.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Ceper plant;
Guj: Kabaree;
Hindi: Kabara, Hainsaa, Kanthara;
Mar: Kabar;
Punj: Barar, Kaur;
Urdu: Kabar.

Eng: Caper bush.

CONSTITUENTS

The roots contain alkaloid stachydrine. Glucobrassicin, neoglucobrassicin and 4-methoxyglucobrassicin have also been identified in the root.

Contains indole glucosinolates (glucobrassicin, neo-glucobrassicin, and 4-methoxy-glucobrassicin). The root bark contains stachydrine, rutic acid, and a volatile substance with garlic odor.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vātavikara, Kāsa, śvāsa, Galaganda, Gulma, Arśa, Āmavāta, Gṛdhrasi, Vātarakta, Raktagranthi, Vātikayoniroga, Vātaśopha, Vraṇa, Granthi

Used for neurological disorders, cough, asthma, goiters, piles, rheumatism, sciatica, gout, erysipelas, diseases of the female genital tract, edema, ulcers, and abscesses (therapeutic uses based on texts from 1000 BC to fourteenth century).

A paste of Himsrā root and Rāsanā leaves was prescribed for swellings (Vrṇdamādhava, eighth century). A root paste was used as a vaginal pessary for disorders of the female genital tract (Charaka Samhita, 1000 BC).²⁷

The ethanolic extract of root bark showed hepatoprotective activity in CCl₄-induced liver

toxicity in rats, and significantly reduced elevated serum transaminase.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Amritādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains *Tinospora cordifolia* as main herb, with 8 supporting herbs in one compound; 16 supporting herbs in another compound.

Used for headache, gout and cough and asthma.

Does not contain Himsra.

Himsrāḍya Ghrita (Bhaishajya Ratnāvali, seventeenth century, not included in the AFI) contains the Himsrā plant and six other herbs in equal proportions. Used for cough and asthma.

Kutikhādi Vatika could not be traced.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g

Cardiospermum halicacabum L. Seed Karṇasphoṭā

BOTANICAL SOURCE(S)

Cardiospermum halicacabum L.
(Fam. Sapindaceae)

In North India, *C. halicacabum* is used as Karnasphoṭā; in West Bengal, it is used as Jyotishmati.³⁰

Jyotishmati is no longer a controversial drug. It is equated with *Celastrus paniculatus* Willd.

In South India, *C. halicacabum* is used as Indravalli.⁵ Indravalli of Sushruta Samhitā was a different drug.³⁰

(Plant sketches of Tejovati¹⁵ and Indravalli⁵ are identical.)

PHARMACOPOEIAL AYURVEDIC DRUG

Karṇasphoṭā (Seed).

API, Part I, Vol. V.

Karṇasphota is a post-seventh century drug.^{16(a)}

AYURVEDIC SYNONYMS

Kākādānī, Kākatiktā, Kākamardanikā, Śakakralata.

Tejovati¹⁵ (in West Bengal, a synonym of Jyotishmati).

Indravalli⁵ (syn. in South India).

Indravalli of Sushruta Samhitā and Matsyākhaka are synonyms (equated with *Alternanthera sessilis* [L.] R. Br.).³⁰

HABITAT

As a weed throughout India, ascending up to 1,200 m in the North West Himalayas.

REGIONAL LANGUAGE NAMES

Eng: Ballon vine, Heart's pea;
 Beng: Jyotishmati (of Bengal);
 Guj: Nayaphatki, Kapaalphodi, Bodha, Shivajaala;
 Hindi: Kaanphuti, Lataaphataki;
 Kan: Kanakayya;
 Mal: Ulinna;
 Mar: Fatphati, Kaanphuti, Khiljala; Siddha:
 Mudakkarutana;
 Tam: Mudukkottan, Modikkottan;
 Tel: Vekkudutiga.

Eng: Blister creeper, Heartseed, Winter cherry.

CONSTITUENTS

Fixed oil.

The fixed oil (about 28%) from seeds is unique in having 11-ecosenoic acid as a major fatty acid (37.87%); other acids include capric, lauric, myristic, palmitic, stearic, oleic, linoleic, archidic (26.40%), boheric, and lignoceric.

Amino acids include DL-dopa 15.14%, threonine 22.05%, ornithine 14.65%, histidine 10.87%, arginine 10.66%, alanine 8.50%, tryptophan 7.7%, leucine 3.81%, and *iso*-leucine 2.79%.^{20(e)}

Seeds show the presence of glycosides, alkaloids, sugars, saponins, and tannins.^{20(e)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Śopha, Pāndu, Śūla, Vṛddhi, Sandhi-vāta, Graha bādhā, Bhūtabādhā, Viṣabādhā

Used for fever, edema, anemia, colic, hydrocele, osteoarthritis, fear psychosis, ghost syndrome

and disorders due to poisons (therapeutic uses for fear psychosis and ghost syndrome are based on Rājanighanu, fourteenth century; for other attributes, Sanskrit *ślokas* (verses) have been composed by contemporary scholars for Indravalli, used in South India).

Root: diaphoretic, diuretic, laxative, stomachic, rubefacient and efficacious in nervous diseases and rheumatism.¹⁵ Also used in amenorrhea, hemorrhoids, and erysipelas.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Āmatisāra-nāshaka Yoga, Vāsādi Lepa (compounds not included in AFI, Part I and II).

Nāgarādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica; not in the AFI) contains ginger root as main herb. Shārngeshta is among five supporting herbs. (Shārngeshta is considered a syn. of Kākādani.) Used as a massage oil for rheumatic affections.

Laushunādi Kashāya (Sahasrayoga, not in the AFI) contains Shakra-latā (a syn. of Indravalli) as one of the ingredients. Used for diseases of the abdomen.

Nilibhrngādi Tailam (Sahasrayoga) contains the juices of four herbs, including the juice of Shatkratu latā (Karnsphota plant/Indravalli). Used as a popular OTC hair oil for hair growth.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g.

Cardiospermum halicacabum Linn. Root Karnasphoṭā

BOTANICAL SOURCE(S)

Cardiospermum halicacabum Linn.
 (Fam. Sapindaceae)

In North India, *C. halicacabum* is used as Karnasphoṭā; in West Bengal, it is used as Jyotishmati.³⁰

Jyotishmati is no longer a controversial drug. It is equated with *Celastrus paniculatus* Willd. In South India, *C. halicacabum* is used as Indravalli.⁵ Indravalli of Sushruta Samhitā was a different drug.³⁰ (Plant sketches of Tejovati¹⁵ and Indravalli⁵ are identical in reference works.)

PHARMACOPOEIAL AYURVEDIC DRUG

Karṇasphoṭā (Root).

API, Part I, Vol. V.

Karṇasphoṭā is a post-seventh century drug.^{16(a)}

AYURVEDIC SYNONYMS

Kākādānī, Kākatiktā, Kākamardanikā, Śakakralata.

Tejovati¹⁵ (in West Bengal, a synonym of Jyotishmati).

Indravalli⁵ (a synonym in South India).

Indravalli of Sushruta Samhitā and Matsyākhaka are synonyms (equated with *Alternanthera sessilis* [L.] R. Br.).³⁰

HABITAT

As a weed throughout India, ascending up to 1,200 m in the North West Himalayas.

REGIONAL LANGUAGE NAMES

Eng: Ballon vine, Heart's pea;

Beng: Jyotishmati (of Bengal);

Guj: Nayaphatki, Kapaalphodi, Bodha, Shivajaala;

Hindi: Kaanphuti, Lataaphataki;

Kan: Kanakayya;

Mal: Ulinna;

Mar: Fatphati, Kaanphuti, Khiljala; Siddha:

Mudakkarutana;

Tam: Mudukkottan, Modikkottan;

Tel: Vekkudutiga.

Eng: Baloon vine, Blister creeper, Heartseed, Winter cherry.

CONSTITUENTS

Not quoted in API.

Root yielded phlobaphene, phlobatannin, and beta-sitosterol.¹⁵

Apigenin and its glycoside, arachidic acid, monomethylether of inositol (quebrachitol), proanthocyanidin, saponin, beta-sitosterol, its beta-D-glactoside, and stigmasterol glycoside are reported from plant.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Pāṇḍu, Kāmalā, Śūla, Vṛddhi, Smṛti ksaya, Sandhi vāta, Kuṣṭha, Sarpaviṣa, Mūsikāvisa, Jvarayukra-kāsa, Indralupta, Sannipātodara, Aśmari, Śopha, Bhūta-bādhā, Grahābādhā

Used for fever, anemia, jaundice, colic, hydrocele, loss of memory, osteoarthritis, leprosy, snake bite, rat bite, bronchitis with fever, alopecia, severe abdominal distress, calculus, ghost syndrome, and fear psychosis (therapeutic uses in snake bites, rat bites, ghost syndrome and fear psychosis based on Rājanighanu, fourteenth century; for other attributes, Sanskrit *ślokas* have been composed by contemporary scholars for Indravalli, used in South India).

Root: diaphoretic, diuretic, laxative, stomachic, rubefacient and efficacious in nervous diseases and rheumatism.¹⁵ Also used in amenorrhea, hemorrhoids, and erysipelas.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Āragvadhādi Kwāth Churna (Ashtāngahridaya, seventh century), contains 20 herbs in equal proportion, including Kākatiktā (a syn of Kākādāni) root. Prescribed in poisoning, vomiting, cough, itch, septic wounds, and leprosy.

Kākādāni root, pounded with sour gruel, was prescribed in snake bites, internally and topically (Rājamārṭanda, eleventh century).^{16(a)}

In rat poisoning, *ghee* processed with Kākādāni and Kākamāchi (*Solanum nigrum*) was given (Sushruta Samhitā, 1000 BC).^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

Careya arborea Roxb.

Kumbhīkah

C

BOTANICAL SOURCE(S)

Careya arborea Roxb.
(Fam. Lecythidaceae)

Careya herbacea Roxb. (a shrub) is known as Kumbhādu latā in Bengal.⁷
C. arborea is a tree.
Botanical identity of “Madanakāmā-poo”, an aphrodisiac, used in Siddha medicine, is identified as the flowers of *C. arborea*.^{20(e)}
Padmaka (*Prunus cerasoides* D. Don.) of South India is identified as the flowers of *C. arborea*.^{20(e)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kumbhīkah (Seed).

API, Part I, Vol. V.
Kumbhikā is equated with Jala kumbhi (*Pistia stratiotes* L.); Kumbha and Nikumbha with *Operculina turpethum* L. and Kumbhayoni with *Sesbania grandiflora* (L.) Pers.^{3,30}

AYURVEDIC SYNONYMS

Svādupuṣpa, Viṭapī, Sthala kumbhī, Romaśā.
Parpatadruma, Shriparnikā.^{20(e)}

HABITAT

Throughout India up to an altitude of 1,500 m.
Found in the sub-Himalayan tract, Punjab, and West Bengal, and in the forests of South India.¹⁵

REGIONAL LANGUAGE NAMES

Eng: Kumbi;
Beng: Kumbhi;
Hindi: Sthala kumbhi;
Kan: Daddala, Gudda, Daddippe,
Mal: Pezuntol;
Mar: Kumbhaa;
Tam: Kumbi;
Tel: Dudippi.

Eng: Patana Oak, Slow-match tree, Wild guava.^{2(b)}
Trade name of dried calyces: Vekumbha.^{2(b)}

CONSTITUENTS

Saponins (five sapogenols-careyagenol A, B, C, D & E); sterols, α-spinosterol and α-spinosterone.

Previously, saponins were identified as barringtonol C, 16-deoxy barringtonol C, and barringtonol D.^{2(b)}

Starch content of seeds: 50.3% on a dry basis.^{20(e)}

Seed oil contain linoleic, oleic, and palmitic acids.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Vātika kāsa, Kuṣṭha, Prameha, Kṛmi, Viṣaroga, Pakvātisara, Vṛṇa, Naḍivraṇa

Used for morbid cough, obstinate skin diseases including leprosy, urinary disorders, worm infestations, disorders due to poisoning, later stages of diarrhea, ulcers, and sinusitis (therapeutic uses based on texts from 1000 BC to fourteenth century).

Fruits are astringent, demulcent and used in cough and cold and to promote digestion.

Seeds are used in filaria.^{20(e)}

IMPORTANT FORMULATION/ APPLICATIONS

Marma Gutikā (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), a thrice impregnated compound, contains 45 herbs and 27 supporting herbs. Kumbi could not be identified in the compound. Prescribed in trauma.

Kumbhikādyam Tailam (Bhaishajya Ratnāvali, seventeenth century, not quoted by the API) contains Kumbhika fruits among five main herbs with eight supporting herbs. Prescribed for sinusitis.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–6 g powder.

LD₅₀ of the plant extract was found to be 500 mg/kg i.p. in mice.^{20(e)}

Carica papaya L.**Fruit****Eraṇḍakarkaṭī****BOTANICAL SOURCE(S)**

Carica papaya L.
(Fam. Caricaceae)

C. papaya was introduced into India in the sixteenth century (the period of the last treatise of classical Ayurveda, Bhāvaprakasha).

Not be confused with Papitaa Vilaayati, equated with *Strychnos ignatii* Berg., Ignatus bean.³⁷

Pawpaw (quoted as a common English name) is also equated with *Asimina triloba* L.¹⁹

PHARMACOPOEIAL AYURVEDIC DRUG

Eraṇḍakarkaṭī (Fruit).
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A wrongly introduced non-classical synonym. Eranda = *Ricinus communis* L., castor oil plant. Karkati = *Cucumis melo*, slender fruit of the creeper. In Unani medicine, it is known as Papitaa Desi. Papaya or Papitaa is a common name all over India.

AYURVEDIC SYNONYMS

Madhukarkaṭī, Gopālakarkaṭī.

Madukarkati = sweet *Cucumis melo* slender fruit; and Gopālakarkaṭī (neither it was a favorite fruit of Lord Krishna, nor of cow nor of cow-owners). Both non-classical synonyms are wrongly introduced.

HABITAT

Cultivated throughout India.

Native to the West Indies and Central America. Cultivated in Uttar Pradesh, Punjab, Rajasthan, Gujarat, Maharashtra and South India.

REGIONAL LANGUAGE NAMES

Eng: Papaya, Melon tree, Pawpaw;
Ben: Papeyaa, Pappiyaa;
Guj: Erandakaakadi, Papaiyu, Papita;
Hindi: Papitaa;
Kan: Pirangi, Pappaay;

Mal: Karmaasu, Pappaay, Karumatti;
Mar: Papaayaa, Papai;
Pun: Erandakharbujaa;
Tam: Pappali;
Tel: Boppayi, Bobbaasi, Paringi.

CONSTITUENTS

β-carotene, papain, carpaine.

Major carotenoid in the fruit is cryptoxanthin (48%).^{20(e)}

The alkaloid carpaine is found in unripe fruit.¹⁷

Unripe fruit latex is rich in enzymes, papain, and chymopapain. As the fruit ripens, papain and chymopapain dissipate and neither is present in the ripe fruit.¹⁷ Papain degrades proteins, carbohydrates, and fats, but is unstable in gastric juices.¹³

Chymopapaine, though similar to papain, is less potent.¹⁷

The seeds and pulp contain benzyl glucosinolate, which is hydrolyzed to benzyl isothiocyanate.¹⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmi (worm infestation), Kāsa (cough), Raktavikāra (disorders of blood), Śvāsa (Asthma), Vātararakta (Gout) (therapeutic uses based on Sanskrit *shlokas* composed by contemporary Ayurvedic scholars).

Benzyme isothiocyanate is the chief anthelmintic in papaya seed extracts.¹⁷

Skin flesh and seeds of both unripe and ripe papaya showed *in vitro* anti-bacterial activity. Papain solutions have exhibited therapeutic effects in inflammatory disorders of the genitals, intestine, liver, and eye. Unripe fruit extracts reduced ulcer index experimentally.

The ethanol and aqueous extracts of dried papaya fruits exhibited hepatoprotective activities in male albino rats.^{20(e)}

IMPORTANT FORMULATION/ APPLICATIONS

Apakva-phalaniryās lepa (a ethno medicine), contains latex from unripe fruits, used to treat jaundice, dental carries and toothache,

eczema, ringworm and itches; topically on wounds and ulcers.

Used as a rubefacient, vermifuge, and abortifacient drug.^{20(e)}

C

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (powder): 10 to 20 g.

An ointment containing papain is a prescription drug in the U.S. for decubitus ulcers, burns and wounds and pressure ulcers.¹⁷

Unripe or semi-ripe papaya, with higher concentrations of latex, could be unsafe during pregnancy.¹⁷

Various studies with papain indicate teratogenic and embryotoxic effects.^{20(e)}

Carica papaya L.

Root

Eraṇḍakarkaṭī

BOTANICAL SOURCE(S)

Carica papaya L.
(Fam. Caricaceae)

C. papaya was introduced into India in the sixteenth century (the period of the last treatise of classical Ayurveda, Bhāvaprakasha).

Not be confused with Papitaa Vilaayati, equated with *Strychnos ignatii* Berg., Ignatus bean.³⁷
Pawpaw is also equated with *Asimina triloba* L.¹⁹

PHARMACOPOEIAL AYURVEDIC DRUG

Eraṇḍakarkaṭī (Root).

API, Part I, Vol. VI.

A wrongly introduced non-classical synonym.

Eranda = *Ricinus communis* L., castor oil plant.
Karkati = *Cucumis melo*, slender fruit of the creeper.

In Unani medicine, it is known as Papitaa Desi.
Papaya or Papitaa is a common name all over India.

AYURVEDIC SYNONYMS

Madhukarkaṭī, Gopālakarkaṭī.

Madukarkati = sweet *Cucumis melo* slender fruit; and Gopālakarkaṭī (neither it was a favorite fruit of Lord Krishna, nor of cow nor of cow-owners). Both non-classical synonyms are wrongly introduced.

HABITAT

Cultivated throughout India.

Native to the West Indies and Central America.
Cultivated in Uttar Pradesh, Punjab, Rajasthan, Gujarat, Maharashtra, and South India.

REGIONAL LANGUAGE NAMES

Eng: Papaya, Melon tree, Pawpaw;
Ben: Papeyaa, Pappiyaa;
Guj: Erandakaakadi, Papaiyu, Papita;
Hindi: Papitaa;
Kan: Pirangi, Pappaay;
Mal: Karmaasu, Pappaay, Karumatti;
Mar: Papaayaa, Papai;
Pun: Erandakharbujaa;
Tam: Pappali;
Tel: Boppayi, Bobbaasi, Paringi.

CONSTITUENTS

Carpesanine, carpaine.

Carpain, isolated from the root, showed amebicidal activity,¹³ as well as anti-tumor activity *in vitro*.^{2(b)} It may cause bradycardia and have a CNS-depressant effect.¹³

Root constituents includes caproside and the enzyme myrosin.^{20(e)}

THERAPEUTIC AND OTHER ATTRIBUTES

Āśmari (calculus), Arśa (piles), Aruci (tastelessness), Kṛmi roga (worm infestation), Mūtraroga

(urinary diseases), Raktapitta (bleeding disorder), Rakta pradara (menorrhagia or metrorrhagia or both), Tvakroga (skin diseases), Udaraśūla (pain in the abdomen), Vātarakta (Gout), Vrana (ulcer) (therapeutic uses based on Sanskrit slokas composed by contemporary Ayurvedic scholars).

Roots or their extracts are used for tumors of the uterus, syphilis, yaws, hemorrhoids and to remove urine concretions.¹⁷

The root is abortifacient and diuretic; it is given internally for checking irregular bleeding from the uterus; mixed with lime, it is applied in yaws. It is also used for piles.

Extracts showed anti-fungal activity against *Candida albicans*.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Ashmarihara kashāya Churna (Siddha yoga Samgraha, a compound formulated by a contemporary Vaidya Yadavaji Trikamji), contains Papaya root with 14 diuretic and anti-lithic roots and seeds.

It is not known whether the compound is a time-tested drug, or whether it has been subjected to clinical and toxicological trials.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder) 2 to 6 g.

Contraindicated during pregnancy.

Carissa carandas Linn.

Karamarda

BOTANICAL SOURCE(S)

Carissa carandas Linn.
(Fam. Apocynaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Karamarda (Stem bark, root).

API, Part I, Vol. II.

API, Part I, Vol. III.

Karmardikā (Rāja nighantu, fourteenth century) is a wild variety with smaller fruits, equated with *C. spinarum* L.

AYURVEDIC SYNONYMS

Stem bark: Krshnapak phala (?) (could not be identified). Root: Karamla, Karamardaka.

Susheṇa, Krishna phalā, Vanya phalā.⁴

HABITAT

Throughout India in wild state, sometimes cultivated.

REGIONAL LANGUAGE NAMES

Beng: Karamach;
Guj: Karamadan;
Hindi: Karijige;
Kan: Karimkar;
Mal: Karimkar;
Mar: Karamanda;
Punj: Garna;
Tam: Kalakke;
Urdu: Karaunda.

Eng: Karunda, Christ's thorn.^{2(b)}

CONSTITUENTS

Stem bark: Glycosides and β-Sitosterol.

Root: Cardiac glycosides.

Stem and root bark afforded lupeol and beta-sitosterol. Petroleum ether extract of the root yielded four polar glycosides, A, B, C, and D, along with carrisone, beta-sitosterol and an identified substance P. On hydrolysis, these polar glycosides afforded odorside H, digitoxigenin, possibly anhydrodigitoxigenin, glucose, and D-digitalose. A novel terpenoid, carindone, and a phenolic lignan, carinol, were also isolated.^{20(e)}

THERAPEUTIC AND OTHER ATTRIBUTES

Stem bark: Kuṣṭahara. Obstinate skin diseases including leprosy (therapeutic use based on texts, 1000 BC to sixteenth century).

Root: Mūtra roga, Visphota, Vidradhi, Vrna. Used in urinary diseases, blisters and abscesses (therapeutic uses based on texts from the thirteenth–sixteenth centuries).

There is no reference to the root in the quoted classical text.

Leaves, stems, and roots of Karamarda and Karamardikā (*C. carandas* and *C. spinarum*) exhibited cardiotonic activities. This has been attributed to odoroside H, which is found in both species.^{2(b),20(e)}

IMPORTANT FORMULATION/ APPLICATIONS

Marma gutikā (Sahasrayoga, a non-Samhitā, Kerala Materia Medica). A thrice impregnated compound drag, contains 45 herbs; 18 main herbs and 27 supporting herbs, including Karinkāra/ Karinkā stem bark. (In AFI, Karinkāra is equated with Karamarda.) Prescribed in trauma. Marma gutika, also quoted for the root of Karmarda, contains only Karinkāra stem bark; the root is not mentioned in the text of the AFI and CCRAS.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

48 g of the drug for decoction.

Carthamus tinctorius L.

Fruit

Kusumbha

BOTANICAL SOURCE(S)

Carthamus tinctorius L.
(Fam. Asteraceae)

Cultivated safflower is considered to have originated either from *C. lanatus* (Saffron thistle) or *C. oxyacantha* (Wild safflower) in one of two primary centers of origin: the mountainous regions of Ethiopia and Afghanistan or Myanmar and India.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kusumbha (Fruit).

API, Part I, Vol. VI.

Seeds vary in size and color. Weight of 100 seeds has been recorded between 3.5 and 7.0 g; color is dull white to pearly white.^{2(b)}

AYURVEDIC SYNONYMS

Pāvakam, Vahniśikhā, Vastrarañjana.

Latvā.^{27,30}

HABITAT

Cultivated throughout India.

REGIONAL LANGUAGE NAMES

Eng: Safflower, Parrot seed, Bastard saffron;
Ben: Kusum, Barre;
Guj: Kusumbo, Kusumbi, Karad;
Hindi: Kusum, Barre;
Kan: Kusubeegida, Kusumekalu;
Mal: Chendurakam, Kuyimpu;
Mar: Kardai, Kardi;
Pun: Kusum;
Tam: Kusam, Kartum;
Tel: Kusumbaa, Sendurakam, Senturakam;
Urdu: Kusuma.

Urdu: Tukhm-Kurtum (seed), Darkht-e-kurtum (plant).

CONSTITUENTS

Lignan glucoside (matairesinol, monoglucoside), glucose, maltose, raffinose, luteolin-7-O-glucoside, N-(P-coumaroyl) tryptamine, campesterol, cholesterol, β -sitosterol and its glucoside, Δ^7 -stigmasterol, myristo-oleo-linolein, myristodilinolein, palmitooleolinolein, palmitodilinolein, stearo-oleolinolein, stearo-dilinolein, dioleolinolein, oleo-dilinolein, trilinolein. (Constituents of seeds, cited from Reference 15.)

Seeds yield serotonin derivatives N-(coumaroyl) serotonin³¹ and N-feruloylserotonin and their glucosides.⁹²

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta (rheumatism), Aśmari (calculus), Daurbalya (weakness), Kāmāla (Jaundice), Kaṣṭārtava (dysmenorrhoea), Mūtrakṛcchra (dysuria), Pratiśyāya (coryza), Raktapitta (bleeding disorder). Used as single drug.

Charaka prescribed seeds for phlegm, urinary gravel, and dysuria; oil was prescribed topically in insect bites.^{27,30,63}

Sushruta gave the oil internally for urinary disorders and polyuria (Chi. 31,5).⁶³

Seeds were used in prescriptions for cough and bronchitis, hemorrhagic disorders, and dysuria and as aphrodisiac confections (Dhanvantari

Nighantu, thirteenth century; Rājanighantu, fourteenth century; Bhāvaprakāsha, sixteenth century).^{3,63}

IMPORTANT FORMULATION/ APPLICATIONS

Seeds are anti-oxidants and inhibited LDL oxidation and atherosclerosis in mice.⁹²

Seed oil exhibited anti-bacterial activity against *Staphylococcus aureus*, *Bacillus subtilis*, *E. coli*, *Salmonella typhi*, and *Vibrio cholerae*; they also showed anti-fungal activity against *Candida albicans*, *Trichophyton mentagrophytes*, *T. rubrum*, and *Saccharomyces cerevisiae*.^{20(e)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 2 to 4 g.

Carthamus tinctorius L.

Leaf

Kusumbha

BOTANICAL SOURCE(S)

Carthamus tinctorius L.
(Fam. Asteraceae)

Cultivated safflower is considered to have originated either from *C. lanatus* (Saffron thistle) or *C. oxyacantha* (Wild safflower) in one of two primary centers of origin: the mountainous regions of Ethiopia and Afghanistan or Myanmar and India.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kusumbha (Leaf).

API, Part I, Vol. VI.

Two varieties based on color of the flower are reported: the yellow turning orange-red variety (yields a deep yellow chalcone glycoside, carthamin); and the ivory white variety (yields a colorless glycoside, neo-carthamin).

AYURVEDIC SYNONYMS

Pavakam, Vastraranjana, Kausumbha.

Latva.^{27,30}

HABITAT

Cultivated throughout India.

REGIONAL LANGUAGE NAMES

Eng: Safflower, Bastard saffron;

Assam: Akharij, Jhartam;

Ben: Kusum phool;

Guj: Kusumbo;

Hindi: Kusum, Kusumb;

Kan: Kusubbi, Kasube;

Mal: Kuyimpu, Chentukam;

Mar: Kardi, Kardai;

Ori: Kusum;

Pun: Kusum;

Tam: Senturkam;
Tel: Kusumulu;
Urdu: Kusum.

C

CONSTITUENTS

Hinesol- β -D-fucopyranoside, 1- pentadecene.

Leaves yielded luteolin, quercetin, luteolin-7-O- β -D-glycopyranoside, luteolin-7-O-(6''-O-acetyl)- β -D-glycopyranoside, quercetin-7-O- β -D-glycopyranoside, acacetin 7-O- β -D-glycronide, apigenin-6-C- β -D-glucopyranosyl-8-C- β -D-glycopyranoside, and a novel quercetin-7-O-(6''-O-acetyl)- β -D-glycopyranoside.⁹³

Young leaves contain minerals 1.3 g/100 g; calcium 185 mg/100 g, phosphorus 35 mg/100 g, iron 5.7 mg/100 g, magnesium 51 mg/100 g, sodium 126.4 mg/100 g, potassium 181 mg/100 g, copper 0.22 mg/100 g and chlorine 235 mg/100 g and carotene 3540 μ g/100 g. Proteins 2.5 g/100 g; lysine 9.76, tryptophan 0.48, phenylalanine 2.56, threonine 2.72, leucine 1.12, isoleucine 8.64 and valine 6.56 g/16 g Nitrogen.^{2(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aśmari (calculus), Badhiryā (deafness), Daurbalyā (weakness), Mūtrakścchra (dysuria),

Mūtravikāra (urinary diseases), Netraroga (diseases of the eye), Pralāpa (delirium), Prameha (metabolic disorder), Raktavikāra (disorders of blood), Yoniroga (disease of female genital tract), Pradara (excessive vaginal discharge). Used as single drug.

Charaka and Sushruta prescribed leaves as a vegetable for cough, for promoting eyesight and treating digestive impairments and lipid disorders.^{27,28} Leaves were also prescribed for regulating bowel movements and for kidney and urinary bladder functions (Rajnighantu, fourteenth century).⁶³

IMPORTANT FORMULATION/ APPLICATIONS

In ethnomedicine, leaves are used to treat cold and suppressed urination.^{20(e)} Luteolin, quercetin and their corresponding glycosides exhibited anti-oxidant activities.⁹³

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 2 to 4 g.

Carthamus tinctorius L.

Flower-head Kusumbha

BOTANICAL SOURCE(S)

Carthamus tinctorius L.
(Fam. Asteraceae)

Cultivated safflower is considered to have originated either from *C. lanatus* (Saffron thistle) or *C. oxyacantha* (Wild safflower) in one of two primary centers of origin: the mountainous regions of Ethiopia and Afghanistan or Myanmar and India.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kusumbha (Flower head).

API, Part I, Vol. VI.

Two varieties based on the color of the flower are reported: the yellow turning orange-red variety (yields a deep yellow chalcone glycoside, carthamin); and the ivory white variety (yields a colorless glycoside, neo-carthamin).

International Pharmacopoeial name: Flos carthami.¹⁰⁽³⁾

AYURVEDIC SYNONYMS

Pāvakam, Vastrarañjana, Kausumbha.

Latva.^{27,30}

HABITAT

Cultivated throughout India.

REGIONAL LANGUAGE NAMES

Eng: Safflower, Bastard saffron;
Assam: Akharij, Jhartam;
Ben: Kusum phool;
Guj: Kusumbo;
Hindi: Kusum, Kusumb;
Kan: Kusubbi, Kasube;
Mal: Kuyimpu, Chentukam;
Mar: Kardi, Kardai;
Ori: Kusum;
Pun: Kusum;
Tam: Senturkam;
Tel: Kusumulu;
Urdu: Kusum.

Urdu: Gulkaafishah, Gulkaazeer.

CONSTITUENTS

Contains a dye of flavonoid, Carthamin.

Major constituent is chalcone C-glycoside carthamin (up to 8.5%). Other constituents include fatty acids, the chalcone hydroxysafflor yellow-A, the nitrogenous chalcone tinctormine, the quinoid C-glycosides safflor A and B; the flavonoids neo carthamin, quercetin, rutin, kaempferol, and related hydroxy derivatives and glycosides (WHO).¹⁰⁽³⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Kaṣṭārtava (dysmenorrhoea), Kāsa (cough), Mūtrakrcchra (dysuria), Pratiśyāya (coryza), Raktapitta (bleeding disorder), Romāntikā (measles),

Śvāsa (Asthma), Visphotaka (blisterous eruption), Yoniroga (disease of female genital tract). Used as single drug.

Flowers were used for treating cough. Commonly used as a hair dye and scalp disinfectant (Kaiyadeva Nighantu, fifteenth century).⁶³ Flowers were included in prescriptions for diseases of the nervous system, ear diseases, eye diseases, head tremors, delirium, diseases of the female genital tract, vaginal discharges, and infertility (Bhavaprakasha, sixteenth century).³

IMPORTANT FORMULATION/ APPLICATIONS

Aqueous flower extract showed activation of digestive enzyme amylase.^{15(e)} Carthamone, a benzoquinone and pigment, is immunosuppressive and lowers blood pressure in spontaneously hypertensive rats. The polysaccharide induces antibody formation in mice. Dried flowers are used in cardiovascular diseases, amenorrhea, dysmenorrhea, retention of lochia and for the prevention of atherosclerosis; they are used externally on wounds or sores with pain and swelling, ringworm, and scabies.^{3,10(3)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 2 to 4 g.

Safflower has a bitter taste, but the Institute of Botany of the Chinese Academy of Sciences, Beijing, developed a non-bitter, sweet-smelling tea that contains amino acids and vitamins B₁, B₂, B₁₂, C, and E.

Carum carvi Linn.

Kṛṣṇajiraka

BOTANICAL SOURCE(S)

Carum carvi Linn.
(Fam. Umbelliferae)

Jiraka (*Cuminum cyminum* L.) Krishna jiraka (*Carum carvi* L.) Karavi (*Nigella sativa* L.).

PHARMACOPOEIAL AYURVEDIC DRUG

Kṛṣṇajiraka (Fruit)

API, Part I, Vol. I.

Black cumin is equated with *Carum carvi* and white cumin with *Cuminum cyminum* L.³

In South India, *Nigella sativa* L. is used as black cumin.⁶

Three varieties of cumin seeds are mentioned in Bhavaprakasha: Jiraka (*Cuminum cyminum* L.), Krishna jiraka (*Carum carvi* L.) and Karavi (*Nigella sativa* L.).³

International Pharmacopoeial name: Carvi fructus.^{8,11}

AYURVEDIC SYNONYMS

Asitajiraka.

Varshākāla sygandhikā.⁴ Jiraka, Jira, Ajāji, Jāji, Jarana³ (equated with *Cuminum cyminum* L.). Eng: Black caraway.

HABITAT

Cultivated in plains of India and as summer crop in hilly areas of Kashmir, Kumaon, Garhwal and Chamba.

More than 30 species exist in temperate and warm regions, five in Europe¹ and six in India.^{2(b)} It is cultivated in the hills and plains of North India and in the hills of South India.^{2(b)}

REGIONAL LANGUAGE NAMES

Assam: Krisnjeera, Kalajira, Kalijira;
Beng: Kalajira;
Guj: Shahjirun;
Hindi: Kalajira;
Kan: Kari jeerige, Shahajeerige;
Kash: Krihunuzur;
Mal: Karunjiraka, Karinjeerakam;
Mar: Shahira, Shahajira;
Ori: Kalajira;
Punj: Zira Siyah, Kalajira;
Tam: Karamjiragam, Shimai shambu;
Tel: Nalla Jeelakarra;
Urdu: Zira Siyah, Kala Zira
Urdu: Kamoon.⁷

CONSTITUENTS

Essential oils (carvone and carvacrol).

Essential oil (2.7%–6.0%) consisting of (+)-carvone (49%–70%) and (+)-limonene (30%–47%) as main components; others,

about 30, are mainly monoterpenes in smaller amounts. Fixed oil (6.2%–10.1%) contains fatty acids as glycerides, petroselinic acid 33%–43%, and linoleic acid 35%–37%.

The fruit contains flavonoids (about 0.1%), phenylpropanoids, coumarins, polysaccharides, minerals, protein, and sugars.^{2(b),11,14,24}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Ādhmāna, Jirnajvara, Grahaṇiroga, Kṛmiroga

Used for digestive impairments, flatulence, chronic fever, malabsorption syndrome, and worm infestations (therapeutic uses based on texts from 1000 BC to thirteenth century). Charaka and Sushruta (1000 BC) prescribed Jiraka for all types of anorexia and intestinal catarrh; Vrṇdamādhava (eighth century) used it in irregular fevers, including malarial fever with rigor, and in vomiting.

Used in ethnomedicine as a carminative, anti-spasmodic, and anti-microbial.^{7,24}

IMPORTANT FORMULATION/ APPLICATIONS

Jirakadyarishta (Bhaishajya Ratnavali, seventeenth century) contains white cumin as the main constituent (AFI, Part I, page 13), with 10 supporting herbs. Prescribed for puerperal diseases, diarrhea, and dysentery. In South India, used as a ecobolic and uterine tonic.

Jirakadi Modaka (Bhaishajya Ratnavali) contains white cumin (AFI, Part I, page 39) as the main constituent and *Cannabis sativa* seeds (50% in proportion to cumin), with 40 supporting herbs, calcined mica, tin, and borax (ore). Used for diarrhea with blood, dysentery, and chronic fever.

Jirakadi Rasayana (IMPCOPS, not quoted in the API) is prescribed as a uterine tonic in menorrhagia, metrorrhagia, dysmenorrhea, and leucorrhea.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-3 g of the drug in powder form

Usually used as an infusion of seeds.

Uses recognized by German Commission E for dyspeptic problems such as mild, spastic conditions

of the gastrointestinal tract, bloating and fullness,⁸ and flatulent colic of infants (ESCAP).^{11(a)}

Cassia angustifolia Vahl

Svarṇapatrī

C

BOTANICAL SOURCE(S)

Cassia angustifolia Vahl
(Fam. Leguminosae)

C. angustifolia Vahl and *C. acutifolia*. Delile are considered two distinct species in a number of pharmacopoeias as Tinnevely senna and Alexandrian senna. However, both are considered to be synonyms of the single species, *Cassia senna* L. (WHO, Kew bulletin, 1958.)^{10(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Svarṇapatrī (Leaf).

API, Part I, Vol. I.

The active purgative principle of senna was discovered in 1866. Previously, Senna was used by Unani physicians for removing capillary congestion (pods were preferred).⁷ It was known as Sanna-makki in Unani medicine and Sonnamukhi in Malayalam, Kannada, and Telugu. The name was Sanskritized as Svarṇapatrī. It entered into Indian medicine after the period of Akbar.

International Pharmacopoeial name: *Sennae folium*.⁸

Sennae fructus angustifoliae (pods).

AYURVEDIC SYNONYMS

Mārkaṇḍī, Markandikā.⁷

Cassia spp. in classical Ayurveda:^{3,16,27,28}

Kāsmarda (Charaka Samhitā, Sushruta Samhitā, Ashtāṅgahridaya, Bhāvaprakasha): *C. occidentalis* L., *C. sophora* L.

Chakramarda (Bhāvaprakāsha): *C. tora* L.

Āragavadha (Charaka Samhitā): *C. fistula* L.

HABITAT

Cultivated largely in Southern India, especially in districts of Tinnevely, Madurai and Tiruchirappalli, also introduced in Mysore.

REGIONAL LANGUAGE NAMES

Eng: Indian Senna, Tinnevely Senna;

Assam: Sonamukhi;

Beng: Svarnamukhi, Sonapata;

Guj: Mindhiaval, Sonamukhi;

Hindi: Sanaya, Hindisana;

Kan: Nelavarika, Sonamukhi, Nelaavare, Nelavarike, Nela Aavariake;

Kash: Sna;

Mal: Sunnamukhi, Nilavaka, Chinnukki, Adapatiyan;

Mar: Sonamukhi;

Ori: Sunamukhi;

Punj: Sanapati, Sarnapatta, Sannamakhi;

Tam: Nilapponnai, Avarai;

Tel: Sunamukhi;

Urdu: Sena, Barg-e-Sana.

CONSTITUENTS

Anthraquinone, glucoside, flavonoids, steroids and resin.

Hydroxyanthracene glycosides (2.5%–3.5%) and major constituents sennosides A (dextrorotatory) and B (optical isomer); corresponding glycosides include rhein and aloe emodin, together with free anthraquinones. Naphthacene glucosides include 6-hydroxymusizin glucoside (0.85% in *C. senna*) and tinnevellin-6-glucoside (0.3% in *C. angustifolia*). The laxative effect is due to sennosides and their metabolite, rhein anthrone, in the colon.^{2(b),14,17,24(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vibandha, udararoga. Constipation, diseases of the abdomen (therapeutic uses are based on a non-classical verse composed by a contemporary Ayurvedic scholar).

C

Used as a laxative in all medicinal systems of India. Also prescribed in splenic enlargements, anemia, jaundice, gout, rheumatism, amebic dysentery, worm infestations and externally in skin diseases.^{20(e)} (May cause dermatitis externally.)

IMPORTANT FORMULATION/ APPLICATIONS

Panchsakāra Churna (a contemporary formulation of Siddha Bheshaj Manimālā, not included in AFI, Vol. I and II) is an OTC drug for indigestion and constipation. Sārivādyāsava (Bhaishajya Ratnāvali, seventeenth century) contains 23 herbs in equal proportions. Svarnapatri is one of them. Used as a blood purifier for treating boils and carbuncles.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

0.5-2 g of the drug in powder form.

For laxative effect, senna tablets contain 8.6 mg sennosides or 470 mg leaf powder.

Preparations equivalent to 15–30 mg of hydroxyanthracene derivatives, calculated as sennoside B, are taken once at night.^{8,10,11(a)}

Contraindicated in intestinal obstruction and inflammatory colon diseases. Not to be given to children under 10 years of age.⁸

To be used only for the short term in occasional constipation.^{8,10,11(a)}

OTC drugs: Glaxsenna (Glaxo), Laxatin (Alembic), Laxena (Alpine), Sofsena (Wander), and Pursennid-IN (Novartis).

<i>Cassia fistula</i> Linn.	Stem bark	Āragvādha
BOTANICAL SOURCE(S) <i>Cassia fistula</i> Linn. (Fam. Fabaceae)		
PHARMACOPOEIAL AYURVEDIC DRUG Āragvādha (Stem bark). API, Part I, Vol. V. Āragvadha (AFI, Part I, Part II.)		
AYURVEDIC SYNONYMS Kṛtamāla, Vyādhighāta, Śampāka, Śamyāka, Nṛpadruma, Kṛtamālaka. Āmayaghāta, Ārevata, Karnikāra, Chaturangula, Narādhipa, Nrpataru, Rajadruma, Shampāka. ³⁰	Guj: Garmaalo; Hindi: Amaltaas, Girimaal; Kan: Kakke, Kakkemar; Mal: Konna; Mar: Baahvaa; Ori: Sunaari; Punj: Amaltaas, Kaniyaar, Girdnalee; Tam: Konnai; Tel: Rela; Urdu: Amaltaas.	Urdu: Khiyar shambar. ⁶³ Eng: Golden shower. ²⁰
HABITAT Wild, also commonly planted as ornamental tree in most parts of India, up to an altitude of 1,200 m.		
REGIONAL LANGUAGE NAMES Eng: Indian laburnum, Purging fistula, Pudding pipe tree; Beng: Sondaalee, Sonaalu;		CONSTITUENTS Anthraquinones, tannins, sterols. Stem bark yielded seven biflavonoids and two triflavonoids, in addition to clitorin, chrysophanic acid, emodin, epicatechin, (–)-epiafzelechin and its 3–O-glucoside, kaempferol-3-β-glucoside, kaempferol-3-neohesperidoside, phlobaphene, and procyanidin, as well as known constituents lupeol, beta-sitosterol, hexacosanol, tannins 9%–12%, non-tannins 13%, and sugar 1.6%.

Barbaloin, fistucacidin and a small amount of rhein have also been isolated.^{15,20(e)}

THERAPEUTIC AND OTHER ATTRIBUTES

Gandamālā, Upadāmsa, Kuṣṭha, Aruci, Vibandha, Śūla, Kāmalā, Hṛdroga, Raktapitta, Vātarakta, Śoṭha, Mūtrakṛcchra, Dāha, Jvara, Udaravikāra, Kṛmi, Prameha, Gulma, Vraṇa, Kaṇḍu, Grahani, Aśmarī

Used for cervical lymphadenitis, syphilis, obstinate skin diseases, constipation, colic, jaundice, cardiac diseases, bleeding disorders, gout, edema, dysuria, burning sensation, fever, diseases of the abdomen, worm infestations, urinary disorders, abdominal lumps, ulcers, itch, malabsorption syndrome and calculus (therapeutic uses based on texts from 1000 BC to sixteenth century; Quoted text is related to the root and sap, with no direct link to stem bark).

Charaka included root, bark, sap, and leaves in prescriptions for chronic skin diseases and misperistalsis in infants, and as a diuretic and purgative. Sushruta used the alkaline ash for promoting the growth of normal tissues after surgery.^{27,28}

IMPORTANT FORMULATION/ APPLICATIONS

Āvittoḷādi Bhasma (Kshāra) (Sahasrayoga, a non-Samhitā, Kerala Materia Medica). A drug

composed of alkaline ashes of 11 plant parts, Sampaka stem bark is one of them. For abdominal lump and edema.

Mānasmitra Vataka (Sahasrayoga) contains Kṛtamāla stem bark as a minor component among 72 herbo-mineral drugs. Used for epilepsy and insanity.

Root bark: for cervical adenitis, as snuff and internally. As a paste for external application.

Root: paste used topically in venereal diseases.

Leaf: fried in mustard oil and taken with milk for rheumatoid arthritis. Paste used topically on erysipelas, skin diseases, and wounds.

Other classical uses (parts not specified): fever, jaundice, urinary disorders, and diseases of the abdomen.^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50-100 ml kvatha.

Stem bark is reported to be eaten raw for stomachache.^{2(b)}

Extract of stem bark showed high interferon-like anti-viral activity against Ranikhet disease virus and vaccinia virus.^{2(b)}

The bark is anti-dysenteric, while the whole-seed powder cures intestinal amebiasis.^{2(b)}

Cassia fistula Linn.

Fruit

Āragvadha

BOTANICAL SOURCE(S)

Cassia fistula Linn.
(Fam. Leguminosae)

PHARMACOPOEIAL AYURVEDIC DRUG

Āragvadha (Dried pulp of fruit).

API, Part I, Vol. I.

One kilogram of fruits yields about 250 g of pulp.^{2(b)}

Though specific plant parts are not mentioned in Ayurvedic churna or kwaath compounds,

traditionally, the fruit pulp is used. The leaves have been suggested for Aamvaata (rheumatism) and Urustambh (stiffness of the thigh muscles). Pulp of the leaves is suggested for skin diseases.³

AYURVEDIC SYNONYMS

Kṛtamāla, Vyādhigāta, Śampāka, Nrpādruma.

Ārevata, Chaturangula, Karnikāra, Rājadruma, Rājvriksha.³

Āmayaghāta, Narādhipa, Narendradruma, Pragraha.³⁰

C

HABITAT

Common throughout India as wild or cultivated plant, fruits collected when wild.

Also found in Sri Lanka and Myanmar.⁵

REGIONAL LANGUAGE NAMES

Eng: Indian Laburnum, Purging cassia;
Assam: Sonaroo;
Beng: Sondala;
Guj: Garamala, Garmalo;
Hindi: Amaltas;
Kan: Aragvadha, Kakke, Kakke- gida, Kakkemara, Kakkedai, Rajataru;
Kash: Kriyangal Phali;
Mal: Konna, Kritamalam;
Mar: Bahava, Garamala, Amaltas;
Ori: Sunari;
Punj: Amaltas;
Tam: Sarakonrai, Sarakkonnai, Sarakkondi, Sharakkonnai;
Tel: Rela;
Urdu: Khiyar Shambar.

Eng: Pudding-pipe tree, Golden shower,¹ Riding pipe.^{20(e)}

CONSTITUENTS

Sugar, mucilage, pectin and anthraquinone

Pulp of the pods contains anthraquinone, glycosides, sennosides A and B, rhein and its glucoside, barbaloin and aloin, as well as formic, butyric and fistulic acids. Presence of pectin, tannin, maltose, glucose, fructose, sucrose and a small quantity of volatile oil is also reported.^{2(b),7}

THERAPEUTIC AND OTHER ATTRIBUTES

Vibandha, Udavartta, Gulma, Śūla, Udararoga, Hṛdroga, Prameha

Used for constipation, abdominal diseases characterized by retention of feces, abdominal lumps, colic, diseases of the abdomen, diseases of the heart and urinary disorders (therapeutic uses based on texts from 1000 BC to sixteenth century; plant parts not specified in quoted texts). The pulp is a safe purgative that is given in disorders of the liver and biliousness. It is also prescribed in blood impurities, leprosy, anthrax, dysentery, diabetes, and for the removal of abdominal obstructions.^{2(b),63} Pulp is applied externally in gout and rheumatism.

IMPORTANT FORMULATION/ APPLICATIONS

Āragvadhādi Kwāth Churna (Ashtāngahridaya, seventh century), contains *C. fistula* fruit/plant with 19 supporting herbs including *Randia dumetorum* Poir (Madan), an emetic and purgative drug. Prescribed in leprosy, skin diseases, septic wounds, urinary disorders, toxic conditions, and emesis. Āragvadamritādi Kwāth Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica; not quoted by the API) contains Āragvadha with three other herbal drugs (plant parts not specified). Used for hyperacidity and skin diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g of the drug in powder form
Only the pulp can be taken smeared with almond oil.⁶³

Cassia tora Linn. Prapunnāḍa

BOTANICAL SOURCE(S)

Cassia tora Linn.
(Fam. Fabaceae)
Syn. *C. tora* sensu Hook. f. p.p.^{20(e)}

PHARMACOPOEIAL AYURVEDIC DRUG

Prapunnāḍa (Seed).
API, Part I, Vol. III.

First reference of Prapunnāḍa was found in Sushruta Samhitā, 1000 BC. Syn. Chakramarda and Eḍagaja.

AYURVEDIC SYNONYMS

Eḍagaja, Dadrugna.

Chakramarda, Chakramardaka, Dadrugna, Prapunnāṭa.³
Mardaka, Mesha-kusum, Kushtakṛntana.⁴

HABITAT

Found throughout India in the plains, ascending to 1500 m in the Central Himalayas.

REGIONAL LANGUAGE NAMES

Eng: Ring worm plant, Fetid cassia;
Assam: Kulb;
Beng: Chavuka, Chakunda, Panevar;
Guj: Kavaraya;
Hindi: Pavand;
Kan: Tagache;
Mal: Tagaraa;
Mar: Tankala;
Punj: Panwal, Chakunda, Chakwad;
Tam: Vshittgarai;
Tel: Tagiris;
Urdu: Panwar.

Eng: Fotid cassia.

CONSTITUENTS

Anthraquinones, Fixed oil.

Seeds contain rhein, emodin, aloe-emodins, physcion, rubrofusarin and its 6 beta-gentiobioside, nor-rubrofusarin, 8-hydroxy-3-methylanthroquinone-1-beta-gentiobioside, chrysophanic acid and its 9-anthrone, sitosterol, a polysaccharide consisting of D-galactose, D-glucose, D-mannose, and D-xylose and a gum (7.65%). Seed oil showed the presence of oleic, linoleic, palmitic, and lignoceric acids.^{2(b),20(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kaphavatajanya vikāra, Kuṣṭha, Vrana vikara, Dadru, Paksaghata, Vibandha, Gulma, Kṛmi, Pama, Kandu, Swasa, Kasa

Used for diseases of *kapha* and *vāta* pre-dominance, leprosy, wounds, ringworm, hemiplegia/paralysis, constipation, abdominal lumps, worms, eczema, itch, dyspnea and cough/bronchitis (therapeutic uses based on texts from thirteenth–sixteenth centuries).

Sushruta prescribed paste of the seeds as an ointment for ringworm.²⁸

Chrysophanic acid-9-anthrone was found to be active against *Trichophyton rubrum*, *T. mentagrophytes*, *T. granulosum*, *Microsporum canis*, *M. gypseum*, and *Geotrichum candidum*.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Nimbādi Churna (Bhaishajya Ratnāvali, seventeenth century), contains five main herbs with 16 supporting herbs, Eḍagaja seed is one of them. For obstinate skin diseases.

Kāsisādi Ghrita (Shārangadhara Samhitā, thirteenth century), a herbo-mineral drug, contains 22 ingredients in equal proportions. Prapunnāḍa seed is one of them. Used for skin diseases.

Mahāvishgarbha Taila (Bhaishajya Ratnāvali), a herbo-mineral compound, contains Prapunnāḍa seeds among 46 plant drugs. Used as a massage oil for rheumatic and inflammatory conditions.

Bṛhanmārichāḍya Taila (Yogaratanākara, sixteenth century) contains 31 herbs, including Chakramarda seeds, in equal proportions. Used as a massage oil for cutaneous eruptions.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of powder.

Seeds are used for external application in skin diseases, particularly ringworm; also given internally.³

Chrysophanic acid-9-anthrone, 100 mg in 100 g of petroleum jelly base, was found to be effective at curing ringworm.^{2(b)}

Cedrela toona Roxb.

Tūnī

C

BOTANICAL SOURCE(S)

Cedrela toona Roxb.
(Fam. Meliaceae)

Cedrela toona Roxb. ex Rottl.
Syn. *Toona ciliata* Roem.
T. ciliata var. *pubescens*.

PHARMAKOPOEIAL AYURVEDIC DRUG

Tūnī (Stem bark).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Nandivṛkṣa,* Tūna, Nandī.

Tunikah,³ Gaṇeruka, Shripati, Nakona,
Nandipādapa.⁴

Nandivṛkṣa* is equated with *Ficus retusa* Linn.³
and *Ficus altissima* Blume.^{16(b)}

Nandi pushpa is equated with *Tabernaemontana coronaria* R. Br.⁶

HABITAT

Tropical Himalayas from the Indus eastward, ascending to 1000 m, also throughout the hills of Central and Southern India.

Found in Assam, Bengal, Chota Nagpur, Western Ghats, and other hills of South India.

REGIONAL LANGUAGE NAMES

Eng: Toon, Red cedar;
Beng: Toongaachha;
Guj: Toonee;
Hindi: Tun, Toonee, Tuni;
Kan: Mandurike, Kempu gandagheri;
Mal: Madagirivempu, Ikana, Patukarana;
Mar: Toonee, Kurak;
Tam: Karamusuli, Shevagil Malavembu;
Tel: Nandichettu, Galimanu.

Eng: Indian Mahogany tree,⁷ Hill toon.^{2(a)}

CONSTITUENTS

Triterpenoids.

Stem bark showed presence of limonoids, beta-seco-limonoids, and pregnanes.^{15,26}

Six new tirucallane protolimonoids, toonapubesins A–F, one new rearranged tirucallane protolimonoid, toonapubesin G, and two new 21, 22, 23-trinorapotirucallane limonoids, toonapubesic acids A and B, along with five known tirucallane protolimonoids and one known apotirucallane limonoid, have been isolated.⁹⁴

THERAPEUTIC AND OTHER ATTRIBUTES

Bāla pravāhikā; Vraṇa, Dāha, Yoniroga, Kaṇḍu, Kuṣṭha, Gandamāla, Raktavikāra, Raktapitta, Svetakustha, Prameha, Visavikāra, Medovikāra

Used for infantile diarrhea, ulcer, burning sensation, diseases of the female genital tract, pruritus, obstinate skin diseases, cervical lymphadenitis, disorders of the blood, hemorrhagic diseases, leucoderma, urinary disorders, disorders due to poison and obesity (therapeutic uses based on texts from 1000 BC and seventh century).

Toonapubesin and siderin (isolated from bark and wood) exhibited promising cytotoxic and antitumor activities.^{94,95}

IMPORTANT FORMULATION/ APPLICATIONS

Nyagrodhādi Kwāthi Churna (Ashtāngahridaya, seventh century), contains 21 herbs in equal proportion, including Nandi stem bark. For malabsorption syndrome, hemorrhagic diseases, diseases of female genital tract, obesity.

The bark is astringent and anti-periodic, and used for chronic infantile dysentery, and externally for ulcers.^{2(a)}

Stem bark and leaf: spasmolytic.³²

Crude extract: cell protective.⁹⁵

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 Kvatha: 10–20 ml.

Cedrus deodara (Roxb.) Loud.

Devadāru

C

BOTANICAL SOURCE(S)

Cedrus deodara (Roxb.) Loud.
(Fam. Pinaceae)

C. deodara (Roxb. ex Lamb.) G. Don.
Syn. *C. libani* Barrel, var. *deodara* Hook. f.
C. indica Chambr. *Larix deodara* Koch.
Pinus deodara Roxb.^{2(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Devadāru (Heart wood).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Bhadradāru, Surabhuruha, Amaradāru,
Devakāstha, Dāru, Suradāru, Amarataru.

Dāruka, Devāhva, Devadārvi, Devadruma,
Indradāru, Kallima, Maruttaru, Surāhva,
Surāhvya, Suradruma,³ Tridashahva.³⁰
Kilima (Charaka Samhitā) is supposed to be a
synonym of Devadāru.³⁰

HABITAT

North Western Himalayas from Kashmir to
Garhwal, between 1200 to 3000 m, cultivated in
Kumaon.

Deodar forests are common in Chamba, Jaunsar,
Bashahr, Kulu, Tehri-Garhwal, Amora, Rani
Khet, Nainital, Chakrata, Mussoorie, Shimla,
and other hill locations.

REGIONAL LANGUAGE NAMES

Eng: Deodar, Himalan cedar;
Assam: Shajar tuljeen;
Beng: Devdaroo;
Guj: Devdar, Teliyo devdar;
Hindi: Devdar, Devdaroo;
Kan: Deevdar;
Mal: Devtaram;
Mar: Devdar, Telya dedaroo;
Punj: Diyar, Dewdar;
Tam: Devdaroo;

Tel: Devdaree, Devdari chettu;
Urdu: Deodar.

Eng: True cedar.^{2(b)}

CONSTITUENTS

Terpenoids, Flavonoids and Glycosides.

Chloroform extract of heart wood gave
(-)-matairesinol, (-)-nortrachelogenin and a
dibenzylbutyrolactollignan.^{20(e)}

Dihydromyricetin, cedrine, deodorin, cedrinox-
ide, kaempferol glucoside, and polyphenolic
lignoids have been reported from the wood.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Vibandha, Adhamana, Śoṭha, Tandra, Hikka,
Jvara, Prameha, Pinasa, Kāsa, Kaṇḍu, Kṛmi,
Kuṣṭha, Āmavāta, Raktavikara, Sutikaroga

Used for constipation, tympanites, edema,
drowsiness, hiccough, fever, urinary disorders,
sinusitis, cough, pruritus, worm infestations,
leprosy, rheumatism, diseases due to vitiated
blood and puerperal diseases (therapeutic
uses based on texts from 1000 BC to sixteenth
century).

Devadaru wood was included in prescriptions for
headache, intestinal worms, urinary diseases,
and menorrhagia (Charaka, 1000 BC),²⁷ inter-
nally in skin eruptions and chronic dysentery,
externally as a paste for swellings and in hair
oil for treating baldness (Sushruta, 1000 BC)²⁸
and as a decoction in asthma (Charaka) and
fever (Sushruta).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Devadārvārishta (Bhaishajya Ratnāvali, seven-
teenth century), contains Devadāru heartwood
as main herb with *Adhatoda vasica* root, and
28 supporting herbs.

Used for dysuria, rheumatic afflictions, and
chronic skin diseases.

Khadirārishta (Shārangadhara Samhitā, thirteenth century) contains *Acacia catechu* and *Deodara* heart wood (in equal proportions) as the main herbs, with five supporting herbs and seven supplementary herbs. Used for obstinate skin diseases, abscesses, worm infestations, and anemia. Sudarshan Churna, Dashmūlārishta, Narayan Taila and Mahāvishgarba Taila (OTC drugs),

and other quoted drugs, contain *Deodara* heart wood as a supporting herb.

DOSAGE/USAGE/CAUTIONS/COMMENTS

3-6 g of the drug in powder form.

Celastrus paniculatus Willd.

Jyotiṣmatī

BOTANICAL SOURCE(S)

Celastrus paniculatus Willd.
(Fam. Celastraceae)

Bengal Ayurvedic scholars equate *Cardiospermum halicacabum* L. with Jyotishmati.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Jyotiṣmatī (Seed).
API, Part I, Vol. II.

60-75 seeds weigh 1 g.^{2(b)}

AYURVEDIC SYNONYMS

Paravata padi, Katabhi.

(API, Vol. II.)

Durmada, Jyotirlatā,²⁷ Pārāvartapadi,^{27,28}
Alavana,²⁸ Jyotishkphala, Vahni, Ruchi,
Kanguni,³⁰ Katabhī.⁴

Cardiospermum halicacabum is equated with
Karnsphotā.^{2(a)}

HABITAT

All over the hilly parts of India up to an altitude of 1200 m.

Tropical Asia to the Pacific.¹

REGIONAL LANGUAGE NAMES

Eng: Staff tree,
Assam: Kapalphotla;

Guj: Malkangani;
Hindi: Malkangani;
Kan: Doddaganugae, Gangunge beeja, Gangunge humpu, Kangondiballi;
Mal: Ceruppunnari, Uzhinja;
Mar: Malkangoni;
Ori: Malkanguni, Jyotishmati;
Punj: Malkangoni;
Tam: Valuluvai;
Tel: Malkangani, Peddamaveru;
Urdu: Malkangani.

Eng: Black-oil tree, Climbing staff tree, Intellect tree.
(Though a climbing shrub, it is known as tree.)

CONSTITUENTS

Alkaloids, Oil and Tannins.

Seeds yield acetic, formic, linoleic, linolenic, palmitic and stearic acids; celapagine, celapnigine, celapanine, celestrol, celastrine, paniculatine, malkanguniol and related polyalcohols, malkangunin (sesquiterpene ester); paniculatadol; beta-amyrin, beta-sitosterol and 5-stigmasten-3 beta-ol.¹⁵

Seeds yield a dark brown oil (52%), known as Malkanguni oil.^{2(b)}

Extract of plant, excluding root, showed the presence of tannins (3.52%).^{20(e)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vatavyadhi, Smrtidaurbalya, Switra

Used for disorders of nervous system, memory disorders and leucoderma/vitiligo (therapeutic

uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta (1000 BC) prescribed the oil internally in headache, rhinitis, fainting, intestinal parasites, urinary and skin diseases.^{27,28}

The oil, mixed with cow's ghee, was given internally in neurological disorders and as a brain tonic (Rajanighantu, Bhavaprakasha).¹⁸

Seed oil exhibited tranquilizing, sedative, and anti-convulsant activities, and hastened the process of learning in experimental animals.^{2(c),18,29(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Smṛtisāgara Rasa (Yogarātnākara, sixteenth century), contains 5 minerals (purified

mercury, sulphur yellow orpiment, realgar and calcined copper) impregnated 21 times with Katabhi seed oil, Bacopa plant juice and *Acorus calamus* root decoction.

Used for epilepsy and weak memory.

Jyotishmati Taila (Yogarātnākara) contains

Jyotishmati oil, processed seven times in alkaline water of *Achyranthus aspera*.

The moisture-free drug is used externally for leucoderma/vitiligo.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Seed: 1-2 g. Oil: 5-15 drops.

Emetic and toxic in large doses.¹⁸

Celosia argentea L.

Śitivāraka

BOTANICAL SOURCE(S)

Celosia argentea L.
(Fam. Amaranthaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Śitivāraka (Seed).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Sirivālikā, Kuraṇḍa, Kuraṇṭika, Śitavāra, Sitivāra

Vitunna.¹⁵ (Should be reviewed.)

Kuraṇṭa and Kuraṇṭaka are different herbs, equated with *Barleria prionitis* Linn.³

HABITAT

As a weed in cultivated fields throughout India up to an altitude of 1500 m.

REGIONAL LANGUAGE NAMES

Eng: Silver spiked cock's comb;

Ben: Sushunimaak, Shushunishaak;

Guj: Laanpadi, Lonpadi;

Hindi: Siriyaari, Suravaali, Siravaari;

Mar: Kuradu, Karadu, Surali;

Pun: Suravaali;

Tam: Pannaikkeerai;

Urdu: Suravaali.

Eng: Wild cock's comb.³²

CONSTITUENTS

Nonpeptide, celogenamide, celosian, an acidic polysaccharide.

Seeds contain beta-sitosterol, cholesteryl palmitate, 3, 5-dihydroxy benzaldehyde, 4-hydroxybenzoic acid, 3, 4-dihydroxybenzoic acid, alpha-butyl-beta-D-fructoside, and sucrose.^{2(c)}

Seeds contain 6.4%–10.9% of a fatty oil,^{2(c)} known as celosia oil.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aśmarī (Calculus), Arśa (piles), Atisāra (diarrhoea), Gulma (abdominal lump), Hṛdroga (heart disease), Jvara (fever), Mūtrāghāta (urinary

obstruction), Mūtrakṛcchra (dysuria), Plihāroga (splenic disease), Raktavikāra (disorders of blood), Śopha (oedema). Used as single drug.

For therapeutic uses, classical sources are not quoted.

IMPORTANT FORMULATION/ APPLICATIONS

Investigations on the effect of aqueous extract of the seed on induced liver injury in mice revealed significant hepatoprotective

activity. The active principle identified was celosian.^{2(d)}

Seeds are considered to be aphrodisiac, and also find application in diarrhea and diseases of the eye,¹⁵ and topically for sore mouth and inflammation.^{2(d)} An alcoholic extract of the seeds also possesses significant diuretic activity.^{2(b)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 3 to 6 g.

Centella asiatica (Linn.) Urban.

Mandūkaparnī

BOTANICAL SOURCE(S)

Centella asiatica (Linn.) Urban. syn. *Hydrocotyle asiatica* Linn.
(Fam. Apiaceae)

Hydrocotyle rotundifolia Roxb. and *H. javanica*
Thumb are also used as Mandūkaparni in some parts of India.³⁰

Both *Centella asiatica* and *Bacopa monnieri* are known as Brāhmi, even though they are different drugs. Brāhmi (*Bacopa*) promotes fertility and sustains implantation, while Mandūkaparni ejects them.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Mandūkaparnī (Whole plant).

API, Part I, Vol. IV.

International Pharmacopoeial name: *Centella asiatica* herba.^{11(b)}

AYURVEDIC SYNONYMS

Mandūki, Darduracchada.

Brahma-mandūka,⁷ Tvāṣṭri.²⁰

HABITAT

Commonly found as a weed in crop fields and other waste places throughout India up to an altitude of 600 m.

Found from the Pantropics to Chile.¹

REGIONAL LANGUAGE NAMES

Eng: Indian pennywort;
Assam: Manimuni;
Beng: Jholkhuri, Thalkuri, Thankuni;
Guj: Khodabrahmil Khadbhrammi;
Hindi: Brahma manduki, Brahmi;
Kan: Ondelaga, Brahmi soppu;
Mal: Kodangal;
Mar: Karivana;
Punj: Brahmi;
Tam: Vallarai;
Tel: Saraswati aku, Vauari;
Urdu: Brahmi.

Eng: Gotu kola.¹

CONSTITUENTS

Glycosides—Saponin Glycosides.

Saponins include brahmoside and brahminoside; triterpene acids include brahmic acid,

isobrahmic acid, and betulic acid; glycosides include thankuniside and asiaticoside; flavonoids include quercetin and kaempferol.

Plant also contains stigmasterol and indocentoic acid; amino acids, alpha-alanine and phenylalanine, beta-sitosterol, palmitic acid, and stearic acid³² (see details in Reference 20[e]).

Asiaticoside is anti-leprotic; brahmoside is a tranquilizing principle.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Kuṣṭha, Meha, Jwara, Śwāsa, Kāsa, Aruci, Pāṇḍu, Śoṭha, Kaṇḍu, Raktadoṣa

Used for hemorrhagic diseases, obstinate skin diseases including leprosy, polyuria, fever, dyspnea, cough, anorexia, anemia, edema, pruritus, and vitated blood (therapeutic uses based on texts from 1000 BC to sixteenth century).

It seems, quoted texts were not thoroughly analyzed. Age-sustaining, learning and memory-promoting activities of the drug were not highlighted.

Mandūkarni is an intellect-promoting drug and is the Ayurvedic *Medhya Rasāyan* (brain tonic) in India, while in China and in the West, it is

used as a wound-healing, anti-psoriatic, anti-ulcer, and cytotoxic drug.

IMPORTANT FORMULATION/ APPLICATIONS

Brahma Rasāyana (Ashtāṅghridaya, seventh century), contains *Embelica officinalis* (Āmalaka) fruits and *Terminalia chebula* (Haritaki) fruits as main herbs, with 25 supporting herbs. Mandūkarni is among 15 supplementary herbs. Prescribed for disturbed memory. Charaka and Sushruta (1000 BC) prescribed the juice or decoction of the herb for intellectual vigor and longevity, as well as for pectoral lesions, ulcers, and intestinal afflictions.^{27,28}

The herb, fried in *ghee*, was given as an intellect-promoting tonic (Ashtāṅghridaya). It was one of the main drugs in tonics for improving the receptive and retentive capacities of the mind (Bhāvaprākasha, sixteenth century).^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Standardization basis marker compound: Asiaticoside—NLT 0.5% w/w (IP).

C

Centratherum anthelminticum (L.) Kuntze Vanyajiraka

BOTANICAL SOURCE(S)

Centratherum anthelminticum (L.) Kuntze
(Fam. Asteraceae)

Syn. *Vernonia anthelmintica* (L.) Willd.

PHARMACOPOEIAL AYURVEDIC DRUG

Vanyajiraka (Fruit).

API, Part I, Vol. V.

Not used like Jiraka.⁶³

In Ayurveda texts, three Jiraks are mentioned, Jiraka, Krishna jiraka and Kāravi, *Cuminum*

cuminum L., *Carum bulbocastanum* W. Koch and *Carum carvi* L., respectively.⁷

AYURVEDIC SYNONYMS

Āraṇyajirakah, Brhatpālī, Somarājī,* Vanajirakah.

Somarājī of Sushruta Samhitā (syn. Somavalli, Somavallikā, Soma, Chāndri) is equated with *Psoralea corylifolia*, L.

An important section of Ayurvedic physicians treat Somarājī and Bakuchi (*Psoralea corylifolia*) as synonyms, while Bengali physicians* use *C. anthelminticum* as Somarāj. ^{3,30}

HABITAT

Throughout India up to 1850 m in Himalaya and Khasi hills, also cultivated.

C

REGIONAL LANGUAGE NAMES

Eng: Purple flebaane, Worm seed fleabane;
Beng: Somaraaj*
Guj: Kaaleejeeree, Kadavijeeree;
Hindi: Kaaliyeeree, Karajiri, Soharaai;
Kan: Kaadujeerage, Kaarijirige;
Mal: Krimishatru, Kattujirakam;
Mar: Kadujire;
Tam: Kaattuchirakam, Chittilai;
Tel: Adavijilakaroa, Garetikamma.

Urdu: Kamun barri.

CONSTITUENTS

Sterols, avenasterol (avenosterol) and vernosterol, a bitter principle, essential oil, resins and fixed oil consisting of myristic, palmitic, stearic, oleic, linoleic and vernolic acids.

Seeds are reported to contain fixed oil (18%) and essential oil (0.02%); oil contains resin (2%).²⁰

Seeds contain monoepoxy and diepoxy-triglyceride of vernolic acid, in addition to known triglycerides of vernolic acid.

Vernodalol, a new elemanolide lactone, a new flavone glycoside and a new glycosylated triterpene (hederagenin) were isolated from seeds^{20(e)} (for chemical constituents, consult References 20[e] and 25).

THERAPEUTIC AND OTHER ATTRIBUTES

Śvāsa, Kāsa, Hikkā, Jvara, Kuṣṭha, Vraṇa, Kaṇḍū, Svitrakustha, Kṛmi, Śopha, Śūla, Gulma, Mūtraghāta, Raktavikāra

Used for dyspnea, cough, hiccup, fever, leprosy, ulcers, pruritus, leucoderma/vitiligo, worm infestations, edema, colic, abdominal lumps, retention of urine and vitiated blood (therapeutic uses based on a text of the twelfth century and two contemporary Sanskrit *ślokas*).

In a clinical study (aqueous extract, 4.5 mg extract/kg bw × 7 days), out of 15 patients with round worm, hook worm and *Giardia*, 6, 6 and 8, respectively, showed total cure.^{20(e)}

IMPORTANT FORMULATION/ APPLICATIONS

Madhusnuhi Rasāyana (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains China root, Guggulu and purified sulphur as main drugs, with 26 supporting herbs including Vanya jiraka, in equal proportion. Prescribed as a blood purifier in leprotic and syphilitic conditions.

(Due to its trade name, Kālijiri, in South India, *Nigella sativa* seeds are used in Madhusnuhi Rasāyana.)

Seeds of Somaraji (Sushruta Samhitā, 1000 BC) were used in prescriptions for toxicosis.²⁸

In a clinical study (powdered drug along with local applications of Nimbādi oil), out of 15 patients, only 13 patients with acute eczema were cured.^{20(e)}

An aqueous decoction failed to show anti-histaminic effects in human subjects.^{20(e)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

LD₅₀ of the ethanolic extract was found to be 250 mg/kg bw i.p. in mice.^{20(e)}

Chrysanthemum indicum L.

Guladāudī

BOTANICAL SOURCE(S)

Chrysanthemum indicum L.
(Fam. Asteraceae)

Syn.: *Pyrethrum indicum* L.

PHARMACOPOEIAL AYURVEDIC DRUG

Guladāudī (Leaf).

API, Part I, Vol. VI.

Guladāudī is used in Unani medicine.

AYURVEDIC SYNONYMS

Chinnapatrā.

A non-classical synonym.

Shatpatri is a wrong equation by the National Academy of Ayurveda (page 60).²⁹

Shatpatri and shatpatrikā of classical Ayurveda is equated with *Rosa centifolia* L. (the National Academy of Ayurveda, page 157).²⁹

HABITAT

Widely grown in gardens as an ornamental.

Native of China and Japan, occasionally grown in Indian gardens.^{2(b)}

A related species, *C. parthenium* (L.) Berhh. (Feverfew), is found in Jammu and Kashmir.

REGIONAL LANGUAGE NAMES

Eng: Chrysanthemum;

Ben: Chandramukhi;

Guj: Guldaaudi;

Hindi: Guldaaudi;

Kan: Shevanti;

Mar: Chamanti, Shevanti;

Pun: Chamanti;

Tam: Chamanti;

Tel: Bagaura;

Urdu: Gule-dawoodi.

Pun: Bagaur, Gendi.^{2(c)}

Tam: Akkarakkaram;

Tel: Chamunti;

CONSTITUENTS

Sesquiterpene lactones-angeloylcumambrin B, arteglin A and angelolajadin. Essential oil from aerial parts contain di- and sesquiterpenoids α -copaene, β -elumene, P-carophyllene, β -farnesene, β -humulene, germacrene- D, α -silenene, curcumene, calamenene, γ -cadinene

and T-murolo, and mono-terpenoids myrcene, 1, 8-cineol and bornyl acetate. Chrysanthenone and chrysanthenin glycoside. Aerial parts also contain lignans sesamin, fargesin, and flavonoic penduletin.

Air-dried aerial parts contain angeloyl ajadin together with ageloyl cumabrin B and arteglin A;^{96,97} adenosine and the alkyl alcohol glycoside, 1-octen-3-ol-3-O-beta-D-xylopyranosyl-(1 \rightarrow 6)-beta-D-glycopyranoside.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Ardhāvabhedaka (hemicrania/migraine), Mukhasphota (ulcer in the mouth), Śiraḥśūla (headache), Tvakroga (skin diseases), Vraṇa (ulcer), Yuvānapidīkā (pimples/acne vulgaris). Used as single drug. (Therapeutic uses not based on Ayurvedic texts.)

Whole plant with black pepper is given in gonorrhea.

Leaves are used as a depurant in Chinese medicine and prescribed in migraine.²⁵ Ash of the plant is used as a diuretic.⁶³

Plant enters into a Chinese drug, Xia acuojieoffu, used for acne.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Sesquiterpene lactones of *C. parthenium* inhibit prostaglandin production and arachidonic acid release (anti-platelet and anti-febrile actions). Extracts also inhibit secretion of serotonin from platelet granules and proteins from polymorphonuclear leucocytes (responsible for therapeutic effects in migraine).³¹

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

Cicer arietinum L.

Caṇaka

C

BOTANICAL SOURCE(S)

Cicer arietinum L.
(Fam. Fabaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Caṇaka (Whole plant).

API, Part I, Vol. VI.

Two main group of chickpea: *desi* (wrinkled seed) and *kabuli* (rounded seed).

Kabuli gram contains higher amounts of protein, fat and iron than the *desi* variety, which contains larger amounts of crude fiber and calcium.^{2(b)}

(Plants of both the varieties should not be treated as one drug.)

AYURVEDIC SYNONYMS

Harimanthāḥ, Sakalapriya, Vújimantha.

Chaṇakā.³

HABITAT

Cultivated in most parts of India.

Gram is considered to have originated in the tract lying between the Caucasus and the Himalayas, from there it spread into South Europe, Iran, Egypt, and India. In India, the earliest record dates from 4000 BC at Atranjikhhera in Uttar Pradesh. The introduction of the *Kabuli* type is probably more recent.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Bengal gram, Chick pea, Gram;

Assam: Imas;

Ben: Chholaa;

Guj: Chanaa, Chanya;

Hindi: Buut, Chanaa, Chunnaa, Chane, Chholaa;

Kan: Kadale;

Mal: Katal;

Mar: Harbaraa, Chane;

Punj: Chholaa;

Tam: Katalai, Kadalai, Kondakkadalai;

Tel: Sangalu.

Eng: Garbanzo.^{2(b)}

CONSTITUENTS

Flavonoids such as, quercetin, isoquercetin, kaempferol-3-glucoside, astragalin, populnin, biochenin-A-7-glucoside, isorhamnetin, protensein, garbanzol and cyanogenic glycosides. (Chemical constituents of foliage, quoted from Reference 32. Seeds gave cyanogenic glycosides.)

Leaf contains amino acids leucine 6.6, isoleucine 5.3, lysine 6.8, methionine 1.7, phenylalanine 4.0, threonine 3.4, tryptophan 0.6, and valine 4.5 g/16 g N.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Annadravaśula (gastric ulcer), Chardi (emesis), Dāha (burning sensation), Jvara (fever), Kāsa (cough), Pinasa (chronic rhinitis/sinusitis), Prameha (metabolic disorder), Śoṣa (emaciation), Śvāsa (Asthma), Tr̥ṣṇā (thirst), Udara (diseases of abdomen).

Quoted uses are of the seed, parched seed, and flour. Leaves were used as the pot herbs and are heavy and difficult to digest (Sushruta Samhitā).

IMPORTANT FORMULATION/ APPLICATIONS

For burning sensation in fever, soup of Chanaka seeds was given (Bhāvaprakāsha, sixteenth century); Chanaka seeds, soaked in *Ephorbia latex* was used as a drastic purgative (Siddha-bhaishāja Manimālā). In vomiting, soup of seeds mixed with coriandrum seeds, was prescribed (Gadanigraha, twelfth century).^{16(c)}

Ethnomedical uses: plant is refrigerant and leaves are astringent; useful in bronchitis; leaf juice is stomachic and laxative; plant exudate is astringent and used in indigestion, diarrhea, and dysentery. Paste of leaves is applied on dental swellings.^{20(f)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 5 to 20 g.

In Ayurvedic medicine, *yusha* of Chanaka, as a part of diet in fever, bleeding disorders, arthritis, gout, colic, and urinary disorders, was prescribed.³

Yusha (soup): 24 or 48 g of Chanaka with *moong* pulse, cooked with 750 mL of water, reduced to half in volume.

Cinnamomum tamala Nees & Eberm.

Tvakpatra

BOTANICAL SOURCE(S)

Cinnamomum tamala (Buch. Ham.) Nees & Eberm. (Fam. Lauraceae)

Syn. *Laurus tamala* Buch.-Ham.

PHARMACOPOEIAL AYURVEDIC DRUG

Tvakpatra (Dried mature leaf), from about 10 year-old plant.

API, Part I, Vol. I.

Leaves belong to two chemotypes: eugenol type and cinnamic aldehyde type. Eugenol-type trees are found in Kashmir, Tehri Garhwal and other tropical and subtropical Himalayan areas, as well as Khasi and Jantia hills and West Bengal.^{2(b)} Eugenol-type trees occur more widely than the cinnamic aldehyde type.

AYURVEDIC SYNONYMS

Patra, Varāṅga, Coca (read as Chochaa).

Sakala, Tvakocha, Tanuka, Vara, Lātaparṇya, Ghana, Bhringa, Guda-tvak, Svarṇa bhumika.⁴ Lavanga-patra.

HABITAT

Tropical, sub-tropical Himalayas between 900–2300 m.

Cassia bark is collected from trees growing at the foot of Sikkim, Himalaya.^{2(b)} Cultivated in Tripura.^{20(f)}

REGIONAL LANGUAGE NAMES

Eng: Indian Cinnamon;
Assam: Tejpat, Mahpat;

Beng: Tejpatra, Tejpatā;
Guj: Tamala patra, Develee;
Hindi: Tejpatra;
Kan: Tamalapatra, Dalchini ele;
Kash: Dalchini pan, Tajpatra;
Mal: Karuvapatta patram;
Mar: Tamalpatra;
Ori: Tejepatra;
Punj: Tajpater;
Tam: Lavangapatri;
Tel: Akupatri;
Urdu: Tezpat.

Eng: Indian cassia lignea.^{2(b)} Urdu: Saleekhaa.⁷

CONSTITUENTS

Essential oils (d-alpha-phellandrene and eugenol).

Leaves yield an essential oil (0.2%–0.6%)^{2(b),20(f)} The oil resembles *C. zeylanicum* leaf oil, which contains d-alpha-phellandrene and 78% eugenol.^{2(a)} A sample of oil from Assam (yield 2.0%) has been found to contain as high as 80%–85% eugenol (13.3% and 1.0% from Kumaun hills and Joginder Nagar, respectively). Clove contains 60%–90% eugenol.^{2(a)}

(For an analysis of essential oil constituents, see Reference 20[f].)

THERAPEUTIC AND OTHER ATTRIBUTES

Aruci, Hṛllāsa, Arśa, Pinasa

Used for aversion towards food/tastelessness, nausea, piles, and sinusitis (therapeutic uses based on Bhavaprakasha, sixteenth century).

In ethnomedicine, leaves are used as a carminative and stimulant, in fever, colic, diarrhea, headache and nausea and for promoting

appetite. Used with long pepper and honey in cough and cold.

Leaves gave encouraging results in diabetes, experimentally as well as clinically.^{20(f)}

C

IMPORTANT FORMULATION/ APPLICATIONS

Chitrakādi Taila (Sushrutā Samhitā, 1000 BC); Kāsisādi Taila (Bhaishajya Ratnāvali, seventeenth century); and Vajraka Taila (Ashtangahridaya, seventh century), quoted in API, do not contain Tvakapatra (AFI).

AFI compounds, not quoted in the API: Elādi Gutikā (Charaka Samhitā, 1000 BC); Elādi

Churna (Gadanigraha, twelfth century); Bhaskara Lavana Churna (Shārngadhara Samhitā, thirteenth century); and Avipattikara Churna (Bhaishajya Ratnāvali, seventeenth century). Tvakapatra is included in all of the compounds. All are available over the counter. Leaves were used in prescriptions for their stimulating and carminative properties.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-3 g of the drug in powder form.

LD₅₀ of the ethanolic extract was reported to be 100 mg/kg i.p. in mice.^{20(f)}

Cinnamomum zeylanicum Blume.

Tvak

BOTANICAL SOURCE(S)

Cinnamomum zeylanicum Blume.
(Fam. Lauraceae)

C. zeylanicum Nees.

Syn. *C. verum* Presl.^{20(f)}

C. verum Presl. is the correct botanical name according to the International Rules of Botanical Nomenclature (WHO).^{10(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Tvak (Inner bark).

API, Part I, Vol. I.

International Pharmacopoeial name: Cortex cinnamomi.^{10(a)}

Cinnamomi ceylanici cortex.⁹

AYURVEDIC SYNONYMS

Dārusitā.

Varāṅga, Sakala, Tvakocha, Tanuka, Vara, Latāparnya, Ghana, Bhringa Guḍa, Svarṇa bhūmika.⁴

HABITAT

Cultivated on the Western Ghats and adjoining hills.

Cinnamomum: Native to Sri Lanka and Southwest India.¹

Cultivated in parts of Africa, Indonesia, the Seychelles, South America, and the West Indies.^{10(a)}

REGIONAL LANGUAGE NAMES

Eng: Cinnamon bark;
Assam: Dalcheni, Dalchini;
Beng: Daruchini, Darchini;
Guj: Dalchini,
Hindi: Dalchini;
Kan: Dalchini chakke;
Kash: Dalchini, Dalchin;
Mal: Karuvapatta, Ilavarngathely;
Mar: Dalchini;
Ori: Dalechini, Guda twak;
Punj: Dalchini, Darchini;
Tam: Lavangapattai; Karuvapattai;
Tel: Lavangapatta, Dalchini chekka,
Urdu: Darchini.

Eng: Ceylon cinnamom.

CONSTITUENTS

Essential oil, tannin and mucilage.

Major constituents of volatile oils of *C. verum* and *C. cassia* are cinnamaldehyde 65%–80%

and 90%, respectively. *C. verum* also contains O-methoxycinnamaldehyde.

C. verum volatile oil contains 10% eugenol, whereas *C. cassia* only has a trace quantity. Coumarin is present in *C. cassia*, but not in *C. varum*^{10(a)} (*C. cassia* is also the source of the drug) cinnamom.^{10(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Mukhaśosa, Trṣā, Kanthamukharoga, Pinasa, Kṛmiroga, Vastiroga, Arśa, Hṛdroga

Used for dryness of mouth, excessive thirst, diseases of the throat and mouth, sinusitis, worm infestations, diseases of the bladder, piles, and cardiac diseases (therapeutic uses based on Dhanvantari Nighantu, twelfth–thirteenth centuries and Bhāvaprakāsha, sixteenth century).

In ethnomedicine, the bark is used as an aromatic, stimulant, expectorant and carminative, in nausea and vomiting, in cramps of the stomach, in gastric irritation and also in diarrhea and dysentery; it is used externally in neuralgia and rheumatism.^{20(f)}

IMPORTANT FORMULATION/ APPLICATIONS

Sitopalādi Churna (Shārangadhara Samhitā, thirteenth century), contains tvaka as one of the five constituents. A popular remedy for cough and cold.

Chatur-jātaka Churna (Shārangadhara Samhitā) contains both tvaka and tvaka-patra with cardamom and *Mesua ferrea*. The combination is known as Chatur-jātaka or the “Four Aromatics”. Used for nausea and bad breath.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

1.5–4 g of dried bark is used as an infusion.^{11(a)} Contraindicated in fevers of unknown origin, lactation and stomach and duodenal ulcers.^{9,10(a)}

Cinnamon bark oil had a spermicidal effect on human spermatozoa *in vitro* with a minimum effective concentration of 1:400 v/v.^{11(a)}

Research potential: clinical response in *Helicobacter pylori*-positive patients.

Cissampelos pareira Linn.

Pāṭhā

BOTANICAL SOURCE(S)

Cissampelos pareira Linn.
(Fam. Menispermaceae)

Bigger var. (Rājapāṭhā) is equated with *Stephania hernandifolia* Walp.⁷ and *Cyclea peltata* (Lamk.) Hook. f. & Thoms.⁵

True Pareira Brava is derived either from *Chondrodendron tomentosum* Ruiz & Pav. (a native of Peru and Brazil) or *C. platyphyllum* Miers.^{2(b)}

In South India, the roots of *Cyclea peltata* Diel are considered to be the true source of Pāṭha.^{5,36}

PHARMACOPOEIAL AYURVEDIC DRUG

Pāṭhā (Root).

API, Part I, Vol. I.

The root is sometimes found adulterated with the roots of *Stephania glabra* Hook. f.³⁶

International Pharmacopoeial name:
Cissampelotis radix.

AYURVEDIC SYNONYMS

Ambaṣṭhaki.

Ambaṣṭhā,³ Vrhattiktā, Prāchināmbaṣṭhaki, Varatiktā, Pāpacheli, Shreyasi, Viddha Karnikā.⁴ Pāṭhī is equated with Chitraka (*Plumbago indica* Linn.).⁴

HABITAT

Warm and dry regions of tropical and sub-tropical parts of India up to an altitude of about 1500 m.

Cissampelos: 20 species in the tropics.¹

C

REGIONAL LANGUAGE NAMES

Eng: Velvet leaf;
 Assam: Tuprilata;
 Beng: Akanadi, Patha;
 Guj: Venivel, Karedhium, Kalipath, Karondhium, Karondhium;
 Hindi: Patha, Padh, Akanadi;
 Kan: Pahadavela, Agalushunthi;
 Kash: Pad;
 Mal: Patha;
 Mar: Pashadvel, Paharrel, Pahadavel, Padali;
 Ori: Kanabindhi, Patha;
 Punj: Patha;
 Tam: Vatta tiruppi;
 Tel: Adivibankatiga, Chiru boddi, Boddi tiga.
 Eng: Velvet leaf pareira, False pareira brava.^{2(b)}

CONSTITUENTS

Alkaloids, saponin and quarternary ammonium bases, flavonol and sterol.

Roots are rich in alkaloids, hayatine, hayatinine, hayatidine, and other bisbenzylisoquinoline alkaloids; novel tropoloisoquinoline alkaloids pareirubrine A and B are present.

(For pharmacological and biological studies, see Reference 20[f].)

THERAPEUTIC AND OTHER ATTRIBUTES

Sularoga, Atisāra, Kuṣṭha, Kaṇḍu, Jvara, Chardi, Sanyadusti

Used for colic, diarrhea, obstinate skin diseases including leprosy, pruritus, fever, emesis and lactal disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

Hayatine derivatives were reported to be potent neuromuscular-blocking agents that produced varying degrees of reductions in blood pressure and showed direct inotropic effects on isolated cardiac muscle. Pareirubrines A and B showed anti-leukemic activity.

Roots are used to prevent threatened abortion, for treating cramps, for painful menstruations and from pre/post-natal pain.

IMPORTANT FORMULATION/ APPLICATIONS

Pushyānuga Churna (Bhaishajya Ratnāvali, seventeenth century), contains 25 herbs in equal proportion, Pāṭhā root is one of them. For leucorrhea and menorrhagia.

Pradarāntaka churna (Bhaishajya Ratnāvali) contains 17 herbs, including Pāṭhā, 7 calcined minerals and 5 salts. Prescribed for leucorrhea. Sāraswata Ghrita (Ashtāngahridaya, seventh century), Sāraswata churna and Sāraswatārishta (Bhaishajya Ratnāvali) are prescribed for improving mental faculties.

Brahmadādhara Churna (Shārangadhara Samhitā, seventh century) is prescribed in diarrhea and dysentery.

Sanyashodhana kashaya Churna (Charaka Samhitā, 1000 BC) was specific for galactocrasia.

All five compounds contain Pāṭhā.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3-6 g of the drug in powder form.

Research potential: muscle relaxant activity of hayatine.

Cissus quadrangularis L. Asthiśṛṅkhalā/Asthisamhṛta

BOTANICAL SOURCE(S)

Cissus quadrangularis L.
 (Fam. Vitaceae)

Syn: *Vitis quadrangularis* (L.) Wall, ex Wight.
Cissus edules Dalz.

PHARMACOPOEIAL AYURVEDIC DRUG

Asthiśṛṅkhalā (Aerial part).
 API, Part I, Vol. VI.

Asthisamhṛta (stem).
 API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Asthisamhr̥ta, Vajravallī, Chaturdhārā.

Asthisamhāraka, Kroshtu ghanṭikā, Vajri,
Granthimāna,⁴ Asthisamhāra, Asthisamhr̥t.³

HABITAT

Throughout the hotter parts of India, alongside hedges.

Also cultivated in gardens.

A fleshy, cactus-like, jointed climber; stem is quadrangular with acutely four-angled or four-winged internodes.

REGIONAL LANGUAGE NAMES

Eng: Bone setter;
Ben: Haadjodaa;
Guj: Haadsaankal;
Hindi: Hadjoda;
Kan: Mangarballee, Sunduballi;
Mal: Piranta;
Mar: Kaandvel;
Ori: Haadabhanga gachha;
Pun: Hadajoda;
Tam: Pirandai;
Tel: Nalleru, Nallerutige;
Urdu: Harjora.

Eng: Edible-stemmed vine, Andaman creeper.

CONSTITUENTS

Aerial Part: Triterpenoids: 7-oxo-onocer-8-ene-3 β , 21 α -diol; friedelan-3-one; taraxerol; isopentacosanoic acid; β -sitosterol.

Stem: calcium oxalate, carotene, and ascorbic acid.

Aerial part: triterpenoid 7-oxoonocer-8-ene-3- β , 21 α -diol; 3, 3', 4, 4'-tetrahydroxybiphenyl with onocer-7-ene-3 α -21 β -diol, α -amyryn and α -amyrone.

Stems: onocer-7-ene-3- α , 21 β -diol and onocer-7-ene-3- β and 21 α -diol, with α -amyryn and α -amyrone.

Stem and leaves: average carotene content 267 γ /100 g, vitamin C 479 mg/100 g, mineral salts, sugars, resin, pectins, calcium oxalate (in the stem) and tannins (in leaves).^{20(f)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aerial part: Arśa (piles), Asthibhagna (bone fracture), Kṛmi (worm infestation), Netraroga (diseases of the eye), Śvāsa (Asthma), Urustambha (stiffness in thigh muscles), Vṛṇa (ulcer).

Stem: Kṛmi, Arśa, Asthibhanga and Sandhichyuta (worms, piles, fractures, and dislocation of the joints).

Therapeutic uses based on fifteenth to sixteenth century texts.

In a clinical trial, paste of the herb on local application to the fractured area reduced healing times by 33%–55%. Using pills made from the juice of the stem (100 mg extract + 400 mg lactose), three out of six patients of osteomyelitis improved with the drug alone and three showed remarkable improvement when combined with antibiotics.^{20(f)}

Experimental studies of its fracture-healing, anti-inflammatory, analgesic, anti-ulcerogenic activities are encouraging.^{20(f)}

IMPORTANT FORMULATION/ APPLICATIONS

Original texts of Asthisanghātikā Yoga, Ashthisanghāra Vatika and Asthisanghara Tailam could not be traced.

Lākshādi Guggulu (Bhaishajya Ratnāvali, seventeenth century), a Guggulu-based drug, contains lac resin, Asthisamhr̥ta stem and three supporting herbs. Used internally in dislocations of the joints and bone fractures.

Stems are bitter and given internally as *vataka* (cooked with meat) (Gadanigraha, twelfth century) in fractures and rheumatic afflictions; and cooked with green gram and black gram (Bhāvaprakāsha, sixteenth century) in dislocations of the joints. A bolus prepared with a paste of the Asthisanhāra plant parts and its juice with an equal quantity of oil was given to women as a fertility-promoting drug (Vaidya Manorama, thirteenth century).^{16(a)}

Juice of stems: used in irregular menstruation (CCRAS).

C

DOSAGE/USAGE/CAUTIONS/
COMMENTS

Svarasa (juice): 10 to 20 ml. Āndra kalka (paste): 10 to 20 g.

The plant, when used as an indigenous herb in certain South Indian dishes, showed moderate genotoxic effects in Swiss mice. It induced chromosomal aberrations, sperm head abnormalities, and micronuclei production.⁹⁸

Citrullus colocynthis Schrad. Leaf, root Indravāruṇī

BOTANICAL SOURCE(S)

Citrullus colocynthis Schrad.
(Fam. Cucurbitaceae)

Syn. *Colocynthis vulgaris* Schrad.
Cucumis colocynthis Linn.^{20(f)}

PHARMAKOPOEIAL AYURVEDIC DRUG

Indravāruṇī (Dried leaf, Dried root).

API, Part I, Vol. II.
(Pita Indravārūni.)

AYURVEDIC SYNONYMS

Endrī, Indravallī, Śatakratulatā, Indravārṇkā, Gavākṣi.

Indravalli (syn. Hriversa) is equated with *Coleus vettiveroides* Schrad. (AFI). Śatakratulatā (syn. Kakatikā) is equated with *Cardiospermum halicacabum* Linn. (AFI).

Chitra, Chitrāphalā, Mrigdāni, Vārūni,^{20(f)}
Indrasāhva, Indrasurā, Indrā, Indrāhva,
Mrigabhojani.³⁰

Vishālā is equated with Rakta Indravārūni.³⁰

HABITAT

Wild in the warm, arid and sandy tracts of North West, Central and Southern parts of India.

Found throughout India at an altitude of up to 1500 m.

REGIONAL LANGUAGE NAMES

Eng: Colocynth, Bitter apple;
Assam: Nantiyah;
Beng: Rahhalasa, Makhal;
Guj: Indrayana, Indrayanoa, Insbak;

Hindi: Indrayana;
Kan: Havumekke kayi, Havamikke;
Mal: Katu vellari, Kadu indrayan, Peykommuti;
Mar: Indrayana, Kodu indrayan;
Ori: Gothkakudi, Mahakal;
Punj: Tumma, lamtumma;
Tam: Peyakkumutti, Peytumatti, Peyththumatti, Peykhumutti, Verittumatti;
Tel: Chedupuchcha;
Urdu: Hanzal, Indrayan.

CONSTITUENTS

Leaf: Colocynthin, traces of an Alkaloid and Flavonoids.

Root: saponins and traces of alkaloids.

Leaf yielded cucurbitacins B and E; flavonoids quercetin in the free form and kaempferol in bound forms (1.21 and 0.44 mg/g dry weight, respectively).^{20(f),25}

Root yielded alpha-elaterin, hentriacontane, and aliphatic compounds 1,11-undecanediol monoacetate and hexadecanoate, along with stearic acid and steroidal compounds (0.51%), including beta-sitosterol and lanosterol. A triterpene, bryonolic acid (not found in the aerial parts), has also been isolated.^{20(f),25}

THERAPEUTIC AND OTHER ATTRIBUTES

Leaf: Keśāpāta, Palita, Kuṣṭharoga

Used for loss of hair, graying of the hair and obstinate skin diseases.

Root: Kāmalā, plihārogā, śvāsa, kāsa, kuṣṭha, gulraa, kṛmiroga, prameha, viṣavikāra, vṛaṇa, apaci, gandamālā.

Used for jaundice, splenic diseases, asthma, cough, obstinate skin diseases, abdominal

lumps, worm infestations, urinary disorders, poisoning, wounds, and chronic lymphadenitis. (Therapeutic uses based on classical texts from 1000 BC to sixteenth century.)

A cataplasm of the leaves is applied in migraine and neuralgia.^{20(f)}

The root is given for blood purification and in ascites, jaundice, urinary diseases, rheumatic diseases, and piles; a paste is applied to venous inflammations and swellings.^{20(f)}

IMPORTANT FORMULATION/ APPLICATIONS

Nilibhrngādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Shatakratulata (in AFI text), Indralatā (in CCRAS text) and Indravalli (in South Indian preparations).

Abhayārishta (Bhaishajya Ratnāvali, seventeenth century), root of Indravārūni, is among 11 supporting herbs.

Brihatmanjishtādi Kwath Churna

(Shārangadhara Samhitā, thirteenth century) contains 45 herbs in equal proportions, including Indravārūni root.

Mishraka Sneha (Ashtāngahridaya, seventh century) contains Gavākshi fruit/root.

Triphalādi Taila (Sahasrayoga) contains Indravalli (a different herb).

Mahāvishagarbha Taila (Bhaishajya Ratnāvali) contains Indravārūni root among 26 supplementary herbs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Leaf: For external use only.

Root: 1–3 g of drug in powder form.

Bryonolic acid (found only in roots) is an active agent against all types of allergies; used in Japan for allergy and hepatitis.^{2(c)}

C

Citrullus colocynthis Schrad. Fruit Indravārūnī

BOTANICAL SOURCE(S)

Citrullus colocynthis Schrad.
(Fam. Cucurbitaceae)

Syn. *Colocynthis vulgaris* Schrad.; *Cucumis colocynthis* Linn.^{20(f)}

PHARMACOPOEIAL AYURVEDIC DRUG

Indravārūnī (Fruit).

API, Part I, Vol. III.
(Pita Indravārūnī.)

In Lodhrāsava/Rodrāsava (Charaka Samhitā, 1000 BC; Ashtāngahridaya, seventh century), both Rakta (red) and Pita (yellow) Indravārūni are included as Vishālā and Indrasāhava.

Rakta Indravārūni is equated with *Tricholepis bracteata* (Lam.) Voigt syn. *T. palmata* Roxb. (known as Lāi Indrayana, Mahākāla), as well as with *Cucurbita trigonus* Roxb. Syn. *C. pseudo-colocynthis* Royle (known as Vishālā).

Fruits of both species are bitter and drastic purgatives.^{33(a)}

AYURVEDIC SYNONYMS

Gavākṣī, Indravallī, Indravalli, Endrī.

Indrasāhva, Indrasurā, Indrā, Indrahvā, Mrigabhojani, Mrigādani.³⁰
Vishālā (Rakta Indravārūni).³⁰

HABITAT

Wild in the warm, arid and sandy tracts of North West, Central and Southern parts of India.

Throughout India, up to 1500 m.

REGIONAL LANGUAGE NAMES

Eng: Colocynth;
Assam: Gavadani;
Beng: Rakhal;
Guj: Indrayan;
Hindi: Indrayan;
Kan: Havumekke;
Mai: Kattu vellarikkai, Valiya pekkummatti;
Mar: Endrayana;

Ori: Gothakakudi, Indrayanalata, Garukhiya;
 Punj: Indrayana;
 Tam: Peitummatti;
 Tel: Chedupuchcha, Peikummatti;
 Urdu: Hanjal.

Eng: Bitter apple.^{2(b)}

CONSTITUENTS

Resins—Resinous Glycosides (Colocynthin and Colocynthitin), A Phytosterol Glycoside, Citrullol, Pectin and Albuminoids, Cucurbitacins—Cucurbitacin E & I.

Cucurbitacin E average 0.09%–0.20%.

Fruit coat and fruit pulp yielded hentriacontane.

Fruit pulp also contained elateridine, hexanorcucurbitacin I and 16-O-acetyl hexanorcucurbitacin I, and free amino acids, valine, alanine, and cystine; steroidal compounds (1.06%) beta-sitosterol and lanosterol; juice contains alpha-elaterine, citrulluin, citrullene and citrulluc acid. Flesh contains a bitter oil, citbittol.^{20(f),25}

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmīroga, Kāmalā, Śwāsa, Kāsa, Kuṣṭha, Gulma, Udararoga

Used for worm infestations, jaundice, cough, asthma, obstinate skin diseases, abdominal lumps, and diseases of the abdomen (therapeutic uses based on thirteenth and sixteenth century texts).

Dried pulp of mature fruits is a hydrogogue, cathartic and purgative, and is usually combined with other purgatives, carminatives and astringents

for treating bilious derangement of chronic constipation, and dropsy and fevers requiring purgatives. Also used as an emmenagogue and vermifuge. Pulp is also used for varicose veins, piles, gangrene, and wounds.^{20(f)}

IMPORTANT FORMULATION/ APPLICATIONS

Jwarghni Gutika (Shārangadhara Samhitā, thirteenth century), a herbomineal compound, contains Indravārūni fruit (more than 60% of combined quantity of other herbs and minerals. For fever (etiology not defined).

Rodhrāsava (Ashtāngahridaya, seventh century) contains fruits of both Rakta and Pita Indravārūni (see Section 2). (Wrongly quoted for root in API, Vol. II.)

Nārāyana Churna (Bhaishjya Ratnāvali, seventeenth century) contains 33 herbs, including the Rakta Indravārūni fruit (see Section 2).

Mishraka Sneha (Ashtāngahridaya, seventh century) contains 22 herbs, including the Gavākshi fruit/root.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

0.125–0.5 g of powder. 0.25–0.5 g of powder.

Contraindicated in infections and inflammatory gastrointestinal conditions. Excessive use may lead to anuria.

Death has resulted from consumption of as little as 1.5 teaspoons of the powder.¹³

Citrus limon (Linn.) Burm. f.

Nimbū

BOTANICAL SOURCE(S)

Citrus limon (Linn.) Burm. f. Syn. *C. Medica* var. *Limonum*
 (Fam. Rutaceae)

C. medica L. var. *limon* Linn.; *C. limonum* Risso;
C. aurantium var. *limonum* Wight & Arn.^{20(f)}

PHARMACOPOEIAL AYURVEDIC DRUG

Nimbū (Fresh fruit).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Jambira, Maha numbu.

Dantasāṭha, Jambhala, Jambha,^{20(f)} Jambiraka.⁴

HABITAT

Cultivated.

Not found growing wild.^{2(b)}

Native to Asia, but widely cultivated throughout the world.

REGIONAL LANGUAGE NAMES

Eng: The lemon of India, Lemon;

Beng: Patinebu, Kagghinebu, Baranebu;

Guj: Limbu;

Hindi: Nimbu, Bara nimbu, Pakari nimbu;

Kan: Nimbe, Lime hannu, Nimbe hannu;

Mal: Cherunarakam, Vadukappulinarakam;

Mar: Nimbu;

Punj: Nimbu;

Tam: Elumichai, Elumichangai, Elumicchai,

Cherunaranka;

Tel: Pedda nimma, Jambira, Nummu, Bijapuram;

Urdu: Limu, Neebu.

CONSTITUENTS

Constituents not quoted in API.

Fresh fruit yields an essential oil 0.9%; D-limolene 92.24% is the major constituent.

Fruit also contains the organic acids, citric acid 74.6 mg/mL, mallic acid 4.01 mg/mL, oxalic acid 20.00 mg/mL, and succinic acid 7.50 mg/mL. Glumatic acid and alanline were also identified.

Mean values of vitamin C in unripe, ripe and about-to-ripen fruit: 36.4, 36.8 and 38 mg/100 g, respectively.^{20(f)}

Lemon contains a number of bioflavonoids including hesperdin⁹⁹ and rutinocide.

Coumarins isolated from lemon peel and lemon juice include bergamottin, limettin, and oxypeucedanin.¹³

THERAPEUTIC AND OTHER ATTRIBUTES

Tr̥ṣṇa, Vatika śūla, Chardi, Vibandha, Kṛmi, Aruci, Agnimandya, Udara roga, Visucikā

Used for excessive thirst, body ache, emesis, constipation, worms, anorexia, loss of appetite, diseases of abdomen and gastroenteritis (therapeutic uses based on texts from 1000 BC to sixteenth century).

Fruits taken internally are digestive, anti-toxic and cure halitosis, cough, hiccup, constipation, colic, and nausea²⁸ and parasitic infection.^{4,28}

Citrus bioflavonoids are used in vascular disorders, and also as an anti-histaminic. They inhibit bacterial mutagenesis.³¹

IMPORTANT FORMULATION/ APPLICATIONS

In Ayurvedic medicine, a number of herbo-mineral preparations are grinded or impregnated with Nimbu juice, at final stage, before preparing pills. Some minerals are soaked in Nimbu juice before calcination.

The juice is used as a stabilizing, fortifying and positive medium for the desired efficacy and bioavailability of the prepared drug (the juice is also bactericidal).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

6–12 g of the drug in juice form.

The sperm-immobilizing properties of lemon juice have been investigated as a topical vaginal contraceptive.¹⁷

Citrus medica Linn.

Bijapūra

C

BOTANICAL SOURCE(S)

Citrus medica Linn.
(Fam. Rutaceae)

C. medica Linn. var. *medica* syn. *C. aurantium*
Linn. var. *medica* Wight & Arn.

PHARMACOPOEIAL AYURVEDIC DRUG

Bijapūra (Fresh fruit).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Mātulūṅga.

Bijapūraka, Keshāmla,²⁷ Phalapūra, Ruchaka.^{20(f)}

HABITAT

Cultivated.

Citron is considered to have originated in
Northeastern India and adjacent areas, where it
is still found wild.^{2(b)}

REGIONAL LANGUAGE NAMES

Eng: Wild lemon, Citron;
Assam: Jaradedā;
Beng: Bijapura, Mutulunga;
Guj: Bijora;
Hindi: Bijoura;
Kan: Madavala, Madalahannu, Madala;
Mal: Matala narakam, Gonapatinarakam, Bongi,
Mathulanarakam, Mathulunga;
Mar: Mahalunga, Bijora;
Ori: Jambhira;
Punj: Galgal;
Tam: Turunji pazham, Kadarangai;
Tel: Madi phalam;
Urdu: Turanj.

Eng: Adam's apple.²⁷

CONSTITUENTS

Volatile oil.

Peel volatile oil constituents include: 1-methyl-3-isopropylcyclopentane, alpha-thujene, alpha-beta-pinene, octanal, *P*-cymene, 1, 8-cineole, gamma-terpinene, 1-octanol, *cis-trans*-limonene oxide, geraniol, *trans*-alpha-bergamotene and beta-bisabolene.

Vitamin C content of fruit (Assam): 12 mg/100 g
Organic acids: citric 18.12%, mallic 1.37%, and oxalic acid 2.18%.

Hesperidin is reported from the peel and rags of fruits. Limonol, limonin, and nomilinic acid have been isolated from the seed.^{20(f)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Śwāsa, Kāsa, Aruci, Trṣṇā, Udara roga, Vibandha, Madātyaya, Hikkā, Agnimāndya

Used for bleeding disorders, asthma, cough, anorexia, thirst, diseases of the abdomen, constipation, alcoholism, hiccough, and loss of appetite (therapeutic uses based on texts from 1000 BC to sixteenth century).

Pieces of fruit with honey, rock salt and black pepper or juice mixed with honey, long pepper, black pepper and ginger were prescribed in anorexia, thirst, tastelessness due to fever, vomiting, colic, and gastric pain and hardness of the bowels (Charaka, Sushruta, 1000 BC; Harita Samhita, Kashyap Samhitā, prior to seventh century; Vrindamādhava, eighth century; Bangasena, eighteenth century).^{16(a)}

Juice was given in alcoholism;²⁷ rind was used as a vermifuge.²⁸

IMPORTANT FORMULATION/ APPLICATIONS

In Ayurvedic medicine, a number of herbomineral drugs, calcined substances, salts and alkaline ashes, carminative and antiinflammatory compounds are grinded or impregnated with Matulunga fruit juice. The juice and fruit is used as a stabilizing, fortifying and a positive medium for desired efficacy and bioavailability of the prepared drug.

Juice of the fruit was used for washing erysipelas and applied on head for diseases of the scalp (Harita Samhita, prior to seventh century).^{16(a)}

Essential oils are anti-bacterial and anti-fungal.^{20(f)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

10–20 ml of juice.

Decoction: 50–100 mL.

C

Cleome gynandra Linn.

Ajagandhā

BOTANICAL SOURCE(S)

Cleome gynandra Linn. Syn. *Gynandropsis gynandra* (Linn.) Briquet (Fam. Capparidaceae)

G. pentaphylla (L.) DC.^{20(g)}

Yellow-flowered var. is equated with *Cleome viscosa* Linn. P.V. Sharma equated Ajagandhā with *Thymus serpyllum* Linn. (Wild thyme); Tilparni and Hulhul equated it with *Gynandropsis pentaphylla* DC. (white-flowered var.).^{16(b)}

Beng: Hurhuria, Shulte;
Guj: Talvani, Dhelitalavan;
Hindi: Hulhul, Hurhur, Kavalia;
Kan: Naram bele Soppu, Nayeetulasi;
Kash: Gandi Buti;
Mal: Atunari vela;
Mar: Tilvan, Bhatvan, Mabli, Tilavana, Tilvant;
Ori: Anasorisia, Anasorisa;
Punj: Bugra;
Tam: Nal valai, Nal velai;
Tel: Vaminta, Vayinta.

Eng: Cat whiskers.¹

PHARMACOPOEIAL AYURVEDIC DRUG

Ajagandhā (Seed).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Paśugandhā.

Pūti, Kīti, Varvarī, Karavī, Kharpushpā, Tungī, Pūtimayūraka,⁴ Bastagandhā.³⁰

The following equations have been suggested:

Cleome gynandra: Tilaparni. *Cleome viscosa*: Ajagandhā, Pashugandhā, Uragandhā, Pūtigandhā, Barbaraka. *G. pentaphylla*: Sūryāvartta.⁷

HABITAT

Throughout warmer parts of India.

Cleome: more than 1250 species are found in the tropics.¹ Naturalized in America.¹

REGIONAL LANGUAGE NAMES

Eng: Dog Mustard;
Assam: Bhutmulla;

CONSTITUENTS

Fixed oil, essential oil and olcoresin.

Fixed oil (Rajasthan sample) contained myristic 0.3%, palmitic 18.3%, stearic 8.1%, arachidic 2.0%, oleic 15.4%, linoleic 53.9%, and linolenic acids 2.0%.

Seeds contain cleomin hexacosanol, beta-D-glucoside of beta-sitosterol, free beta-sitosterol, kaempferol, 5, 7-dihydroxychromone, 5-hydroxy-3, 7, 4'-trimethoxyflavone, and luteolin.

Essential oil: similar to garlic or mustard oil.

Tannins: 1%.^{2(c),20(g),33(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Aṣṭhīlā, Kṛmiroga, Kaṇḍū, Karṇaroga

Used for abdominal lumps, prostate enlargement, worm infestations, pruritus, and ear diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) used seeds of Ajagandhā in prescriptions for headache, rhinitis, and

paraplegia, and also as a purgative and analgesic.²⁷

Sushruta (1000 BC) included Ajagandhā in pastes and plasters for lymphatic swellings, erysipelas and goiters, in a decoction as a cleansing and anti-septic agent, and internally for tympanites, ascites, retention of stool and strangury and splenic diseases.²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Nāyārana Churna (Ashtāngahridaya, seventh century), contains 26 herbs, 4 salts, sodium sulphate, chloride, carbonate and potassium

carbonate. *Cleome* seed proportion is 1:40.

(According to AFI, if seeds are not available whole plant can be used.) Prescribed for diseases of the abdomen and malabsorption syndrome.

In ethnomedicine: *Cleome* seeds are used as a rubefacient, anthelmintic, and vesicant, and in rheumatism, oostalgia, muscular pain, headache, and dermatological conditions. Seeds and leaves are used in fever.^{20(g)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Clerodendrum phlomidis Linn.

Agnimantha

BOTANICAL SOURCE(S)

Clerodendrum phlomidis Linn.
(Fam. Verbenaceae)

Syn. *C. multiflorum* (Burn, f.) O. Ktze.³⁶
Agnimantha of Eastern and Central parts of India contains the root and root bark of *Premna obtusifolia* R. Br., and the drug source of Northern and Western regions is *P. latifolia* Roxb.³⁶ Roots of *P. serratifolia* L. constitute the drug used in South India, especially in Kerala.^{36,5}

PHARMACOPOEIAL AYURVEDIC DRUG

Agnimantha (Dried root).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Gañikārikā, Jayā, Jayantī.

Premna species have been suggested as Kshurāgnimantha (thorny species) and *Clerodendrum* species (non-thorny species) as Akshuragnimantha.

Arini and Agnimantha may be treated as common names for both species.³⁰ In the AFI, Arini is equated with *Clerodendrum phlomidis*. According to the AFI, *Premna integrifolia* is the official drug Agnimantha, while *Clerodendrum*

phlomidis and *Premna mucronata* Roxb. are its substitutes.

HABITAT

Dry parts throughout India.

REGIONAL LANGUAGE NAMES

Beng: Ganiyari, Arani, Goniari;
Guj: Arani, Aranimula, Arni;
Hindi: Urni;
Kan: Taggi, Taggi beru;
Mal: Munja;
Mar: Takalimula;
Ori: Ganiary;
Tam: Tazhutazhai;
Tel: Taluki.

CONSTITUENTS

Sterols.

Roots yield clerodin, clerodendrin A, cerolic acid, ceryl alcohol, raffinose, and clerosterol.^{15(d)}
Beta-sitosterol and gamma-sterol were also present.

THERAPEUTIC AND OTHER ATTRIBUTES

Śoṭha, Pāṇḍu, Arśa, Vātavikāra, Vibhandha, Agnimāndya, Ādhmāna, Gulma, Mūtrakṛcchra, Mūtrāghata

Used for edema, anemia, piles, diseases of the nervous system, constipation, loss of appetite, flatulence, abdominal lumps, dysuria and retention of urine (therapeutic uses based on texts from 1000 BC to sixteenth century).

Agnimantha was prescribed for polyuria (Charaka, Sushruta, 1000 BC, Ashtāngahridaya, seventh century, Vrindamādhava, eighth century); for calculi (Charaka); for constipation and misperistalsis (Charaka); for migraine, internal abscesses and erysipelas (Charaka, Sushruta); for obesity (Charaka); for edema and inflammations, externally (Sushruta; Gadanigraha, twelfth century) and for cutaneous diseases, worms, freckles and other skin problems and urticaria (Sushruta; Chakradatta, seventh century, Gadanigraha).^{16(a),27,28}

IMPORTANT FORMULATION/ APPLICATIONS

Dashamūlārishta (Shārangadhara Samhitā, thirteenth century), Dashamūla Kwāth Churna

(Bhaishajya Ratnāvali, seventeenth century), Dhanvantara Ghrita (Ashtāngahridaya, seventh century).

All these composite drugs contain the classical *Dashmūla*, the “Group of Ten Roots”.

Nārāyana Taila (Bhaishajya Ratnāvali) contains *Mahat pañchamūla*.

Indukānta Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains *Dashamūla*, though Chirbilvā stem bark and Devadāru heart wood are the main herbs.

All *Dashmūla* products, due to recent changes in plant parts, do not qualify for claiming classical properties. They should be treated as new drugs and should be revalidated.

Gorochanadi Vati contains a number of animal products and minerals, including Munna (Agnimantha, according to the AFI, page 184). It is an obsolete drug.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

12–24 g of the drug in powder form for decoction.

C

Clerodendrum serratum (Linn.) Moon

Bhāraṅgī

BOTANICAL SOURCE(S)

Clerodendrum serratum (Linn.) Moon
(Fam. Verbenaceae)

C. indicum (L.) O. Kuntze.¹⁵

None of the *Clerodendrum* spp. are the sources of what is available on the market. It has been found that the stem bark of *Elaeodendron glaucum* Pers. and *Gardenia turgida* Roxb. or *Picrasma quassioides* Benn. has been used as Bhārgi for a long time.³⁰ Particularly in Eastern India, the bark of *Picrasma quassioides* is sold as Bhārngi.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Bhāraṅgī (Dried root).

API, Part I, Vol. III.
Bhārngi,³⁰ Bhārgi.³

AYURVEDIC SYNONYMS

Āṅgāravallī, Brāhmaṇayaṣṭikā.

Bhārgaka.³⁰

HABITAT

Throughout India.

It is widely distributed.

C. indicum: common in Southern and Eastern India. *Elaeodendron glaucum*: found throughout India. *Gardenia turgida*: found in Bihar, Maharashtra, Karnataka, and Tamil Nadu. *Picrasma quassioides*: found in Northeastern India (regional name: Bhārungi).

REGIONAL LANGUAGE NAMES

Beng: Bamun hatee, Baman hatee, Bhuijam;
Guj: Bhārangee;

Hindi: Bharangee;
 Kan: Gantubarangee;
 Mal: Cheruteku;
 Mar: Bharangee, Bharang;
 Ori: Chinds;
 Punj: Bhadangee;
 Tam: Cheruteku;
 Tel: Ganttubarangee;
 Urdu: Bharangi, Baharangi.

Eng: Blue-flowered glory tree, Beetle killer.³²
 Eng: *C. indicum*: Turk's turban, Tube flower.³²

CONSTITUENTS

Saponins.

Bark is rich in saponins, which, on hydrolysis, yielded a sapogenin mixture containing three major triterpenoid constituents, oleic acid, queretaroic acid and a new serratogenic acid, which has been identified;¹⁵ also contained beta-sitosterol and D-mannitol. Sugars include D-glucose, L-rhamnose, and D-xylose.¹⁵ *C. indicum*: bark contains D-mannitol and sorbitol.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Jwara, Śwāsa, Kāsa, Yakṣma, Pīnasa, Śōtha, Hikkā, Raktadoṣa

Used for abdominal lumps/chronic obstructive jaundice/chlorosis, fever, dyspnea, cough, phthisis, sinusitis, edema, hiccup, and vitiated blood (therapeutic use based on texts from the twelfth–sixteenth centuries).

Bhārngi root was prescribed for catarrh, cough, and bronchial asthma (Charaka, Sushruta, 1000 BC; Vr̥ndamādhava, eighth century; Bangasena, eighteenth century).^{16(a),27,28}

In experimental studies, the root exhibited dose-dependent analgesic and anti-inflammatory activities; the aqueous extract of the root bark exhibited graded inhibition of histamine responses (alcoholic and chloroform extracts were ineffective); saponins (from the plant) showed potentiation at high concentrations (1 mg) and inhibition at low concentrations (50 µg) of histamine release; saponins (0.3 mg/kg) exhibited anti-cholinesterase activity *in vitro*; root extracts exhibited *in vitro* ACE inhibition.^{20(g)}

IMPORTANT FORMULATION/ APPLICATIONS

In quoted compounds, Bhārngi is not the main drug.

In Sahasrayoga, there are five Rāsanādi Kashāyas, and only in one is Bhārngi a supporting drug.

Main compounds (not quoted by the API): Bhārngyādi Kwātha Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains 11 herbs in equal proportions, including Bhārngi root. Prescribed for cough, bronchitis and fever and as anti-periodic and anthelmintic.^{6,16(c)}

Bhārngi Guda (Bhaishajya Ratnāvali, seventeenth century) contains Bhārngi root, the “Ten Roots” (*Dashmūla*) and four supporting herbs. Prescribed for cough, dyspnea and loss of appetite.^{6,16(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of powder. 10–20 g of kwathaurna.

Clitoria ternatea Linn.

Aparājītā

BOTANICAL SOURCE(S)

Clitoria ternatea Linn.
 (Fam. Fabaceae)

The market samples of Shankhapushpi from South India consisted largely of *C. ternatea*,

whereas those from other regions contained dried herbs of *Canscora decussata* Roem. & Schult., *Convolvulus microphyllus* Sieb. ex Spreng. (syn. *C. pluricaulis* Choisy), *Evolvulus alsinoides* L. and *Lavendula bipinnata* Kuntze (syn. *L. burmanii* Benth.).^{2(c)}

PHARMACOPOEIAL AYURVEDIC DRUG

Aparājita (Leaf and Root).

API, Part I, Vol. IV.

API, Part I, Vol. II.

Kerala physicians do not discriminate between Aparājita and Shankhapushpi, and use *Clitoria ternatea* in place of both. (Vishṇukrāntā, a blue-flowered variety of Shankhapushpi, is treated as a synonym of Aparājita in Bhavaprakasha, sixteenth century.)⁵

AYURVEDIC SYNONYMS

Girikarnikā, Viṣṇukrāntā.

In the quoted text of Bhāvaprakāśh in API, Vol. IV, Appendix VI, Āsphotā is a synonym of Girikarni, Vishnukrantā and Āparajita, while Asphota is now equated with *Vallis solanacea* O. Kutz.

Two varieties of Girikarni (white- and blue-flowered) have been mentioned. The white-flowered one is found to be therapeutically more active.^{2(c)}

HABITAT

All over the tropical parts of India, also cultivated in gardens.

REGIONAL LANGUAGE NAMES

Eng: Winged-leaved clitoria;

Beng: Aparajita;

Guj: Garnee;

Hindi: Aparajita, Koyal;

Kan: Girikarnike;

Mal: Shankhapushpam;

Mar: Gokarnee;

Ori: Aparajita;

Punj: Aparajita;

Tam: Kakkanam;

Tel: Dintena, Sankupushpam.

Eng: Butterfly-pea, Conchflower, Mussel-shell creeper.^{2(c)}

CONSTITUENTS

Dried leaf: Glycosides—Flavonal glycosides and Resin glycosides.

Root: tannins, starch, resin, tarxerol and taraxerone.

Leaf yielded a delta-lactone and aparajitin (delta-lactone of 2-methyl-4-hydroxy-*n*-pentacosanoic acid); beta-sitosterol, chlorophyll and waxy matter. Three compounds, kaempferol-3-monoglucoside, kaempferol-3-*O*-rhamnosyl-(1 → 6)-glucoside and kaempferol-3-*O*-rhamnosyl-(1 → 6)-galactoside, were also present.^{20(g)}

Root was reported to yield teraxerol and teraxerone.^{2(c),20(g)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dried leaf: Kuṣṭha, Mūtradoṣa, Śoṭha, Vraṇa, Viṣa, Unmada, Ardhava bhedaka, Śūla, Graha badha, Āmadoṣa, Raktatisāra, Bhrama, Śwāsa, Kāsa, Jwara, Dāha, Vamana

Used for leprosy/skin diseases, diseases of the urinary system, edema, ulcers, poisoning, insanity, migraine, colic, idiopathic psychotic syndromes, intestinal diseases, blood dysentery, vertigo, dyspnea, cough, fever, burning sensation, and emesis.

Root: Mūtra roga, Kuṣṭha, Shotha, Vrana and Shula.

Used for diseases of the urinary system, leprosy/skin diseases, edema, ulcers and colic (therapeutic uses based on fourteenth–sixteenth century texts). (Memory-enhancing properties of the leaf were also mentioned in the quoted text.)

Leaves are used for improving mental faculties.

Juice of the leaves mitigates toxins and is used in jaundice, swellings, abscesses, and boils. The root is cathartic, diuretic, anthelmintic, and emetic.

IMPORTANT FORMULATION/ APPLICATIONS

Vātaraktānataka Rasa (Bhaishajya Ratnāvali, seventeenth century), a mercury based herbomineral drug, contains Sveta Aparājita, as one of the supporting herbs.

Mishraka Sneha (Ashtāṅgahridaya, seventh century) contains 21 herbs, including Sankhini root. Shankhini is related to

Shankhapushpi, but in the AFI, it is equated with *Euphorbia dracunculoides* Lamp. (AFI, Part I, page 324).

Both compounds do not represent the therapeutic importance of Aparājītā.

DOSAGE/USAGE/CAUTIONS/COMMENTS

Root powder 1–3 g. Seed powder 1–3 g. Leaf powder 2–5 g.

C

Coccinia grandis (L.) Voigt

Bimbī

BOTANICAL SOURCE(S)

Coccinia grandis (L.) Voigt

Syn. *C. cordifolia* Cogn

C. indica W&A.

Cephalandra indica Naud.

(Fam. Cucurbitaceae)

Coccinia var. *grandis* is a cultivated variety with sweet fruits, used as a vegetable.

Coccinia var. *wightiana* M. J. Roem. is the wild form with bitter fruits, leaves, and rootstocks; used in medicine, mainly against diabetes.^{5,100}

Bitter species are used in medicine.^{16(c),51,63}

PHARMACOPOEIAL AYURVEDIC DRUG

Bimbī (Stem).

Bimbī (Leaf).

API, Part I, Vol. VI.

In classical Ayurvedic medicine, Tiktatundi, the bitter, inedible fruit species, was used, while the cultivated variety was included in *Shāka varga* (the edible group) for its nutritional properties.

All experimental and clinical trials recorded in the literature are, at times, misleading as specific varieties (wild or cultivated) have not been mentioned.

AYURVEDIC SYNONYMS

Raktaphalā, Tuṇḍī, Bimbikā, Oṣṭhopamaphalā.

Edible variety: Bimbi, Raktaphalā, Tundi, Tundikeri, Bimbikā, Ghrha bimbikā.

Inedible, bitter, wild species: Tikta-tundi, Katutundikā, Katukā. (Kaiyadeva Nighantu,

Rāja Nighantu, Nighantu Ratnākara.) (See API, Vol. III, page 322; API, Vol. VI, pages 353, 354.)

Bimbi of Ayurvedic texts was included in the Varunādi group (Sushruta). The Varunādi group was the group of drugs for Saṃshodhana (emesis).

Bimba is included in the group of bitter herbs with Bitter gourd.

HABITAT

All over India, often cultivated.

Wild species grows abundantly in Bengal.⁵¹

Also found wild in hedges and waste places in Assam, Bihar, Odisha, Maharashtra, Andhra Pradesh, and Tamil Nadu.¹⁵

Cultivated in Assam, Bihar, Odisha, West Bengal, Maharashtra, Andhra Pradesh, and Tamil Nadu.³²

REGIONAL LANGUAGE NAMES

Eng: Ivy gourd;

Assam: Kanabhaturi;

Ben: Tela kuccha, Bimbu;

Guj: Gholam, Ghilodi, Tindoran, Kadavi ghilodi;

Hindi: Kunduru, Kunru;

Kan: Tonde balli;

Mal: Koval, Kova, Nallakova;

Mar: Tondlee;

Ori: Kainchi kakudi, Bano kundri;

Pun: Kunduru, Kunduri;

Tam: Kovai;

Tel: Donda tige;

Urdu: Kunduru.

CONSTITUENTS

Leaf, stem: Alkaloids such as cephalandrine A, cephalandrine B, β -sitosterol and triacontane.

Plant showed the presence of aspartic acid, glutamic acid, asparagine, tyrosine, histidine, phenylalanine, threonine, serine, hypoxypoline, arginine, and valine amino acids, and nicotinic acid and ascorbic acid.²⁵

Aerial parts showed the presence of cephalandrol, triacontane, beta-sitosterol and two unknown alkaloids, named as cephalandrine-A and cephalandrine-B, and heptacosane.²⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Leaf: Kāmalā (Jaundice), Madhumeha (Diabetes mellitus), Pūyameha (urinary infection)

Stem: Aruchi (tastelessness), Prameha (metabolic disorders), Pravāhika (dysentery) and Raktapitta (bleeding disorders).

Used as a single drug.

(Classical references quoted from Kaiyadeva Nighantu and Rājanighantu are of wild, inedible, bitter species.)

Fresh juice of the leaves, stem and roots alone or in combination with calcined minerals is

prescribed in traditional medicine for diabetes, enlarged glands and skin diseases.

Leaves and stem: used in bronchial catarrh.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

Bimbi Ghrita (Sahastrayoga, a non-Samhitā, Kerala Masteria Medica; not in AFI), is a single drug preparation, contains Pita Bimbi (Piluparni, Tiktatundi of Charka, the wild species of Bimbi). Prescribed as an anthelmintic.

Various extracts of leaves (at 200 mg/kg p.o.) reduced significantly elevated levels SGPT, SGOT, and serum bilirubin in rats.^{20(g)}

Aqueous extract of the leaves (300 mg/kg, once daily for 8 weeks) in rats showed hypolipidemic activity.^{20(g)} 95% ethanolic extract of the leaves (200 mg/kg p.o., 45 d) showed hypoglycemic effects in both normal and diabetic rats.^{20(g)}

Alcoholic extract of the leaves and roots showed anti-bacterial activity against *Staphylococcus aureus*.^{20(g)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Svarasa (juice): 10 to 20 mL. curna (powder): 3 to 6 g.

Stem (powder): 3–6 g.

Coccinia indica W.&A.

Bimbī

BOTANICAL SOURCE(S)

Coccinia indica W.&A. = *C. cordifolia* Cogn.
Syn. *Cephalandra indica* Naud.
(Fam. Cucurbitaceae)

Syn. *C. grandis* (Linn.) Voigt.^{2(c)}

Coccinia var. *grandis* is a cultivated variety with sweet fruits, used as a vegetable.

Coccinia var. *wightiana* M. J. Roem. is the wild form with bitter fruits, leaves and rootstocks; used in medicine, mainly against diabetes.^{5,100}

Bitter species are used in medicine.^{16(c),51,63}

PHARMACOPOEIAL AYURVEDIC DRUG

Bimbī (Whole plant).

API, Part I, Vol. III.

In classical Ayurvedic medicine, Tiktatundi, the bitter, inedible fruit species, was used, while the cultivated variety was included in *Shāka varga* (the edible group) for its nutritional properties.

All experimental and clinical trials recorded in the literature are, at times, misleading as specific varieties (wild or cultivated) have not been mentioned.

AYURVEDIC SYNONYMS

Tuṇḍikā, Tuṇḍikerī.

Edible variety: Bimbi, Raktaphalā, Tundi, Tundikeri, Bimbikā, Ghrha bimbikā.

Inedible, bitter, wild species: Tikta-tundi, Katutundikā, Katukā. (Kaiyadeva Nighantu, Rāja Nighantu, Nighantu Ratnākara.) (See API, Vol. III page 322; API, Vol. VI pages 353, 354.)

Bimbi of Ayurvedic texts was included in the *Varunādi* group (Sushruta). The *Varunādi* group was the group of drugs for *San̥shodhana* (emesis).

Bimba was included in the group of bitter herbs with Bitter gourd.

HABITAT

Wild throughout India.

Wild species grows abundantly in Bengal.⁵¹

Also found wild in hedges and waste places in Assam, Bihar, Odisha, Maharashtra, Andhra Pradesh, and Tamil Nadu.¹⁵

Cultivated in Assam, Bihar, Odisha, West Bengal, Maharashtra, Andhra Pradesh, and Tamil Nadu.³²

REGIONAL LANGUAGE NAMES

Eng: Ivy-gourd;

Assam: Kawabhaturi;

Beng: Bimbu, Telakucha;

Guj: Kadavighilodi, Ghilodi;

Hindi: Kunderuki-bel;

Kan: Tonde-balli;

Mal: Kova, Nallakova;

Mar: Tondale;

Ori: Pitakundii, Kainchikakudi;

Punj: Kanduri;

Tam: Kovai;

Tel: Donda tiga;

Urdu: Kunduru.

CONSTITUENTS

Saponins and fixed oil in seeds.

Aerial parts afforded alpha- and beta-amyrin, lupeol, and cycloartenol as major components and euphol, tirucallol, taraxerol, butyrospermol, *iso*-multiflorenol,

24-methylene-24-dihydrolanosterol, 24-methylenecycloartanol and multiflorenol in small quantities.

Oil content of seeds: 23.6%; palmitic 16.3%, oleic 22.4%, linoleic 58.6%, lauric 0.1%, myristic 0.5%, stearic 1.2%, linolenic 0.5%, and arachidic acids 0.4%.^{20(g)}

Lupeol, beta-amyrin, beta-amyrin acetate, and cucurbitacin B in the form of glycosides were reported from the young bitter fruits.

Glucoside of (24*R*)-24-ethylcholest-5-en-3 beta-ol was also reported from the fruits.^{28(g)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kāsa, Śwāsa, Jwara, Raktavikāra, Dāha, Śopha, Paṇḍu

Used for cough, asthma, fever, vitiated blood, burning sensation, edema, anemia (therapeutic uses based texts from the twelfth–sixteenth centuries).

Pectin extracted from the fruit shows a hypoglycemic effect. Fruit pectin enhanced glycolysis, glycogenesis and decreased glycogenolysis experimentally. The root, stem, leaves, and fruits are used in diabetes.^{2(c)}

In a clinical trial, patients with infective hepatitis were given ground green leaves at a dose of 10 g per day in two separate doses for 28 days. All patients showed significant improvements.^{20(g)}

IMPORTANT FORMULATION/ APPLICATIONS

Vastyāmanyāntaka Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains 57 constituents. Bimbi plant's fresh juice is among important ingredients.

(In the CCRAS text of Sahasrayoga, Bimbi-rasa of Malayam text has been interpreted as Nimbi-svarasa and Neem fruit juice.) Prescribed for dysuria, diabetes, and calculus.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form. 5–10 mL (svarasa).

LD₅₀ of the 50% ethanolic extract of the plant was found to be 1000 mg/kg i.p. in mice.^{29(g)}

Cocos nucifera Linn.

Nārikela

BOTANICAL SOURCE(S)

Cocos nucifera Linn.
(Fam. Arecaceae)

Broadly, there are two varieties: the tall and the dwarf.

Fruit color varies from dark green to deep orange or brick red. Size and shape of the fruits show striking variations.

Dwarf coconuts are grown mainly for coconut water.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Nārikela (Endosperm).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Tr̥ṇarāja.

Nāṅgali, Tunga, Skandhaphala, Sadāphala, Kūrch-shirshaka.⁷

HABITAT

Cultivated in coastal and deltaic regions of South India.

Important coconut-producing countries are India, Sri Lanka, Malaya, Indonesia, the Philippines and South Sea Islands in the Pacific. They are cultivated to a small extent in East Africa, the West Indies and Central America.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Coconut palm;
Assam: Khopra;
Beng: narikel, Narkel;
Guj: Naliar, Nariyel, Shriphal, Koprun;
Hindi: Nariyal, Gola;
Kan: Khobbari, Tenginamara, Temgu, Thengu, Thenginamara;
Mal: Nalikeram, Ten, Thengu, Keram;
Mar: Naral;
Ori: Nariyal;
Punj: Narela, Khopra, Garigola;
Tam: Tenkai, Koppurai;

Tel: Narikelamu, Tenkay, Kobbari;
Urdu: Narjil, Narial.

CONSTITUENTS

Fixed oil.

Oil content of endosperm varies from 47.5% to 74.4% and iodine value from 3.3% to 12.6%.

Chemical composition of dry, fresh and tender kernel, respectively: protein 6.8, 4.5, 0.9 (N × 6.25); fat 62.3, 41.3, 1.4 g/100 g; minerals 1.6, 1.0, 0.6 g/100 g; fiber 6.6, 3.6, 0.0 g/100 g; carbohydrates 18.4, 13.0, 6.3 g/100 g; calcium 400, 10, 10 mg/100 g, phosphorus 210, 240, 30 mg/100 g, iron 7.8, 1.7, 0.9 mg/100 g.

Vitamin content of dry and fresh kernel, respectively: thiamine 0.08, 0.05 mg/100 g, riboflavin 0.01, 0.10 mg/100 g, niacin 3.0, 0.8 mg/100 g, total folic acid 16.5, 12.5 mg/100 g, vitamin C 7.0, 1.0 mg/100 g.

Globulin cocosin from endosperm is found to be rich in L-arginine.^{20(g)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Kṣata, Kṣaya, Raktapitta, Tr̥ṣṇā, Śoṣa, Śūla

Used for burning syndrome, external injury, phthisis, bleeding disorders, thirst, emaciation and colic (therapeutic uses based on texts from 1000 BC to sixteenth century).

Coconut protein (rich in L-arginine) has been studied in lipid metabolism in ethanol-fed rats. Kernel was found to decrease lipogenesis in the liver and intestines; the globulin fraction showed anti-hyperlipidemic and anti-peroxidative effects in rats fed with high-cholesterol diets.^{20(g)}

IMPORTANT FORMULATION/ APPLICATIONS

Nārikela Khanda (Bhaishajya Ratnāvali, seventeenth century), contains Nārikela endosperm and Nārikela water as main herbs with 10 supporting herbs in minor proportion. Prescribed for hyperacidity colic, bleeding disorders, and emaciation. (Original compound is by Chakradata, eleventh century.)

Nārikela Lavana (Bhaishajya Ratnāvali) is an alkaline ash of a fully ripe coconut. Prescribed for duodenal ulcers, hyperacidity, and colic (original compound is by Chakradāṭa). Inflorescence is used in leucorrhea and fever after childbirth. Endosperm is used as a diuretic.^{20(g)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

10–20 g of the drug in powder form.

***Coix lachryma-jobi* Linn.**

Gavedhuka

BOTANICAL SOURCE(S)

Coix lachryma-jobi Linn. Syn. *C. lachryma* Linn. (Fam. Gramineae)

PHARMACOPOEIAL AYURVEDIC DRUG

Gavedhuka (Dried root).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Gavedhu, Gavedhukā.

Gavedhukā was also equated with *Abutilon indicum* (Atibalā).⁴

HABITAT

Throughout the plains and warm slopes of hills up to 1500 m.

The grass is a native of Southeast Asia and is widely distributed in tropical and sub-tropical parts of the world. Cultivated in the Philippines as an auxiliary food crop.

REGIONAL LANGUAGE NAMES

Eng: Adlay, Job’s tears;
Beng: Gadagad, Dedhaan, Devaan;
Guj: Kasai;
Hindi: Kasai, Garheduaa, Garahedu, Gargari;
Kan: Manjutti;
Mal: Kaatugotampu, Kaakkappalunku;
Mar: Kasai;
Tam: Kaatukuntumani;
Tel: Adaviguruginja.

CONSTITUENTS

Benzoxazolinones, amino acids (leucine, tyrosine, histadin, arginine and coicin).

Seeds and grain contain amino acids. Roots gave benzoxazolinones. Adenosine and phenolic compounds, erythro- and threo-l-C-syringyl glycerols, 4-ketopinoresinol, 2, 6-di-methoxy-P-hydroquinone-1-O-beta-D-glucopyranoside, and coixol.^{15,2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Mūtrakṛcchra, Netra-masūrikā, Pittaja chardi, Sthaulya

Used for dysuria, eruptions on the eyes (pox), biliary emesis and obesity (therapeutic uses based on references from Charaka Samhitā, Kaiyadeva Nighantu and Bhāvaprakāsha are more valid for grains).

Used for protection during pox; a decoction of Gavedhuka and licorice was used for washing eyes (Vrindamādhava, eighth century).

For biliary emesis, a decoction of Gavedhuka root was given (Charaka Samhitā, 1000 BC).^{16(a)}

Charaka used the seeds alone, cooked as a cereal or in an infusion, in emaciation and debility.²⁷

According to Bhāvaprakāsha (API quoted reference), Gavedhu is *Kārshyakrita* (causes emaciation).

IMPORTANT FORMULATION/ APPLICATIONS

Vishnu Taila (Bhaishajya Ratnāvali, seventeenth century), contains 10 herbs including Gavedhuka root, in equal proportion. Prescribed for angina, migraine, facial palsy, gout, pain due to calculus. “Taken with warm water removes *Napunsakta* (impotency).”

In traditional medicine, roots are used in menstrual disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

C

Coldenia procumbens L.

Tripakṣī

BOTANICAL SOURCE(S)

Coldenia procumbens L.
(Fam. Boraginaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Tripakṣī (Whole Plant).

API, Part I, Vol. VI.

A non-classical entry from ethnomedicine.

AYURVEDIC SYNONYMS

Tripunkhī.

HABITAT

Found wild in fallow fields, dried up lakes and roadsides in warmer parts of India.

Distributed in Africa, the Indian subcontinent, Indo–China, Malesia, and Australia; naturalized in the tropics.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Trailing coldenia;
Guj: Basriookharad;
Hindi: Tripunkhi;
Kan: Tripakshi;
Mal: Cherupadi;
Mar: Tripakshi, Tripunkhi;
Ori: Gondri lota;

Tam: Ceruppatai;

Tel: Hamsapadu,* Chepputhatteku.

CONSTITUENTS

Steroid glycosides.

Quoted constituents could not be rechecked.

Only one chemical study is available that showed the absence of tannins in the plant.^{20(g)}

The ethanol extract of the aerial parts showed inhibition of carrageenan-induced rat paw edema at 150 mg/kg p.o. It also exhibited inhibitory effects on leukocyte migration and reductions in pleural exudates, as well as in the granuloma weight in the cotton pellet granuloma method.

The aqueous, ethanol, and acetone extracts of the aerial parts showed 15%, 8%, and 8% inhibition, respectively, of angiotensin converting enzyme.^{20(g)}

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta (rheumatism), Vidradhi (abscess).

Used as a single drug.

Therapeutic uses based on the Wealth of India monograph.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Fresh poultice of leaves is applied to mature abscesses.

* Hamsapadi is a different plant equated with *Adiantum lunulatum* Burn.³ Tripādikā (a synonym of Hamsapadi) is equated with *Desmodium triflorum* (L.) DC. in Kerala.⁵

The decoction of powdered root is given in rheumatism. Powdered root is included in prescriptions for leucorrhea and menorrhagia.^{2(c)} The plant is also used in menorrhagia. Leaves are used in dermatitis and hydrocele. Leaf juice is applied on injuries from scorpion stings.^{20(g)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

Cūrṇa (powder): 3 to 6 g.

LD₅₀ of the 50% ethanolic extract of the plant was found to be >1000 mg/kg i.p. in mice.^{20(g)}

Coleus amboinicus Lour.

Parṇayavānī

BOTANICAL SOURCE(S)

Coleus amboinicus Lour.
Syn. *C. aromaticus* Benth.
(Fam. Lamiaceae)

Plectranthus amboinicus (Lour.) Spreng.^{19,20(g)}

PHARMAPOEIAL AYURVEDIC DRUG

Parṇayavānī (Leaf).

API, Part I, Vol. VI.

A non-classical Sanskritized name. Pattharchūra and Karpuravalli are common names in whole of North and South India, respectively.

AYURVEDIC SYNONYMS

Yavānīgandhā.

(Non-classical name.)

HABITAT

Cultivated in gardens throughout India, wild in Rajasthan.

A native of the East Indies.

REGIONAL LANGUAGE NAMES

Eng: Country borage, Indian borage;
Ben: Paatharchur, Paterchur;
Guj: Ovaapaan;
Hindi: Pattaajvaayana;
Kan: Karpurahalli, Penova;
Mal: Kannikurukka, Panikkurukka, Navarayilla;
Mar: Paan-ovaa;
Ori: Hemakedara, Amarpoi;

Pun: Patharchura;
Tam: Karpuravalli;
Tel: Kapparillaku, Vamu-aku.

Eng: Indian mint, Mexican mint, French thyme, Spanish thyme.¹⁹

CONSTITUENTS

Oleanolic acid; crategolic acid; pomolic(?) acid; euscaphic acid; tormentic acid; ursolic acid and 2α, 3α, 19α, 23-oxalacetic acid; cirsimaritin; sitosterol glucoside; salvingenin; quercetin; 6-methoxygenkwanin; chrysoeriol; ethyl salicylate; γ-terpinene; β-selinene; luteolin, apigenin; eriodictol; p-cymene; α and β-pinene; taxifolin; thymol; carvacrol; myrcene, 1, 8-cineole; eugenol; β-caryophyllene.

(Sources of quoted constituents could not be traced.)
Bangalore sample of leaves collected in May and September gave essential oil 0.4% and 0.6%; carvacrol 53.0%, 67.0%; p-cymene 12.6%, 6.5%; gamma-terpinene 15.5%, 5.9%; beta-caryophyllene 4.3%, 7.4%; alpha-humulene 1.2%, 2.1%; caryophyllene oxide 0.9%, 2.2%, alpha-terpinene 2.4%, 0.4% and myrcene 1.8%, 0.9%, respectively.^{20(g)}

THERAPEUTIC AND OTHER ATTRIBUTES

Ādhmāna (flatulence with gurgling sound), Agnimāndya (digestive impairment), Ajirna (indigestion), Aruci (tastelessness), Atisāra (diarrhoea), Grahaṇi roga (colitis/ulcerative colitis), Gulma (abdominal lump), Hikkā (hiccup), Hrdyadaurbalya (weakness of the heart), Jīṇasvāsa (chronic asthma), Kāsa (cough), Kṛmi (worm infestation), Mūtrakṛcchra (dysuria), Mūtraroga (urinary diseases), Mūtrasmarī (urinary calculus), Śvāsa (Asthma), Udararoga

(diseases of abdomen), Unmāda (mania/psychosis), Visūcikā (Gastroenteritis with piercing pain). Used as single drug.

Therapeutic uses based on a Sanskrit *shloka*, composed by a contemporary Ayurvedic scholar. It is not known, how so many therapeutic attributes of a non-classical Ayurvedic drug were posted in API. These should have been incorporated on the basis of well-documented long-term use or valid clinical trials. (See Reference 20g)

IMPORTANT FORMULATION/ APPLICATIONS

Fresh juice expressed from leaves (first dose 4 teaspoonful, second and third of two teaspoonful, controlled diarrhea in 92.5% of 200 cases of cholera in 72 h, in a clinical trial. Leaf juice

could not render the stool culture negative for *Vibro cholerae*.^{20(g)}

Juice of the leaves prevented experimental urolithiasis in rats fed with calculi-producing diets (3% glycolic acid).^{20(g)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Svarasa (juice): 5 to 10 mL.

Only *C. forskohlii* is the source of forskolin (0.1% on a dry weight basis). In none of the other *Coleus* spp. (*C. amboinicus*, *C. scutellarioides*, *C. aoninus*, *C. malabaricus*, and *C. rotundifollius*) could forskolin be detected at levels down to $1 \times 10^{-4}\%$ on dry weight of the plant material.^{20(g)}

C

Coleus forskohlii Briq.

Gaṇḍīra

BOTANICAL SOURCE(S)

Coleus forskohlii Briq.
Syn. *C. barbatus* Benth.
(Fam. Lamiaceae)

Plectranthus barbatus (Andrews) Benth.^{19,20(g)}
In Kerala, *Cayratia carnos*a Gaggnep. is reported as being used as Gandīra.³

PHARMAPOEIAL AYURVEDIC DRUG

Gaṇḍīra (Root).

API, Part I, Vol. V.
Gaṇḍīra of Sushruta Samhitā (1000 BC) is equated with *Cucumis utilissimus* Roxb. (a species of cucumber that was used as a pot herb and suppressed stool and urine; while Gandīra of the API is recommended for anuria).²⁸

AYURVEDIC SYNONYMS

Gaṇḍīra (Sthalaja).

There is great confusion regarding the identity of Gandīra.

After textual analysis, two varieties of Gandīra have been suggested by Ayurvedic scholars,

sthalaja (non-aquatic) and *jalaja* (aquatic).

The non-aquatic variety has been suggested as *Coleus amboinicus* or *C. barbatus* (as mint species) and the aquatic variety as *Achyranthes aquatica* Br.^{3,16(a)}

Gandīra may be cited as an example where the unwise use of synonyms clouds the correct identity of a drug plant, bringing in other unwanted ones.³⁰

HABITAT

Subtropical western Himalayas, Nilgiri hills, Gujarat, and Bihar, also cultivated in Maharashtra.

Distributed in the Indian subcontinent¹⁹ and East Africa.¹⁷

REGIONAL LANGUAGE NAMES

Guj: Garmar, Garmal;
Hindi: Garmar.

CONSTITUENTS

Diterpene, coleonol, coleosol, deoxy-coleonol, forskohlin, naphthopyrone, coleoforsine.

C

Deterpenoids in the root: forskolin (0.1% dry weight basis), and coleonol (found to be identical to forskolin, named as calforsin).^{20(g)} Approximately 70 diterpenoids have been isolated from the root, leaves, and whole plant. Forskolin is one of the most active compounds.^{20(g)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śoṭha, Arśa, Kāsa, Kṛmi, Kuṣṭha, Duṣṭa vṛana, Lutaviṣa, Gulma, Udara, Plihāroga, Śūla, Mandāgni, Mūtrabandha, Malabandha

Used for edema, piles, cough, worms, obstinate skin diseases, septic wounds, spider bites, abdominal lumps, diseases of the abdomen, splenic disorders, colic, loss of appetite, anuria, and constipation (therapeutic uses based on texts referring to Gandīra and Kāndīra).

The root of *C. forskohlii* has been screened for the following properties experimentally: anti-hypertensive, ocular hypotensive, hyperglycemic, spasmolytic, anti-diarrheal, anti-amebic, anthelmintic,

and anti-allergic.^{20(g)} Anti-thrombotic and bronchodilating activities have also been demonstrated.¹⁷

IMPORTANT FORMULATION/ APPLICATIONS

Krmighna Kashāya Churna (Charaka Samhitā, 1000 BC), contains 10 herbs in equal proportion, including Gandīra (Kandīra) root and *Embelia ribes* Burn. f. (Vidanga) fruits. Prescribed in worm infection. (Menthol extract of the tuber did not show anthelmintic activity).^{20(g)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–5 g.
Oral forskolin has been studied using 10 mg daily over 2–6 months in asthma.¹⁷
LD₅₀ of coleonol was reported as 68.0 mg/kg i.p. in mice.^{20(g)}
Standardization basis marker compound: Forskolin-NLT 0.4% w/w (IP).

***Commiphora wightii* (Arn.) Bhand** **Guggulu**

BOTANICAL SOURCE(S)

Commiphora wightii (Arn.) Bhand
Syn. *Balsamodendron mukul* Hook, Ex Stocks
Commiphora mukul Engl.
(Fam. Burseraceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Guggulu (Exudate).
API, Part I, Vol. I.
Air-dried oleo-gum resin exudate from the stem and branches.
For purification: prepare a decoction of three myrobalans (*triphalā*), reducing it to half; dissolve Guggulu oleo-gum resin during boiling,

Heat until semi-solid, discard insoluble matter and recover the purified drug.
International Pharmacopoeial name: Gugguli gummi.

AYURVEDIC SYNONYMS

Purā, Mahiṣākṣa, Kauśika, Palaṅkaṣā.
Devadhūpa, Kumbha.^{16(c)}

HABITAT

Rocky tracts of Rajasthan, Gujarat.
Found from Arabia to the Indian desert.¹
Indigenous to India, Bangladesh, and Pakistan.¹⁰⁽³⁾

REGIONAL LANGUAGE NAMES

Eng: Gum-gugul, Indian Bdellium;
 Assam: Guggul;
 Beng: Guggula;
 Guj: Gugal, Guggal, Gugar;
 Hindi: Gugal, Guggul;
 Kan: Kanthagana, Guggala, Mahishaksha guggulu, Guggulugida, Guggulu;
 Kash: Guggal Dhoop, Kanth Gan;
 Mal: Gulgulu, Guggulu;
 Mar: Guggul, Mahishaksh;
 Ori: Guggulu;
 Punj: Guggal;
 Tam: Mahisaksi Guggalu;
 Tel: Makishakshi guggulu, Guggipannu;
 Urdu: Muqil (Shihappu).

CONSTITUENTS

Essential oil, gum, resin, steroids.

A mixture of resins, essential oil (1.4%–1.45%) and water-soluble gum, made of galactose, arbinose, and 4-O-methylglucuronic acid. Resinous fraction contains diterpenes, cembrene A and mukulol; the lignans sesamin and guggullignam I and II and the sterols guggulsterol-I–V, and E- and Z-guggulsterone up to 15%.^{10(3),13}

A new triterpene, myrrhanol A, has also been isolated.¹⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Vātavyādhi, Āmavāta, Granthi, Śopha, Gandamālā, Medoroga, Prameha, Kuṣṭha

Used for diseases of the nervous system, rheumatoid arthritis, cysts, edema, scrofula, diseases due to obesity, urinary disorders and obstinate skin diseases including leprosy (therapeutic uses based on texts from the seventh and sixteenth centuries).

Uses supported by clinical data: treatment of hyperlipidemia and hypercholesterolemia. E- and G-guggulsterones are hypolipidemic. Myrrhanol A exhibited potent anti-inflammatory effects.¹⁷

Extracts of oleo-gum resin for the treatment of obesity gave negative results.¹⁰⁽³⁾

IMPORTANT FORMULATION/ APPLICATIONS

Yogarāj Guggulu (Bhaishajya Ratnāvali, seventeenth century); Vātāri Guggulu (Bhaishajya Ratnāvali); Simhanāda Guggulu (Bhaishajya Ratnāvali); Mahāyogarāj Guggulu (Shārangadhara Samhitā, thirteenth century), a herbo-mineral compound; Kaishore Guggulu (Shārangadhara Samhitā): Guggulu oleo-gum resin is the main drug in all the compounds, prescribed for arthritis, rheumatism, and gout.

Chandraprabhā Vati (Shārangadhara Samhitā), a herbo-mineral compound, is prescribed in acute urinary disorders.

Kānchnāra Guggulu (Shārangadhara Samhitā), not quoted in the API, contains Kānchnār stem bark and purified Guggulu in 1:2.075 proportions. Prescribed for enlarged cervical glands.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–4 g of the drug

Oleo-gum resin 3–4.5 g in two or three separate doses. Petroleum ether extracts of oleo-gum resin 500 mg two or three times.¹⁰⁽³⁾

Caution: guggulsterone showed thyroid-stimulating activity. It may increase T_3 synthesis by increasing conversion of T_4 to T_3 ; it can lower TSH.¹³

Standardization basis marker compound: Guggulsterones NLT 1.0 and NMT 1.5% w/w (IP).

Convolvulus pluricaulis Choisy

Śaṅkhaṇḍī

C

BOTANICAL SOURCE(S)

Convolvulus pluricaulis Choisy
(Fam. Convolvulaceae)

Syn. *C. prostratus* Forsk.

C. microphyllus Sieb. ex Spreng.^{20(g)}

Convolvulus pluricaulis is used as Shankhapushpi in North India;⁵ *Clitoria ternatea* Linn. (Papilionaceae) and *Canscora decussata* Schult. in South India.^{3,5,6} *Canscora decussata* and *Lavendula bipinnata* O. Ktze. are used as Shankhapushpi in Bengal;^{3,30} *Evolvulus alsinoides* (Convolvulaceae) is treated as Vishnukranta, Vishnukrandi and Vishnugandhi of Siddha medicine.²⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Śaṅkhaṇḍī (Whole plant).

API, Part I, Vol. II.

Convolvulus pluricaulis, *Canscora decussata*, and *Evolvulus alsinoides*: distinguishing characteristics are presented in Reference 20(g).

AYURVEDIC SYNONYMS

Śaṅkhaṇḍī, Śaṅkhāhvā.

Medhya, Kiriti, Shankhyakusumā, Shitapushpi.²⁷ Kshirapushpi, Māṅgalyakusuma (white-flowered var.).⁷

Kambupushpi, Kambumālīni, Smṛti, Vanavilāsini.⁴

Vishnukrantā: Nilapushpi, Jayā, Vaśyā, Aparājītā.⁴

HABITAT

Throughout India.

REGIONAL LANGUAGE NAMES

Beng: Sankhapuspi;

Guj: Shankhavalī;

Hindi: Shankhapushpi;

Kan: Bilikantisoppu, Shankhapushpi, Shankhauli;

Mar: Shankhavela, Sankhahuli, Sankhapuspi;

Ori: Sankhapuspi;

Punj: Sankhapuspi, Ksirapuspi, Sankhahuli;

Tam: Sanghupushpam, Kakattam, Kakkanangudi, Karakhuratt;

Tel: Shankhapushpi.

Urdu: Shakhaahuli (blue-flowered var.).⁷

Tam: Shivakrāndi (white-flowered var.),

Vishnukraandi (blue-flowered var.).⁷

CONSTITUENTS

Alkaloid.

Plant contains alkaloids, convolvine, convolamine, phyllabine, convolidine, confoline, convoline, subhirsine, convosine, scopoline, and convolidine, along with beta-sitosterol.^{2(c)} A HPTLC method for the estimation of scopolin, a chemical marker in the herb, has been reported.^{20(g)}

THERAPEUTIC AND OTHER ATTRIBUTES

Manasaroga, Apasmāra

Used for psychiatric disorders and epilepsy (therapeutic uses based on texts from 1000 BC to sixteenth century).

Plant shows maximal barbiturate hypnosis-potentiating activity during the Spring season.^{20(g)}

Alcoholic extract of the plant prevented the rise in brain catecholamine levels in stressed rats. It did not cause any significant change in brain 5-HT levels either in normal or stressed rats. The hypotensive effect of the alcohol extract of leaves was greater compared to that of the plant extract.

Fresh juice of the plant showed protection against various models of ulcer.^{20(g)}

IMPORTANT FORMULATION/ APPLICATIONS

Agastyaharitaki Rasāyana; Brahma Rasāyana (Ashtāṅgahridaya, seventh century), contain Shankhapushpi as a supporting herb. Used as geriatric and general tonics.

Brahmi Ghrita (Ashtāṅgahridaya); Shankhapushpi is among ten supporting herbs. Used for insanity, epilepsy, and memory disorders.

Mānasmitra Vataka (Sahasrayoga, a non-Samhita, Kerala Materia Medica) contains 62 herbs processed with the plant and root juices of ten herbs, including that of Shankhapushpi. Used for insanity, epilepsy and psychoneurosis.

Gorochanādi Vati contains 46 herbo-mineral constituents. It is obsolete in North India, but available in South India. Used for critical toxemic states.

Brahma Vati (not included in AFI, Part I and AFI, Part II).

DOSAGE/USAGE/CAUTIONS/COMMENTS

3-8 g of the drug in powder form.

Shankhapushpi is contraindicated with the modern anti-epileptic drug phenytoin. Shankhapushpi not only reduces the anti-epileptic activity of phenytoin, but also lowers plasma phenytoin levels.^{2,(c),21}

LD₅₀ of the methanolic extract of the plant was 1250 mg/kg in mice orally.^{20(g)}

C

Corallocarpus epigaeus Benth. ex Hook. f. Śukanāsā

BOTANICAL SOURCE(S)

Corallocarpus epigaeus Benth. ex Hook. f.
Syn. *Bryonia epigaea* Rottler
Rhyncocarpa epigaea Naud
(Fam. Cucurbitaceae)

Aechmandra epigaea Arn. could not be traced.
During the classical period, Shukanāsā and Syonāka (*Oroxylum indicum* Vent.) were synonyms.^{3,28,30,34}

PHARMACOPOEIAL AYURVEDIC DRUG

Śukanāsā (Rhizome).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Nāhikanda, Kaṭunāhī, Nāhikā, Ākāśagaruda.

Shukākhyā, Shukāhvā.³⁰

HABITAT

A climber, found in the scrub jungles of South India along hilly tracts.

REGIONAL LANGUAGE NAMES

Guj: Kadvinai, Naahikand;
Hindi: Murchiakand, Kirakanda, Kadvi naahi, Naahi kand;

Kan: Akasha garudagadde;
Mal: Kollamkova kizhang;
Mar: Karunai, Kadavinai, Akashagarudi;
Tam: Karutankilanku;
Tel: Murudonda, Nagadonda.

CONSTITUENTS

Bryonin; epigaeusyl ester; corallocarpuscalarolide; corallocarpenoyl ester; dotriacont-22, 25-diol-10-one. (Quoted constituents, as cited in ref. 2d.)

Cucurbitacin B, *p*-hydroxybenzoyl ester (epigaeusyl ester), a pyridine carboxylic ester (corallocarpeonyl ester), sesterpene lactone (corallocarpuscalarolide) and an aliphatic C₃₂ ketodiol are reported from the root.^{20(g)} The oil obtained from the root was found to contain ishwarane 21.6%, ishwarone 15.4%, alpha-selinene 14.8%, and beta-selinene 11.5% as major components; in addition, 41 components, of which 6.3% were monoterpenes and 88.9% were sesquiterpenes, were also detected.^{20(g)}

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta (rheumatism), Aruci (tastelessness), Atisāra (diarrhoea), Dāha (burning sensation), Hikkā (hiccup), Jīrṇa āntraśoṭha (chronic intestinal pain), Jīrṇajvara (chronic fever), Jvara (fever), Kāsa (cough), Kṛmi roga (worm infestation), Pravāhikā (dysentery), Sarpa viṣa (snake poison), Śoṭha

C

(inflammation), Śvāsa (Asthma), Vatakapḥ + C156a jvara (fever due to Vata and Kapha doṣa), Viṣphoṭaka (blisterous eruption), Vraṇa (ulcer), Yoni roga (disease of female genital tract).

Therapeutic uses based on texts from 1000 BC to twelfth century.

IMPORTANT FORMULATION/ APPLICATIONS

Kāshmaryādi Ghrita (Bhāvaprakāsha, Bhaishajya Ratnāvali, not in AFI).

Shukanāsā Ghrita (Bhela Samhitā, prior to seventh century) contained Shukanāsā

as the main drug. Indicated in asthma, cough, cardiac disorders, and hysteria with loss of consciousness. Details could not be traced.^{16(a)}

Shukanāsā root was used in prescriptions for topical application on poisonous bites. It was an antidote to poisons (Ashtāṅgahridaya, seventh century; Shodhal Nighantu, twelfth century; based on texts quoted in the API).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 5 g.

Cordia dichotoma Forst. f.

Śleṣmātaka

BOTANICAL SOURCE(S)

Cordia dichotoma Forst. f. Syn. *C. obliqua* Willd. *C. myxa* Roxb.
(Fam. Boraginaceae)

Some other species of *Cordia*, such as *C. rothii* Roem. & Schult, and *C. wallichii* G. Don., may also be used in place of Śleṣmātaka.

PHARMACOPOEIAL AYURVEDIC DRUG

Śleṣmātaka (Fruit, Stem bark).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Bahuvāraḥ, Śelu.

Śleṣmātaki.³⁰ Some varieties of Slesmātaka are also known as Gondi or Gondini.³⁰

Picchīla, Bhuta-pādapa, Shaila, Shailuka, Shailūka, Dwija-kutsaka.⁴ Bhū-karvudara is equated with *Cordia wallichii* syn. *C. obliqua* Willd. var. *wallichii*.¹⁵

Sapistān (Lasora) of Unani medicine.³⁷ Karvudāra is a doubtful synonym.³⁰

HABITAT

Medium sized tree with short crooked trunk with drooping branches, distributed throughout warmer parts of India.

REGIONAL LANGUAGE NAMES

Eng: Sebesten;
Assam: Dilk;
Ben: Bahnaree, Bahuvar;
Guj: Gundaavada, Gundaa;
Hindi: Lasora, Lisodaa;
Kan: Challe kaayi;
Mal: Naruvari, Naruviri;
Mar: Bhonkar;
Pun: Lasuda;
Tam: Naruvili, Narivilee;
Tel: Nakkerā.

CONSTITUENTS

Fruit: β-sitosterol, palmitic, stearic and oleic acids.

Fruits contain D-arabinose, L-fructose, D-glucose, D-xylose, galacturonic and beta-glucuronic acids; arabinoglucan and polysaccharides composed of (1 → 6)-linked

D-glucopyranosyl, and (1 → 2) L-arabinofuranosyl residues.¹⁵ (Plant contains a pyrrolizidine alkaloid.)¹⁵

Stem bark: gallic acid and beta-sitosterol.

Bark contains holocellulose, lignin,¹⁵ and 2% tannin.^{2(c)}

C. *wallichii* bark contains allantoin and 3, 5-dihydroxy-4'-methoxyflavanone-7-O- α -L-rhamnopyranoside.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Fruit: Jvara (fever), Kāsa (cough), Kṛmi (worm infestation), Pratiśyāya (coryza), Raktadoṣa (disorders of blood), Raktapitta (bleeding disorder), Śukradaurbalya (seminal stress), Śvāsa (asthma), Trṣṇā (thirst), Upadamśa (syphilis), Vātapittajanya vikāra (disorders due to vāta and pitta doṣa).

Stem bark: Āmadoṣsa (semi-digested food metabolites), Bahuvraṇa (multiple injuries/ulcers), Dr̥kajāta-masūrikā (ocular manifestation of small pox), Kṛmi-śūla (colic due to worm infestation), Kuṣṭha (leprosy/diseases of skin), Lūtāviṣa (spider bite), Masūrikā (small pox), Raktadoṣa (disorders of blood), Tvak-roga (skin diseases), Visarpa (Erysipelas), Visphoṭa (blister), Vraṇa (ulcer).

Used as single drug. (Therapeutic uses based on thirteenth to sixteenth century texts.)

IMPORTANT FORMULATION/ APPLICATIONS

Gojihvādi Kvātha Churna (formulation by a contemporary Ayurvedic scholar), contains Sapistāna and 7 other drugs used in Unani medicine (a combination of 8 Ayurvedic and 8 Unani drugs). Used for catarrhal fever, cough, and asthma.

Fruit: mucilaginous, demulcent, expectorant, astringent, diuretic, and anthelmintic.^{2(a)}

Fruits showed anti-bacterial activity against *Bacillus subtilis*, *B. megaterium*, *Sarcina lutea*, *Micrococcus lysodeikticus*, *Staphylococcus citreus*, *S. aureus*, *S. albus*, *Streptococcus pyogenes*, and *S. faecalis*.^{2(d)}

A decoction of the bark is used in dyspepsia and fever.^{2(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Pakva phala pānaka (syrup of ripened fruit): 10 to 20 mL.

Stem bark: Kvātha (decoction): 50–100 mL.

C

Coriandrum sativum Linn.

Dhānyaka

BOTANICAL SOURCE(S)

Coriandrum sativum Linn.
(Fam. Umbelliferae)

A comparative study was carried out on Moroccan, Russian, and Indian varieties of coriander and the percentage of ether extractives and free fatty acids was determined. The essential oil content was also determined.^{20(g)}

PHARMACOPOEIAL AYURVEDIC DRUG

Dhānyaka (Dried fruit).

API, Part I, Vol. I.

International Pharmacopoeial name: *Coriandri fructus*.⁸

AYURVEDIC SYNONYMS

Dhanika, Dhānya, Vitunnaka, Kustumburu.

Dhanyā, Dhāni, Dhanikā.²⁷ Dhānya is a wrong synonym.

Kunati, Kustumburu,³ Dhaneyā, Chaturannaka.⁴

HABITAT

Cultivated all over India.

There species are in Southwest Asia.¹

It is native to the Mediterranean region and extensively grown in India, Russia, central Europe, Asia Minor, and Morocco; it is naturalized worldwide.

In India, it is cultivated in all states.

REGIONAL LANGUAGE NAMES

Eng: Coriander fruit;
Assam: Dhaniya;
Beng: Dhane, Dhania;
Guj: Dhana;
Hindi: Dhaniya;
Kan: Havija, Kothambari bija;
Kash: Dhaniwal, Dhanawal;
Mal: Malli, Kothampatayari;
Mar: Dhane, Kothimbir;
Ori: Dhania;
Punj: Dhania;
Tam: Kottamalli virai, Dhaniya;
Tel: Dhaniyalu;
Urdu: Kishneez.

Eng: Cilantro, Chinese Parsley.¹

CONSTITUENTS

Essential oil (coriandrol)

Coriandrol, a terpene tertiary alcohol, now known to be identical to *d*-linalool. Essential oil (0.1%–1.30%) contains linalool 49.2%, alpha-pinene 5.4%, camphene 1.3%, *p*-cymene 14.7%, limolene 2.9%, *cis*-linalool oxide 3.2%, terpinolene 2.6%, camphor 9.6%, borneol 1.9%, alpha-terpineol 2.9%, and geraniol 2.6%.^{2(a,c)}
Aqueous extract of roasted seeds contains large amounts of acetylcholine and its precursor choline.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Tṛṣṇā, Chardi, Dāha, Ajirna, Atisāra

Used for fever, thirst, emesis, burning sensation, indigestion, and diarrhea (therapeutic uses based on Bhāvaprakāsha, sixteenth century).
Cold infusion of Dhānyaka, mixed with sugar, alleviates even severe burning sensations in fever (Vrindamādhava, eighth century).

Dhānyaka with dried ginger rhizomes, as decoctions or water extracts, was used as a digestive, appetizer and diuretic, as well as during fevers, diarrhea and colic (Charaka Samhitā, 1000 BC; Ashtāngahridaya, seventh century; Vrindamādhava, eighth century).

For excessive thirst, a cold infusion of Dhānyaka with sugar and honey was prescribed (Ashtāngahridaya, seventh century).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Dhānyapanchaka Kwāth Churna (Bhāvaprakāsha, sixteenth century), contains Dhānyaka and 4 more herbs, in equal proportion.

Decoction for intestinal colic, acute diarrhea, and anorexia.

Clinical studies on monopreparations have not been recorded.

Seeds (10%) in diet caused significant reductions in serum cholesterol and triglyceride levels in high-fat diet-induced hyperlipidemia in rats.

Decoction of seeds did not show any anti-pyretic effects in rats.

Aqueous extract of seeds caused increased acid secretion in injured rat stomach. Aqueous extract of fruits showed anti-oxidant activity *in vitro*.^{20(g)}

Hypolipidemic and anti-diabetic effects have been demonstrated *in vitro*.²⁴

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Essential oil: spasmolytic and carminative.¹⁴

Coriander is prescribed during the pre-eruptic phase of chickenpox and measles in China.¹⁴

Coscinium fenestratum (Gaertn.) Colebr.

Kālīyaka

BOTANICAL SOURCE(S)

Coscinium fenestratum (Gaertn.) Colebr.
(Fam. Menispermaceae)

Syn. *Menispermum fenestratum* Gaertn.

Used as a substitute of *Calumba* *Jateorhiza palmata* (Lam.) Miers.^{2(a)}

Stem bark of *C. fenestratum* is used as a substitute of *Dāruharidra* in Tamil Nadu and Kerala.^{6,36} It has since long been accepted as a substitute for *Berberis aristata* DC.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Kāliyaka (Root and Stem).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Kalambaka, Kāliya, Kāliyākhyā, Kūleyaka.

(Kalambaka is derived from English name Calumba.)³

Pita chandana (official name of Kāliyaka in the AFI). Synonyms: Kāliyaka, Pita sārā, Pita, Nārāyana priya.⁴

(Kāleyaka is also equated with *Santalum flavum* Linn.)²⁷

HABITAT

Western Ghats.

Climbing shrub occurring in South India, Western Ghats, Nilgiris, Tamil Nadu, Kerala, Karnataka, and Sri Lanka.^{2(a),20(g)}

REGIONAL LANGUAGE NAMES

Eng: False calumba;

Hindi: Jhaar-ki-hald;

Kan: Mardaa arashinaa;

Mal: Maramanjāl;

Mar: Venivel;

Tam: Atturam, Kadari, Manjalkoid;

Tel: Manu pasupu.

Eng: Tree turmeric.

Known in the world market as Ceylon Calumba.³⁰

CONSTITUENTS

Alkaloids-berberine, palmitine, jatrorrhizine, proto-berberine, N, N-di- lindacarpine, thalifen- dine and columbamine.

Stems contain up to 3.5% berberine,^{2(a)} oxyberber- ine, tetrahydroberberine (canadine), a minor

alkaloid 12, 13-dihydro-8-oxo-berberine, along with sitosterol and stigmasterol.

Root afforded alkaloids, berberine, ber- lamine, noroxyhydrastinine, and dihydroberlamine.^{20(g)}

THERAPEUTIC AND OTHER ATTRIBUTES

Root: Raktapitta, Jīṇa jvara, Prameha, Kṛmi, Ajīṛṇa, Ādhmāna, Kāmalā, Agnimāndya, Vraṇa, Vyonga

Stem: Kuṣṭha, Prameha, Pānduroga, Jvara, Ajīṛṇa, Agnimāndya, Ādhmāna Yakrt vikana (*vikaara*), Kṛmi, Dāha, Aśmari, Upadaṃśa, Vraṇa, Yuvānapi- ḍakā, Vyanga.

Root: bleeding disorders, chronic fever, urinary disorders, worms, indigestion, tympanites, jaundice, loss of appetite, wounds, chloasma of the face.

Stem: obstinate skin diseases including leprosy, urinary disorders, anemia/jaundice, fever, indi- gestion, loss of appetite, tympanites, hepatic disorders, worms, burning sensation, lithiasis, gonorrhea, wounds, acne vulgaris, chloasma of the face.

IMPORTANT FORMULATION/ APPLICATIONS

(Composite drugs not quoted.)

South Indian compounds, Ashokārishta

(Bhaishajya Ratnāvali, seventeenth century) and Ashwagandhārishta (Bhaishajya Ratnāvali) contain false calumba (Māramanjāl), while compounds of North India contain *Berberis aristata* (Dāruharidra).^{6,20(c)}

In ethnomedicine, the stem is used as a bitter tonic for debility, dyspepsia, dysentery, and fevers.

Root bark paste is used for dressing wounds, ulcers and in leishmaniasis.^{2(c),20(g)} Bark is used to treat jaundice.^{20(g)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-3 g. root; 2-6 g (stem).

Infusion: 1:20.

LD₅₀ of ethanot extract of stem was found to be 1200 mg/kg p.o. in mice.^{20(g)}

Costus speciosus (Koerning ex Retz.) Smith. Kebuka

C

BOTANICAL SOURCE(S)

Costus speciosus (Koerning ex Retz.) Smith.
(Fam. Zingiberaceae)

In the market, dried pieces of Kebuka root tuber are sold as Kalihāri (*Gloriosa superba* Linn.).³ Due to common vernacular names, it is not to be confused with *Saussurea lappa* C.B. Clarke.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kebuka (Rhizome).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Kembuka, Kebuka, Kemuka, Kembu.

(Kembuka is also a synonym of Pūga *Areca catechu* Linn.).³

Kembuka has been used as a substitute of Lāṅgali (*Gloriosa superba* Linn.).³⁰

HABITAT

Sub-Himalayan tract extending between Kangra to Arunachal Pradesh, also in Western Ghats.

The rhizomes can be commercially collected from hilly areas of Garhwal and Kumaun in Uttarakhand and from North Bengal, Assam, Meghalaya, Tripura, Manipur, Nagaland, Southeast Madhya Pradesh, and the West Coast.

REGIONAL LANGUAGE NAMES

Beng: Kevu;

Hindi: Kebu, Kemuk, Kemuaa;

Kan: Chenglavaa-koshtu, Changalvakoshtu;

Mal: Channakkilannu, Channakkuvva;

Mar: Pevaa;

Tam: Koshtam;

Tel: Chenglavaa-koshtu.

Eng: Canereed, Spiral, Wild ginger.^{2(c)}

CONSTITUENTS

Steroidal Saponins such as (Titogenin and diosgenin).

Total steroidal sapogenin content of the rhizome was reported as 1.75% on a moisture-free basis. Dried rhizome yielded 2.12% diosgenin and gave saponins A, B, C, and D. Saponin A on hydrolysis gave beta-sitosterol and glucose; saponins B, C, and D yielded diosgenin and glucose rhamnose. Free diosgenin and tigenin were isolated from petroleum ether extract.^{20(g)}

Essential oil contains pinocarveol 59.9%, cadinene 22.6%, cineol 10.7%, *p*-methoxybenzophenone 3.3%, and carvacrol 1.3%.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kaphapittaja vikara, Agnimāndya, Grahani, Kṛmiroga, Raktavikāra, Ślīpada, Prameha, Śvitra, Kuṣṭha, Jvara, Kāsa, Kāmalā, Arśa, Kaphaja, Mūtrakṛcchra

Used for biliary disorders, loss of appetite, sprue, worm infestations, vitiated blood, elephantiasis, urinary disorders, leucoderma, obstinate skin diseases including leprosy, fever, cough, jaundice, piles, diseases due to excessive phlegm, and dysuria (therapeutic uses based on texts from 1000 BC to sixteenth century).

Alkaloids show papaverine-like smooth muscle-relaxant activity, cardiotonic activity like that of *Digitalis* and anti-spasmodic, CNS-depressant, diuretic, and hydrocholeretic activity. A mixture of saponins shows significant anti-inflammatory, anti-arthritic and anti-fertility activities.^{2(c)}

Aqueous solution of an alkaloidal mixture did not show analgesic and anti-pyretic effects.^{20(g)}

IMPORTANT FORMULATION/ APPLICATIONS

Krmighna Kashāya Churna (Charaka Samhitā, 1000 BC), contains Kebuka root with *Embelia*

ribes fruits and 8 supporting herbs, in equal proportion.

Used as an anthelmintic drug.

The ethanolic extract of the rhizome caused *in vitro* paralysis of *Ascaris lumbricoides* after 18 hours of treatment.

The root did not show anti-bacterial and anti-fungal activity.^{20(g)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g (after purification).

LD₅₀ of alkaloidal solution was found to be 750 mg/kg i.p. in rats.^{20(g)}

C

Crataeva nurvala Buch.-Ham.

Varuṇa

BOTANICAL SOURCE(S)

Crataeva nurvala Buch.-Ham.
(Fam. Capparidaceae)

Syn. *C. magna* (Lour.) DC. var. *magna*, *C. religiosa* Frost, f. var. *nurvala* (Buch.-Ham.) Hook, f. & Jhoms., *C. lophosperma* Kurz., *Capparis magna* Lour.^{20(h)}

PHARMACOPOEIAL AYURVEDIC DRUG

Varuṇa (Stem bark).

API, Part I, Vol. I.

Stem bark of *Aegle marmelos* Corr. is sometimes found mixed with commercial samples.³⁶

AYURVEDIC SYNONYMS

Varaṇa.

Vāruna, Setu, Kumāraka,⁴ Ashmarighna,²⁷ Urumāna.²⁸

HABITAT

Wild or cultivated tree, often found along streams, also in sub-Himalayan tracts..

Common throughout India, Myanmar, and Sri Lanka.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Three leaved caper;

Beng: Varuna;

Guj: Vayvarno, Varano;

Hindi: Baruna, Barna;

Kan: Bipatri, Mattamavu, Neervalamara;

Mal: Neermatalam;

Mar: Haravarna, Varun, Vayavarna;

Ori: Baryno;

Punj: Barna, Barnahi;

Tam: Maralingam;

Tel: Bilvarani.

CONSTITUENTS

Saponin and tannin.

The stem bark contains (–)-epiafzelechin, (–)-epiafzelechin 5-O-beta-D-glucoside, (–)-catechin, diosgenin, friedelin, betulenic acid, ceryl alcohol, glucocapparin, beta-sitosterol, and lupeol;^{2(c)} alpha- and beta-amyrin;^{2(d)} alkaloids include cadabicine, cadabicine diacetate, and cadabicine Me-ether.^{2(c)}

Anti-urolithic activity is attributed to the presence of lupeol (lup-20 [29]-en-3 beta-ol).^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Asmari, Mūtrakṛcchra, Gulma, Vidṛadhi

Used for calculus, dysuria, abdominal lumps, and abscesses (therapeutic uses based on Ashtāngahridaya, seventh century, and Bhāvaprakāsha, sixteenth century).

Stem bark is widely used as a single drug or in compound formulations for urinary disorders including urolithiasis, prostatic hypertrophy, neurogenic bladder, and chronic urinary infections.^{2(c)}

Lupeol not only prevented the formation of vesical calculi, but also reduced the size of formed stones.^{2(c)}

Lupeol significantly reduced the renal excretion of oxalate experimentally.^{20(h)}

IMPORTANT FORMULATION/ APPLICATIONS

Varunādi Kwāth Churna (Chakradāṭa, eleventh century), contains Varuna bark, Pāshānabheda, dried ginger and Gokshura in equal proportion with barley alkaline ash as a supplementary ingredient. (Also Vrindamādhava, eighth century.)^{16(a)}

Used for urolithiasis.

Varunādi Kashāya (Sahasrayoga, a non-Samhitā, Kerala Materia Medica; not in the AFI)

contains Varuna bark decoction with seasalt, Shilajatu and Asafoetida. Used for abscesses and inflammation due to abscesses.

Additional information: Varuna fruits were used in migraine, internal abscesses, and for reducing obesity.²⁸ Sprouts and leaves were used for assimilation disorders and piles.²⁷ Root decoction was used for cervical adenitis. Bark pounded with goat's milk was used for removing freckles.^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–30 g of the drug for decoction.

Crocus sativus Linn.

Kuṅkuma

BOTANICAL SOURCE(S)

Crocus sativus Linn.
(Fam. Iridaceae)

During the classical period, the drug sources were *Mimusops elengi* Linn. or *Mesua ferrea* Linn. Heart woods of both are dark red or deep reddish–brown (color of Rudhir or Rakta). Flower buds of *Mesua ferrea* contain a yellow-colored matter; flowers yield a reddish–brown volatile oil. Kashmiraj was mentioned for the first time by Vāgabhata (sixth to seventh century). Chakrapāṇi (eleventh century) interpreted Rudhira of Charaka as Kumkuma.^{16(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kuṅkuma (style and stigma).

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(Kuṅkuma is the correct spelling.)⁴

Rudhir or Rakta (blood-red in color) was the original classical drug. It was equated with vermilion or kumkuma and used in rituals.

International Pharmacopoeial name: *Stigma croci*.¹⁰⁽³⁾

AYURVEDIC SYNONYMS

Kesara, Ghusina, Kasamira, Rakta.

Rudhirā, Vadrika, Agnishikhā, Ghrusrrn, Rakta, Kshataja.^{7,16(a)}

Kesara, Keshara.

Kesharāhva: in most cases, it has been treated as a synonym of Nāgakesara (stamens of *Mesua ferrea*) and where preceded by Padma or its synonyms, as only Padmakesara or as Padma and Kesara both. Kesara has also been interpreted as Bakul (*Mimusops elengi*). It appears (after analysis of classical references) that Kesara has never been used in the texts as a synonym of Kashmiraja kesara.³⁰

HABITAT

Cultivated by corms in the Kashmir valley, specially in the Pampor plateau, at about 1600 m.

Also found in Chaubattia in Uttar Pradesh.

Indigenous to Southern Europe and Southwestern Asia. Cultivated in Eastern Mediterranean and in China, France, Italy, and Spain.¹⁰⁽³⁾

REGIONAL LANGUAGE NAMES

Eng: Saffron;

Assam: Kumkum;

Beng: Jafran;

Guj: Keshar, Kesar;

Hindi: Keshar, Keshara;

Kan: Kunkuma, Kesari;

Mal: Kunkuma ppuvu;
 Mar: Keshar;
 Punj: Kesar, Keshar;
 Tam: Kungumapuvu;
 Tel: Kunkumapuvvu;
 Urdu: Zafran.

CONSTITUENTS

Essential oils, Bitter Glycoside, Picrocrocin and Crocin.

The essential oil is a complex mixture of more than 30 components, mainly terpenes and their derivatives. Major carotenoid crocetin, picrocrocin and safranal are found in saffron. Crocin is a mixture of glycosides, crocetin, a dicarboxylic terpene lipid and alpha-crocetin, a digentioibiose ester of crocetin; *cis*- and *trans*-crocetin dimethyl esters have also been identified.¹³

THERAPEUTIC AND OTHER ATTRIBUTES

Vyanga, Vrana, Siroroga, Drasti roga, Chardi, Kāsa, Kantha roga, Sidhma, Mutrasoṭha, Udavartta, Mūtraghata, Suryavartta, Ardhava bhedaka

Used for freckles, wounds, diseases of the head, diseases of the eye, emesis, cough, diseases of the throat, pityriasis, obstructive enteropathies, retention of urine, chronic sinusitis, and migraine (therapeutic uses based on texts from 1000 BC to fifteenth century, with no direct reference of Kashmir or Keshara).

Charaka used powdered dried buds in prescriptions for irregular fever, jaundice,²⁷ in dysuria, diseases of the nervous system, and gout.^{16(a)} Sushruta also preferred the drug for urinary

disorders,^{16(a)} anuria, skin eruptions, and blood poisoning.²⁸ (Rudhir and Kumkuma were the original names of the drug.)

IMPORTANT FORMULATION/ APPLICATIONS

Pushyānuga Churna (Bhaishajya Ratnāvali, seventeenth century), contains Vāhlika (interpreted as Kumkuma) and 25 other herbs. Prescribed for leucorrhea and diseases of female genital tract.

Kumkumādi Taila (Yogarātnākara, sixteenth century) contains Kumkuma with 26 components of plant, mineral and animal origin, now converted into a cream. In South India, it is available as Kumkumādi Lepa. Used as a pimple cream and for blemishes.

In other quoted compounds, Kumkuma is only a supporting herb.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

25–50 mg.

For depression, a specific saffron extract 30 mg/day (Novin Zaferan Co., Iran) has been used.

For premenstrual syndrome, a specific ethanol extract 15 mg twice daily has been used. For Alzheimer's disease, a specific saffron extract (IMPIRAN, Iran) 30 mg/day has been used.¹³

Research potential: development of a drug for premenstrual syndrome and dysmenorrhea.

C

Crotalaria juncea Linn.

Śaṇa

BOTANICAL SOURCE(S)

Crotalaria juncea Linn.³
 (Fam. Fabaceae)

(Botanical name spelt wrongly in API.)

PHARMACOPOEIAL AYURVEDIC DRUG

Śaṇa (Seed).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Malya puṣpa.

Katutikta, Tvakasāra.²⁷

Śaṇapushpi of Charaka and Sushruta is equated with *C. retusa* Linn./*C. verrucosa* Linn.

Syn. Mālyapushpi, Dhāvani, Śaṇa-ghantikā, Vrihatpushpi, Svalpa-granthi, Ghantāshabda, Urupushpikā.⁴

HABITAT

Cultivated nearly throughout India, also found wild.

REGIONAL LANGUAGE NAMES

Eng: Sunnhemp;
Assam: Ausa, Suila;
Beng: Shanpat;
Guj: Sun, Hemp;
Hindi: Sunn, San;
Kan: Senabu;
Mal: Chanampayaru, Pulivanji;
Mar: Sanavu;
Ori: Champal beeja;
Punj: Sann;
Tam: Sanal;
Tel: Giliginta;
Urdu: San.

CONSTITUENTS

A bitter principle 'Corchorin'.

Seeds yield a cardenolide glycoside, 14-16-dianhydrogitoxygenin 3-O-beta-xylopyranoside, which, on hydrolysis, gave an aglycone, cardiogenin.

Alkaloids junceine, riddeline and trichodesmine; apigenin-7-glucuronide and apigenin-7-4'-O-diglucoside; beta-sitosterol and quercetine have been reported.

Oil content of seed was 5.3%.^{20(h)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Jwara, Hrdroga, Mukharoga, Raktadosa, Carma roga, Timra, Angamarda, Garbhasrābakara.

Used for loss of appetite, fever, heart diseases, diseases of oral cavity, vitiated blood, skin

diseases, cataracts, muscle fatigue and Garbhasrābakra (could not be identified) (therapeutic uses based on Rāja Nighantu, fourteenth century).

Seeds are used only as a paste or poultice in impetigo and psoriasis.¹⁵

Seeds are hepatotoxic.^{15,32}

Alcoholic extract of seeds showed anti-fertility activity in humans.

Ethanollic extract (90%) of the seeds exhibited anti-plantation activity in albino rats at 200 mg/kg for 7 days, after coitus; abortifacient activity was shown when given for 3 days after coitus.^{2(c,d)}

IMPORTANT FORMULATION/ APPLICATIONS

Sarsapādi Pralepa (Bhaishajya Ratnāvali, seventeenth century), is a paste of Sunn seeds with seeds of 5 more plants, in equal proportion. For external application in goiter and cervical lymphadenitis.

Dashamūlādi Ghrita (Ashtāngahridaya, seventh century) does not contain Sunn seeds (AFI, Parts I and II).

Muktādi Churna and Kulathyādi Ghrita are not included in the AFI, Part I and II.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-3 g of the drug in powder form.

Only external application of seeds is advised.

Ethanollic extract of seeds (at a dose of 200 mg/kg in rats) not only damaged the liver, but also other vital organs.

Alkaloids have been reported to be toxic to humans and animals.^{2(d)}

Croton tiglium Linn.

Jayapāla

BOTANICAL SOURCE(S)

Croton tiglium Linn.
(Fam. Euphorbiaceae)

Seeds of *Jatropha curcas* Linn. are sometimes used as a substitute.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Jayapāla (Seed).

API, Part I, Vol. II.

Used only after purification.³

Purification process of seeds: break open the seeds and collect the cotyledons, discarding the embryonic part. Suspend the cotyledons (in a cloth bag) into a solution of cow dung and boil slowly for 4 hours. Recover the drug.⁶ Alternatively, steam in boiling cow's milk for 3 hours. Dried and powdered cotyledons are to be impregnated with lime juice for 3 days (AFI).

AYURVEDIC SYNONYMS

Mukula, Tintidīphala.

Dravanti,^{3,16(c)} Nikumbha.²⁸

Danti is equated in South India with *C. tiglium* seeds, and in other regions with *Baliospermum montanum* (Muell.).^{3,6}

Baliospermum is the source of Danti; *Jatropha curcas* is equated with Dravanti; *Croton oblongifolius* with Hastidanti and *C. tiglium* with Jayapāla (ICMR).^{20(h)}

HABITAT

Throughout tropical India.

Distributed in Bengal, Assam, South India, Sri Lanka, and Myanmar.

REGIONAL LANGUAGE NAMES

Eng: Croton;

Assam: Kanibish;

Beng: laipala;

Guj: Nepalo, Jamalagota;

Hindi: Jamalgota;

Kan: Nepal, lapal beej, Japala, Nerval;

Mal: Nervalam, Neervalam;

Mar: lepal, Japal;

Punj: Japolota;

Tam: Nervalam, Neervalam, Valam;

Tel: Nepalamu;

Urdu: Jamalgota.

Eng: Purging croton,^{2(a)} Tiglium seeds.¹⁴

CONSTITUENTS

Fixed oil, Resins and Phorbol esters.

Seeds contain deterpenes, phorbol esters, including 12-O-tridecane olphorbol-13-acetate (myristoylphorbolacetate), and fixed oil.¹⁴

Diterpene esters are tumor promoting, while several short-chain synthetic phorbol esters and phorbol 14-deoxy-4-deoxy- α -phorbol esters actually interfere with this tumor-promoting activity.

Isoguanosine, isolated from seeds, showed anti-tumor activity against various cell lines in *in vitro* and *in vivo* tests.^{2(c,d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Udararoga, Vibandha, Jvara

Used for diseases of the abdomen, constipation and fever (therapeutic uses based on texts from the thirteenth–sixteenth centuries; drastic purgative activity was emphasized).

In severe conditions of abdominal diseases, oil of Danti and Dravanti seeds was advised (Ashtangahridaya, seventh century) (oil in one to two drops).^{16(a)}

Dried and finely powdered Danti (Nikumbha) is used for preparing caustic alkalis for cauterization; paste prepared with droppings of pigeons and storks is applied on non-suppurating boils; when cooked in the urine of she-buffalos (urine quantity: 16 times the drug's weight), it is used for treating jaundice. It is also used for acute constipation, abdominal lumps, and dropsy (Sushruta Samhitā, 1000 BC).²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Ichhābhedi Rasa (Bhaishajya Ratnāvali, seventeenth century), contains purified endosperm of Jayapāla seeds as main drug with five supporting herbomineral drugs. For obstruction of urine and stool and diseases of the abdomen.

Ashvakanchuki Rasa (Rasayoga Sagara, Hariprapannaji, identity not known in North India) contains 12 herbo-mineral drugs and purified endosperm of Jayapāla seeds, in equal proportions, impregnated with the plant juice of *Eclipta alba* (Bhringarāja). Used for asthma, cough, diseases of the abdomen, constipation, and fever.

Both are mercury-based drugs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

6–12 mg of the drug in powder form.

The herb is obsolete in Europe.¹⁴ Phorbol esters of the oil are carcinogenic; one to two drops are acutely toxic, and lethal at 20 drops.¹⁴ The plant caused hematuria and swelling of the lymph glands in animals.⁷

Cryptolepis buchananii Roem. & Schult. Krsnaśarivā

BOTANICAL SOURCE(S)

Cryptolepis buchanani Roem. & Schult.
(Fam. Asclepiadaceae)

Ichnocarpus frutescens R. Br. and *Decalepis hamiltonii* Wight & Arn. are used as Krishna Sārivā in South India.^{5,4}

Ichnocarpus frutescens is used as the black variety of Sārivā in Bengal.³

PHARMACOPOEIAL AYURVEDIC DRUG

Krsnaśarivā (Root).

API, Part I, Vol. IV.

Black stem pieces of *C. buchanani* are used and sold in Uttar Pradesh market as Anantamūla.³⁰

AYURVEDIC SYNONYMS

Jambu Patra, Syama, Krsnavalli, Krsnamuli.

Shyamlatā, Asita-sārivā.³⁰

HABITAT

Throughout India from Western Kashmir to Assam, ascending to 1200 m in the Himalayas and in south up to Kerala.

REGIONAL LANGUAGE NAMES

Beng: Shyamalata, Krishna saarivaa;

Hindi: Kaleesar, Kalee anantmool;

Kan: Karccumbu;

Mal: Kalipalvalli;

Mar: Mothi kawalee, Kallee kawalee;
Tel: Naltig, Adavipalatige, Rokallipala.

Eng: Black sarsaparilla.

CONSTITUENTS

Alkaloids.

Buchanin and cryptanoside C are reported from the root.

Major constituent of the root extract is germanicol docosanoate.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Aruci, Śvāsa, Kāsa, Jvara, Prameha, Mukha daurgandhya, Atisāra, Kuṣṭha, Kaṇḍu, Pradara, Vāta rakta, Dehadurgandha, Raktapitta

Used for loss of appetite, anorexia, dyspnea, cough, fever, urinary disorders, foul smell from the mouth, diarrhea, obstinate skin diseases including leprosy, itch, menorrhagia/leucorrhea, gout, foul smell from the body and hemorrhagic diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

According to Bhāvaprakāsha and Dhanvantari Nighantu, both varieties of Sārivās (Sāriva and Krishna Sāriva) are used as closely related drugs.

Charaka used the root in prescriptions as a blood purifier, a styptic in intrinsic hemorrhage, in erysipelas, in chronic fever and in skin diseases. Sushruta used the black variety in respiratory trouble and wasting diseases (1000 BC).^{27,28}

IMPORTANT FORMULATION/ APPLICATIONS

Sārivādyāsava (Bhaishajya Ratnāvali, seventeenth century), not quoted in API, contains both white and black varieties of Sārivā with 23 herbs, in equal proportion. (AFI equated Sārivā and Anantā as Shveta Sārivā.) Prescribed as a blood purifier in skin diseases, diabetic carbuncles, syphilitic diseases.

Shatāvari Guḍa (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Shatāvari root juice as the main component, and both varieties of Sārivā are among the 14 supporting herbs.

Used for dysuria and diseases of the female genital tract.

In all other quoted compounds, both Shveta and Krishna Sārivā are included among the supporting constituents.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

A comparative study is required to identify the correct source of Sārivā before using it in blood-purifying compounds.

Cucumis melo var. utilissimus Duthie & Fuller Ervāru

BOTANICAL SOURCE(S)

Cucumis melo var. *utilissimus* Duthie & Fuller
Syn. *C. utilissimus* Roxb.
(Fam. Cucurbitaceae)

C. melo Linn. var. *momordica* Duthie and Fuller
syn. *C. momordica* Duthie and Fuller is also equated with Ervaru and Karhatī.^{20(h)}

C. melo Linn. is Musk Melon; Kharbuja. *C. sativus* Linn. is Cucumber and Khirā.

Seeds of all the four species are used together in Indian medicine.

REGIONAL LANGUAGE NAMES

Eng: Snake cucumber;
Beng: Kakur, Karikuda;
Guj: Kakadi;
Hindi: Kakri, Kakadi;
Kan: Saute;
Mal: Kamkadi, Vellarika;
Mar: Kakadi, Valnka;
Punj: Kakri;
Tam: Kakkarikkay, Vellarikkai;
Tel: Dosakaya;
Urdu: Kakari.

PHARMACOPOEIAL AYURVEDIC DRUG

Ervāru (Seed).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Bahukanda, Brhatphala, Hastipani, Karkaṭi.

Ervārūka.^{3,30}

HABITAT

Cultivated in many parts of India, especially in upper India, particularly in Uttar Pradesh and Punjab.

CONSTITUENTS

Oil and sugars.

Carotene and ascorbic acid content: 0.2 and 16.7 mg/100 g of fruit, respectively.

Amino acids: lysine, arginine, aspartic acid, glycine, threonine, glutamic acid, alanine, tryptophan, leucine, and isoleucine. Calcium 40.9, magnesium 8.3, phosphate 40.5 and vitamin C 2.3 mg%.^{20(h)}

The whole seed inhibited bacterial growth of *Xanthomonas campestris*, *Pseudomonas cichorii*, and *Escherichia coli* (inactive against *Bacillus subtilis*).^{20(h)}

THERAPEUTIC AND OTHER ATTRIBUTES

Āsmari, Mūtrakṛcchra, Gulma, Raktapitta, Trṣṇā, Dāha, Jvara

Used for calculus, dysuria, abdominal lumps, bleeding disorders, thirst, burning sensation and fever (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) included seeds of *Ervārūka* in prescriptions for urinary calculus, dysuria, and diseases of the bladder.²⁷

Sushruta used oil of seeds as a cooling drug and fruits as a diuretic, stomachic, and laxative.²⁸

Seeds are used in ethnomedicine in painful micturition and suppression of urine, in nose bleeding and as a refrigerant drink, along with seeds of other *Cucumis* fruits during summer.

IMPORTANT FORMULATION/ APPLICATIONS

Dadhikā Ghrita (Ashtāngahridaya, seventh century), *Ervāru* and *Tripusa* seeds are among 40 supplementary herbs in the compound of 73 drugs.

Used for epilepsy, insanity, and urinary obstructions. *Ervārūbija-yoga* (Bhaishajya Ratnāvali, seventeenth century, not quoted in the API), a single drug preparation of *Ervāru* seeds mixed with rocksalt, is to be taken with cooked, fermented rice starch in urine retention.

Ervārūbija-yoga (Mūtrakṛcchra) contains powders of *Ervāru* seed, licorice and *Berberis arisata*. To be taken with rice water for dysuria. (Bhaishajya Ratnāvali. Not quoted in the API.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of seeds.

Cucumis sativus Linn.

Trapuṣaṁ

BOTANICAL SOURCE(S)

Cucumis sativus Linn.
(Fam. Cucurbitaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Trapuṣaṁ (Seed).

API, Part I, Vol. V.

Tripusa is found in texts, not *Tripusha*.^{4, API, Part I}

AYURVEDIC SYNONYMS

Śveta karakaṭakam, Sudhāvāsah, Mutralam, Kaṇṭakiphalam

Trapusi, Trapusa.³⁰

Kantaki-latā, Sudhāvāsa, Paraṅkiṭa, Chhadyāyani, Mūlaphalā, Tikta, Hasti-parini.⁴

HABITAT

Widely cultivated throughout India up to an altitude of 1200 m.

REGIONAL LANGUAGE NAMES

Eng: Cucumber;
Beng: Ksheeraa, Shashaa;
Guj: Taanslee;
Hindi: Kheeraa;
Kan: Mullusavte, Santekaayi;
Mal: Vellari;
Mar: Tause, Khiraa;
Ori: Kantiaali kaakudi;
Punj: Khiraa;
Tam: Vellarikkaay, Pippinkaay;
Tel: Khirakaya;
Urdu: Kheeraa.

Urdu: Khiyar.³⁷

CONSTITUENTS

Fixed oil and sugars.

Seeds contain alpha- and beta-amyrin, multiflorenol, isomultiflorenol, 24-methylenecycloartenol, cycloartenol, and tirucalol.^{2(c)}

Seeds also contain sterols, including sitosterol, stigmasterol, and campesterol.^{2(d)}

Fatty acid composition of oil: palmitic acid 13.0%, stearic acid 5.2%, oleic acid 10.4%, and linoleic acid 71.4%.^{20(h)}

THERAPEUTIC AND OTHER ATTRIBUTES

Mūtraghāta, Mūtrakṛcchra, Raktapitta, Daurbalya, Dāha, Raktavikāra, Anidrā, Śīrahśūla, Chardi, Śītajvara

Used for urinary obstruction, dysuria, bleeding disorders, emaciation, burning sensation, vitiated blood, insomnia, headache, emesis and *Sheetajvara* (either low-grade fever or fever with rigor?) (therapeutic uses based on texts from 1000 BC to sixteenth century).

In ethnomedicine, seed sap is used as an antilithic, in urinary infection, abdominal pain, flatulence, and hyperacidity; a paste is applied on sunburn.^{20(h)}

IMPORTANT FORMULATION/ APPLICATIONS

Dādhika Ghrita (Ashtāngahridaya, seventh century), Trapusa and Ervāru seeds are among 40 supplementary herbs in the compound of 73 drugs. For epilepsy, insanity, urinary obstruction.

Since 1000 BC, seeds of cucumber have been used alone or in prescriptions as a diuretic, stomachic, laxative, and as a cooling drug in hemorrhages and hematuria.

Trapusa seeds, mixed with sour gruel and salt, were given in severe retention of urine. Seeds were also prescribed with sesame seeds, purified butter, and milk.

Trapusa root with honey, taken with rice water, was the prescription for intrinsic hemorrhage. Trapusa seeds were also included in the diet. (Charaka Samhitā, Sushruta Samhitā, 1000 BC, Bhāvaprakāsha, sixteenth century.)^{16(a),28}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g powder.

Cuminum cyminum Linn.

Śvetajīraka

BOTANICAL SOURCE(S)

Cuminum cyminum Linn.
(Fam. Umbelliferae)

The three Jirakas of Ayurvedic texts: Sveta-jiraka, Krishna-jiraka (*Carum bulbocastanum* W. Koch) and Karavi (*Carum carvi* Linn.). *Nigella sativa* Linn.⁷ is used as Krishna-jiraka in South India and as Kalonji in North India.⁶

PHARMAPOEIAL AYURVEDIC DRUG

Śvetajīraka (Fruit).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Ajāji, Jiraka, Ajājikā.

Jāji, Jarana.³

Ajāji is equated with Upakunchikā (*Nigella sativa*) in Kerala.³

HABITAT

Cultivated.

Cuminum: indigenous to Mediterranean regions. Four species are found from the Mediterranean to Sudan and Central Asia.¹

REGIONAL LANGUAGE NAMES

Eng: Cumin seed, Cumin;

Assam: Jira;

Beng: Jira, Sadajira;

Guj: Jirautmi, Jiru, Jiraugi, Jeeru, Jirun;

Hindi: Jira, Safed jira;

Kan: Jirage, Bilejirege;

Kash: Safed zoor;

Mal: Jeerakam;

Mar: Pandhare jire;
 Ori: Dhalajeera, Dalajira, Jira;
 Punj: Safed jira, Chittajira;
 Tam: Sheeragam, Chirakam, Jeerakam;
 Tel: Jilakarra, Telia Jilakarra;
 Urdu: Zirah, Zirasafed.

CONSTITUENTS

Essential oil.

Essential oil (about 2%–5%), composed mainly of cuminaldehyde (25.01%) and flavonoid glycosides belonging to apigenin, luteolin and chrysoeriol groups. Lipids up to 14.5%, neutral lipids 84.8%, glycolipids 10.1%, and phospholipids 5.1%. Neutral lipids contain triglycerides composed of petroselinic 89.1%, palmitic 10.3%, oleic 0.4%, and linoleic acids 0.2%.^{2(c,d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Atisāra, Kṛmiroga

Used for loss of appetite, acute diarrhea, and worm infestations (therapeutic uses based on texts from 1000 BC to sixteenth century).

Seeds were prescribed internally for indigestion, colic, pain and intestinal catarrh; powdered seeds with jaggery were prescribed for irregular or malarial fever with rigor (Sushruta Samhitā, 1000 BC; Ashtāngahridaya, seventh century; Vrindamādhava, eighth century).^{16(a),28}

Charaka used jiraka in prescriptions, as a general tonic and as an aid to virility (1000 BC).²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Jirakārishta (Bhaishanjya Ratnāvali, seventeenth century), contains cumin seeds as main drug with 11 supporting herbs. For puerperal diseases, ebolic, and uterine tonic.

Jirakādi modaka (Bhaishajya Ratnāvali) contains cumin seeds as the main drug and *Cannabis sativa* seeds in a 2:1 proportion of the main drug, with 40 supporting herbs and 4 calcined minerals. Used for acute diarrhea and intermittent fever.

Hinguādi Churna (Yogaratanākara, sixteenth century) and Hinguvachādi Churna (Ashtāngahridaya, seventh century) contain asafoetida as the main drug; cumin seeds are included as a supporting drug. Used for digestive disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Seed oil increases level of GST and GSH enzymes and protects the liver and stomach against carcinogens.

Aqueous extract showed a cholinomimetic effect.^{2(c,d)} Cuminaldehyde is larvicidal and anti-bacterial.¹³

Curculigo orchioides Gaertn.

Tālamūli

BOTANICAL SOURCE(S)

Curculigo orchioides Gaertn.
 (Fam. Amaryllidaceae)

C. malabarica Wight.⁵

In Kerala, in practice, *C. orchioides* is used for both black and white varieties of Mushali (known as Nilappana in Malayalam).⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Tālamūli (Rhizome).

Curculigo orchioides is equated with kṛṣṇa musalī (AFI, Part I, page 333).

API, Part I, Vol. IV.

Black variety of Mushali has long been used as Tālamūli. The white variety of Mushali is equated with *Asparagus adscendens* Roxb.

and *Chlorophytum aurandinaceum* Baker and *C. borivillianum* (cultivated in Jalagaon, Maharashtra).

AYURVEDIC SYNONYMS

Bhumitāla.

Tālapatri, Tālapatrikā, Tālamūlika,³⁰ Mushali.^{3,4}

HABITAT

Occuring wild in sub-tropical Himalayas from Kumaon eastwards, ascending up to 1830 m in Khasi hills, Manipur and the Eastern Ghats, also from Konkan southwards.

REGIONAL LANGUAGE NAMES

Assam: Talmuli, Tailmuli;
Beng: Talmalu, Tallur;
Guj: Kalimusali;
Hindi: Syahmusali, Kalimusli;
Kan: Neltal, Neltathigodde, Nelatale, Nelatelegadde;
Mal: Nilappenea;
Mar: Kali musali, Bhuimaddi;
Ori: Talamuli;
Punj: Syah musali, Musali safed;
Tam: Nilappanai;
Tel: Nel tadigadda;
Urdu: Musali Siyah, Kali musali.

CONSTITUENTS

Tannin, Resin, Sapogenin and Alkaloid.

Major constituents are glycosides, polysaccharides, including hemicellulose, starch, tannins, resin, mucilage, fat, and calcium oxalate. Alkaloids lycorine, sapogenin, yuccagenin, and beta-sitosterol were isolated from fresh rhizomes. Root yielded aliphatic ketones and esters; triterpenoids include curculigol and curculigenin A; glycosides include corchioside A, orchioside A and B, curculigloside, orclinol-3-O-beta-D-glucoside, corchioside A, and anacaroloside.^{20(h)}

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa, Vātaroga, Karsya, Kṣtakṣaya

Used for piles, diseases of the nervous system, emaciation and weakness due to internal injury (therapeutic uses based on texts from the fourteenth–sixteenth centuries).

According to Bhāvaprakāsha (sixteenth century), a compound containing Shatavari (*Asparagus racemosus*), Mundi (*Sphaeranthus indicus*), Guduchi (*Tinospora cordifolia*), Hastikarna Palāsha (*Leea macrophylla*) and Tālamūli (*C. orchioides*) acts as an aphrodisiac.

Uses in ethnomedicine: for treating spermatorrhea, impotency, and increasing sexual vigor in males. Also used for leucorrhea, as a uterine stimulant, as a stomachic during menstruation and for increasing lactation.

IMPORTANT FORMULATION/ APPLICATIONS

Gandharva-hastādi Kwāth Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains 8 herbs including Bhumilatā root with rock salt and jaggery. For acute constipation and loss of appetite.

Chandanādi Churna (Bhaishajya Ratnāvali, seventeenth century) contains 18 herbs, including Tālamūli root with calcined iron. Used for dyspnea, cough, chronic fever, jaundice, and urinary disorders.

(Both of these quoted compounds do not represent the profile of an important tonic herb of Ayurveda.)

Shatāvri Lehya (Sahasrayoga)⁶ contains both Shveta and Krishna Mushali. Prescribed as a restorative, hematinic, cholagogue, and vitalizing tonic.

Tālamūli is used as an aphrodisiac and in rejuvenating and viriligenic tonics.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Musali is being promoted as an aphrodisiac drug on a large scale. It should be subjected to valid clinical trials as a single drug.

Curcuma amada Roxb.

Āmra Haridrā

C

BOTANICAL SOURCE(S)

Curcuma amada Roxb.
(Fam. Zingiberaceae)

In Indian medicine, the powder of five turmeric, mixed with milk, is given for fracture healing: *Curcuma longa*, *C. zedoaria*, *C. angustifolia*, *C. aromatica* and *C. amada*.

PHARMACOPOEIAL AYURVEDIC DRUG

Āmra Haridrā (Rhizome).

API, Part I, Vol. V.

The genuine material is available in West Bengal, Kerala, and Tamil Nadu.

At a majority of trade centers, *C. aromatica* is sold as Āmbāhaldi.³⁶ (*C. aromatica* Salisb. is known as wild turmeric.)

AYURVEDIC SYNONYMS

Āmrādrakam, Āmrāgandha-haridrā

Āmra Haridrā entered into Ayurvedic medicine during the fifteenth to sixteenth centuries. References in earlier texts could not be traced. In Kaiyadeva Nighantu (fifteenth century), Aranyarajani-kanda was mentioned as a wild species of Haridra. In the sixteenth century, Āmrāgandhi-haridrā was mentioned in Bhāvaprakāsha. Both were used in pickles and as a stomachic and carminative.

HABITAT

Grown in West Bengal and on the hills of west coast of India.

Wild in parts of West Bengal and cultivated in Gujarat, Uttar Pradesh, Kerala, Karnataka, Tamil Nadu, and Northeastern states.

Originated in the Indo-Malayan region, distributed widely in the tropics from Asia to Africa and Australia.

REGIONAL LANGUAGE NAMES

Eng: Mango-ginger;

Beng: Aamaa aadaa;
Guj: Aambaa haldhar;
Hindi: Aamaa-haldi, Amiyaa haldi;
Kan: Ambarasini, Hulu arsin;
Mal: Mangayinji;
Mar: Aambe halad, Ambaa halad;
Punj: Ambiya haladi;
Tam: Mankayyinji;
Tel: Mamidi allamu.

CONSTITUENTS

Volatile oil (α -pinene, δ -camphor), α - curcumene, 1- β curcumene, phytosterol.

Rhizomes gave 0.1% volatile oil (fresh weight basis) and 0.7% on a dry weight basis.

Curcumin content 0.1% (*C. longa* yields 7%).

Essential oil is primarily composed of terpene hydrocarbons identified as alpha-pinene (0.40%–0.70%), car-3-ene (0.75%) and cis-ocimene (1.85%). Monoterpenes of volatile oils include camphor (0.72%–11.2%) and 1, 8-cineole (0.1%–6.0%); sesquiterpenes include beta-curcumene (0.26%–11.2%), ar-curcumene (28.1%) and curzernone (0.14%–7.1%).^{20(h)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kaṇḍu, Vṛana, Kāsa, Śvāsa, Hikkā, Jvara, Abhigāhataja, Śopha, Karṇaśūla, Sannipāta

Used for pruritus, ulcers, cough, dyspnea, hic-cough, fever, sprains, edema, earache, and typhoid fever (therapeutic uses based on texts from the fifteenth to sixteenth centuries).

In ethnomedicine, rhizomes are used for gastric and stomach problems, in contusions, sprains, bone fractures (internally and topically) and in skin diseases (internally and topically).

IMPORTANT FORMULATION/ APPLICATIONS

Asthisandhānaka Lepa (Krishnagopalji Vaidya of Ajmer; non-classical), contains 12 herbs in equal proportion.

Paste for application on fractured bone and sprains.

For dislocation of joints and bone fractures, *Cissus quadrangularis* was the drug of choice in classical Ayurvedic medicine. *C. amada* could not be found in any of its compounds as a supporting herb.

DOSAGE/USAGE/CAUTIONS/COMMENTS

2–4 g.

LD₅₀ of ethanolic extract of rhizome was 1000 mg/kg i.p. in mice.^{20(h)}

C

Curcuma longa Linn.

Haridrā

BOTANICAL SOURCE(S)

Curcuma longa Linn.
(Fam. Zingiberaceae)

Syn. *C. domestica* (Medik.) Valetton; *C. rotunda* L., *C. xanthorrhiza* Naves *Amomum curcuma* Jacq.¹⁰⁽¹⁾

Source of *Radix curcumae* in China: *Curcuma wenyujin* Y.H. Lee et C. Ling, *C. kwangsiensis* S. Lee et C.F. Lang, *C. phaeocaulis* Val.¹⁰⁽¹⁾

PHARMACOPEIAL AYURVEDIC DRUG

Haridrā (Rhizome).

API, Part I, Vol. I.

International Pharmacopoeial name: *Curcumae longae rhizome*.^{8,10(1)}

AYURVEDIC SYNONYMS

Rajanī, Niśā, Niśi, Rātri, Kṣaṇadā, Doṣā.

Naktāhvā, Sharvari,³ Ranjani, Gauri, Vara-varṇini, Pitā, Varṇa vati, Nishā, Varna-vināshini.⁴

Haridrā, Priyaka, Haridrūma,²⁷ Kānchani, Krimghna, Varavarnini, Yoshitapriya, Hattavilāsini, Naktāhvā.⁷

Rajanī, *Nishā*, *Nishi*, *Rātri* and *Nilakanth* should be equated with *C. caesia* Roxb. (cultivated mainly in West Bengal).⁷

HABITAT

Cultivated in all parts of India.

Particularly cultivated in West Bengal, Tamil Nadu and Maharashtra.

Also extensively cultivated in China, Indonesia, Thailand, and throughout the tropics, including tropical regions of Africa.¹

REGIONAL LANGUAGE NAMES

Eng: Turmeric;
Assam: Haldhi, Haladhi;
Beng: Halud, Haldi;
Guj: Haldar;
Hindi: Haldi, Hardi;
Kan: Arishina;
Kash: Ledar, Ladhir;
Mal: Manjal;
Mar: Halad;
Ori: Haladi;
Punj: Haldi, Haldar;
Tam: Manjal;
Tel: Pasupu;
Urdu: Haldi.

Urdu: Zard chob.

CONSTITUENTS

Essential oil and a coloring matter (curcumin).

Essential oil (6%) composed of a number of monoterpenes and sesquiterpenes, including zengiberene, curcumene and alpha- and beta-turmerone. Coloring principles (5%) are curcuminoids, 50%–60% of which are a mixture of curcumin, monodesmethoxycurcumin and bisdesmethoxycurcumin.¹⁰⁽¹⁾ Lipids (up to 14.5%) contain neutral lipids (84.4%), glycolipids (10.1%) and phospholipids (5.1%); neutral lipids contain triglyceride compounds

of petroselinic (89.1%), palmitic (10.3%), oleic (0.4%) and linoleic acids (0.2%).^{2(c,d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Viṣavikāra, Kuṣṭha, Vṛana, Tvagroga, Prameha, Pāṇdu, Śītapitta, Pinasa

Used for toxic conditions, leprosy, ulcers, skin diseases, urinary disorders, anemia, urticaria and sinusitis (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Charaka and Sushruta (1000 BC) used dried tubers in prescriptions (internal and external) for toxicosis, dermatosis, senility and impaired vision;²⁷ for purifying breast milk, lack of breast milk, chronic dystentery, hemoptysis, edema, urethral discharges, seminal disorders, uterine and vaginal diseases, leprosy, virulent skin diseases, and for sterilizing the interior of ulcers.²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Haridrākhaṇḍa (Bhaishajya Ratnāvali, seventeenth century), contains Haridrā as main herb, 13 supporting herbs (each, 1/8 of the

main herb) and calcined iron (AFI formulation. OTC products contain Haridradvya, *C. longa* and *Berberis aristata*, also *Picrorrhiza*, *Tinospora cordifolia* and *Adhatoda vasica* root.) Prescribed for urticaria and ascitis.

Typical uses: ash of *C. longa*, prepared by closed heating, was prescribed for asthma and cough (2 g with honey).

Rhizomes, kept in saline water for 21 days, then parched on fire, were used as a sucking drug for cough and asthma.^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Bioavailability of curcumin is very low. A number of improved versions, including theracurmin, have been introduced.

Daily dose of 1200 mg/day of curcumin is equal to about 40 g/day of turmeric powder, which contains maximum 3% curcumin.²¹

Contraindicated in obstruction of the bile passages.⁸

Research potential: ash of *Curcuma longa* rhizome.

Curcuma zedoaria Rosc

Karcūra

BOTANICAL SOURCE(S)

Curcuma zedoaria Rosc
(Fam. Zingiberaceae)

Rhizomes of *Curcuma caesia* Roxb. (Black zedoary) are sold as a substitute, especially in West Bengal.³⁶

The source of Karchūra in Kerala, in recent times, has been *Kaempferia galanga* Linn.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Karcūra (Dried rhizome).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Kaccura, Dravida.

Gandha-mūlaka, Durlabha, Shati.⁴

Vedamukhya, Drāviri.³⁶

(Many authors equate Shati with *Hedychium spicatum* Smith. syn. Palāshi, Shadgranthā, Suvratā, Gandha-mulani.)⁴

HABITAT

Growing wild in Eastern Himalayas and in moist deciduous forests of the central region of Karnataka; also cultivated throughout India.

Native to Northeast India.^{2(a)}

Also cultivated in Sri Lanka and China.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Zedoary;

Assam: Katuri;
 Beng: Sali, Ekangi, Sari, Kachura;
 Guj: Kachuro, Shatakachuro;
 Hindi: Kacura;
 Kan: Kachora;
 Mal: Kachalam;
 Mar: Kachora;
 Ori: Kachoramu, Gandha sunthi, Karchura;
 Punj: Kachur;
 Tam: Kichili, Kizhangu, Kitchiliki zhangu, Padam
 kizhangu;
 Tel: Kachoramu, Kichili gadda;
 Urdu: Zarambad.

CONSTITUENTS

Essential oil and Resin.

Essential oil (1.0%–1.5%), contains zingiberene, 1, 8-cineole, D-camphor, D-camphene, D-borneol, alpha-pinene; in addition, curcumol, zederone, curcumeneol, curculone, furanodienone, and isofuranodienone. Curcuminoids include curcumin and desmethoxycurcumin; starch 50%.¹⁴
 Shoti starch of commerce is extracted from the *C. zedoaria* tuber and used as a substitute for arrowroot and barley.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Hikkā, Swāsa, Kāsa, Kustha, Arsa, Gulma, Jvara, Vrana, Plihā, Galganda, Krmi

Used for hiccup, dyspnea, cough, leprosy, piles, abdominal lumps, fever, wounds, diseases of spleen, goiters, and worms (therapeutic uses based on texts from 1000 BC to fifteenth century).
 Charaka (1000 BC) prescribed the fruit and tuber as an appetizer, in cough, hiccup, asthma, inflammations, arthritis, piles, and skin diseases. Dhanvantari Nighantu and

Bhāvaprakāsha (sixteenth century) attributed similar properties to the tuber.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Kachchūrādi Chūrna (Sahasrayoga, a non- Samhitā, Kerala Materia Medica), contains 28 herbs and 2 mineral substances in equal proportion. Karchura rhizome is one of them. Paste is to be applied on the forehead for hiccup, sinusitis, headache, dementia, diseases of the eye, diseases of the ear, diseases of mucous membrane.
 Sūtashekhara Rasa (Yogarātnākara, sixteenth century) contains five mineral drugs, including mercury, and 15 plant drugs, all in equal proportions, the Karchura rhizome is one of them. Used for hyperacidity, peptic ulcers and chronic gastritis. The market drug, without calcined gold, contains mercury and ginger with red ochre in 8:2 proportions.
 Karpuryādiarka (Arkaprakāsha, Rāvana, period not known) contains 50 animal, mineral and plant drugs in equal proportions. Karchura is one of them.
 Karchura Tailam (Bhaishajya Ratnāvali, seventeenth century) is prescribed for topical application in skin diseases and infected ulcers.¹⁸

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-3 g of the drug in powder form.

The alcoholic extract of the root in a dose of 1–10 mg/mL inhibited the growth of *Entamoeba histolytica* *in vitro*.¹⁰⁰
 Research potential: a herbal drug for amebiasis; also for bacterial and fungal infections.¹⁰¹
 (See References 100 and 101.)

***Cymbopogon citratus* (DC.) Stapf.**

Kattṛṇa

BOTANICAL SOURCE(S)

Cymbopogon citratus (DC.) Stapf.
 (Fam. Poaceae)

Syn: *Andropogon citratus* DC.
C. coloratus (Nees ex Hook, f.) Stapf. syn.
Andropogon coloratus Nees is known as East Indian lemongrass, Malabar or Cochín

lemongrass (found in Tirunelveli, Travancore, and Kochi).

PHARMACOPOEIAL AYURVEDIC DRUG

Katṛṇa (Whole plant). Bhūtikā. AFI, Part I, page 333. API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Bhūṛṇah, Jambīratṛṇah, Guhyabīja, Bhutika.

There is still some confusion regarding the botanical source of aromatic grasses.

Bhūṛṇa and Bhūstrṇa seem to belong to different sources. Bhūstrṇa belonged to the Surasādi group of herbs. It has been suggested that it should be equated with *Hyptis suaveolens* Poit.^{16(a)}

HABITAT

Cultivated in various parts of India.

Grows wild in Mysore. Grown in gardens in Punjab, Mumbai, and Vadodara.

Widely distributed all over the tropics of both hemispheres. Cultivated in Java, Strail settlements, the West Indies and in parts of South America.

The bulk of the oil is produced in Madagascar and Comoro Island. A small quantity is produced in Sri Lanka and Java.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Lemon grass;

Beng: Gandhatrun, Gandhabenaa;

Guj: Lilichaa; Hindi: Gandhatrun, Harichaaya;

Kan: Majjigahullu;

Mal: Chennanampullu, Incippullu, Vasanappullu;

Mar: Hirvaa chahaa, Olaa chahaa, Paatichahaa;

Punj: Gandhatrun, Sharbaan;

Tam: Vasanaipillu;

Tel: Nimmagaddi, Vasana gaddi.

Eng: West Indian lemon grass, True lemon grass.^{20(h)}

CONSTITUENTS

Essential oil containing citral as major component besides geraniol and other terpenes.

Essential oil contains alpha- and beta-citrals, citronellol, elemol, geraniol, neral, nerol, terpinol, and 2-undecanone.¹⁵

Leaves also contain flavones, luteolin and its 7-O-beta-glucoside and 7-O-neohesperidoside, *iso*-orientin and 2''-O-rhamnosyliso-orientin. Presence of chlorogenic, caffeic and *p*-coumaric acids, fructose, sucrose, octacosanol, triacontanol, and dotriacontanol has also been reported.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Kṛmi, Arocaka, Santāpa, Dāha, Vāmi, Kāsa, Śvāsa, Dadru, Udara, Bhūtabādha, Grahabādha, Udarda

Used for obstinate skin diseases including leprosy, worms, tastelessness, restlessness due to heat, burning sensation, vomiting, cough, dyspnea, ringworm, diseases of the abdomen, unfounded fear psychosis and illusions and urticaria (therapeutic uses based on texts from 1000 BC to sixteenth century).

Infusion or decoction of whole plant with ginger, cinnamon and sugar is used as diaphoretic in fevers; with black pepper in discorded menstruation and congestive and neuralgic dysmenorrhea; and infusion of leaves with *Mentha* leaves, black pepper, dried ginger, and sugar candy in catarrh, fever, flatulence, and colic. Oil is prescribed in vomiting, cholera, gastric irritability and externally as a rubefacient in neuralgia, rheumatism, and in skin diseases.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

Māshabalādi Kwātha Churna (Bhaishajya Ratnāvali, seventeenth century), contains 7 plant drugs in equal proportion, including Katṛṇa, *Sida cordifolia* root and *Mucuna pruri* seeds. For paralysis, torticollis, facial palsy. Cetrol and citronellal constituents of the volatile oil of *C. citratus* exhibit marked sedative activity.⁷ Geraniol and *d*-limonene from the essential oil induce the activity of glutathione S-transferase, a detoxifying enzyme that is believed to be a major factor for chemical carcinogen detoxification.⁷

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Cymbopogon martinii (Roxb.) Wats.

Rohiṣa

BOTANICAL SOURCE(S)

Cymbopogon martinii (Roxb.) Wats.
(Fam. Poaceae)

C. martinii (Roxb.) Wats. grows in two forms, a diploid yielding Palmarosa oil, known as “Motia”, and a tetraploid yielding Ginger grass oil, known as “Sofia.”^{20(h)}

PHARMACOPOEIAL AYURVEDIC DRUG

Rohiṣa (Whole plant).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Saugandhikā, Dhyāmpaura, Shyamaka.^{20(h)}

Dhyāmaka is a doubtful synonym.³

Valeriana pyrolaefolia Decne has been suggest as the source of Dhyamaka.^{6(a)}

Bhūta, Rohisaka, Bhuti, Bhutika, Sarala, Tr̥ṇa, Shyāmaka, Paura, Vyāmaka and Devagandhakam.⁴ (Refer to analysis in Reference 30, pages 342–346.)

HABITAT

Occurs wild in dry localities and cultivated in many parts of India.

Found from Kashmir through Punjab hills to Almora, Garhwal and Singhbhum, and extending from central regions to Rajasthan, Mumbai and South India.^{20(h)}

Motia var. grows in open forests or on sunny slopes; it is not gregorious. Sofia var. is gregori-ous and grows in lower altitudes and valleys in shady, dense, moist areas.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Rosha grass;

Beng: Agam ghaas, Agiyaa ghaas;

Guj: Rondso, Ronsdo;

Hindi: Rohis, Roosaa, Roosaa ghaas, Mirchagandha;

Kan: Dunllu, Harehullu;

Mal: Sambhaarpullu;

Mar: Rohish gavat;

Punj: Agya ghash;

Tam: Kaavattampillu, Munkipul, Chooraiappul;

Tel: Kaamakchhi-kassuvu.

Eng: Palmarosa.^{20(h)}

CONSTITUENTS

Essential oil (0.5 per cent) containing terpens such as geraniol, geranyl acetate, citronellol, linalool, geranyl butyrate, myrcene, α - and β -pinene.

The essential oil obtained from Motia var. is rich in geraniol (79%–95%), known as Palmarosa oil, and also Rusa or East Indian geranium oil. Sofia var. yields an oil with less geraniol (39.2%–48.1%), known as Gingergrass oil.^{2(a)} Motia grass yields about 1.4% oil; Sofia grass yields about 0.4% oil.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kāsa, Hṛdroga, Śūla, Raktapitta, Apasmāra, Pinasa, Kaphajvara, Kaṇṭha roga, Jvara, Aruci, Kuṣṭha, Katiśūla, Prameha, Vṛścika-viṣa

Used for cough, heart disease, colic, bleeding disorders, epilepsy, sinusitis, fever due to catarrh, diseases of the throat, fever, anorexia, obstinate skin diseases, lower backache, urinary disorders, and scorpion bites (therapeutic uses based on texts from the fourteenth to sixteenth centuries).

Charaka (1000 BC) used a decoction of the Rohisha plant and roots in prescriptions for fever, abdominal diseases, splenic disorders, and jaundice.²⁷

Sushruta (1000 BC) used a decoction of the Rohisha plant with honey in fever accompanied by bronchitis, cough, asthma, hiccup, swelling in the throat, pain in the chest and in dyspepsia.²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Māshabalādi Kwātha Churna (Bhaishajya

Ratnāvali, seventeenth century), does not

contain Rohisha; contains Kattrna, identified with *C. citratus*.

Balā Taila (Ashtāngahridaya, seventh century) contains 48 plant parts in equal proportions, and Dyamaka (a controversial synonym of Rohisha) is one of them. Used for neurological disorders.

Palmarosa oil is used in preparations for lumbago, stiff joints, skin diseases, and baldness (for external use).

Mosquito-repellant ointments contain Palmarosa oil.^{2(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g.

Decoction: 50–100 mL.

Oil: one to three drops.

Cynodon dactylon (Linn.) Pers.

Dūrvā

BOTANICAL SOURCE(S)

Cynodon dactylon (Linn.) Pers.
(Fam. Poaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Dūrvā (Whole plant).
API, Part I, Vol. IV.

Dūrvā (root).
API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Sataparva, Satavalli, Niladurva. Shatavīrya (root).

Shatvirya, Sahasravirya (Charaka Samhitā, 1000 BC), Nila-dūrvā (Kaiyadev Nighantu, fifteenth century; Bhāvaprakāsha, sixteenth century). (In Rāja Nighantu, fourteenth century, Dūrva and Nila-dūrva are two different drugs. Similarly, in Bhavaprakasha, sixteenth century, Nila-dūrva and Shveta-dūrva are two different drugs.)

Dūrvā: *kashaya* (astringent), *madhura* (sweet).
Nila-dūrvā: *tikta* (bitter), *madhura* (sweet).
Shveta dūrva: *kashaya* (astringent), *tikta* (bitter).

(Only two varieties, white and green, have been recognized and used.)³⁰

HABITAT

Creeping grass, growing throughout India.

REGIONAL LANGUAGE NAMES

Eng: Creeping cynodon, Conch grass, Dhub grass;
Assam: Ushb;
Beng: Doorva, Neel doorva;
Guj: Dhro, Khaddhro, Leelodhro, Neeladhro;
Hindi: Doob, Neelee doob;
Kan: Garikai-hallu, Garike, Garik hallu;
Mal: Karuk, Karukappullu;
Mar: Harlee, Neel durva, Haryali;
Punj: Dubea;
Tam: Arukampillu;
Tel: Doolu, Harvali, Garichgaddi, Garika, Pacchgaddi;
Urdu: Doob ghas, Doob.

Eng: Bermuda grass.

CONSTITUENTS

Whole plant: Phenolic Phytotoxins (Ferulic, Syringic, P-coumaric, Vanillic, P-Hydroxybenzoic and O-Hydroxyphenil acetic acid).

Root: phenolic phytotoxins and flavonoids.

Whole plant: beta-sitosterol and its glycosides, along with palmitic acid; triterpenoids, arundoin and friedelin and the presence of selenium; alkaloids ergonovine and ergonovine; cyanogenic heteroside, cyanogenic glucoside triglochinin; furfural, furfural alcohol, phenyl acetaldehyde, acetic acid, phytol and beta-ionone; mono- and oligo-saccharides (glucose, fructose, sucrose and starch) and lignin (high in carbohydrate content).²⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Whole plant: Raktapitta, Trsna, Chardi, Daha, Murccha, Visarpa, Raktavikara, Tvakroga, Atisara, Kaphaja jvara, Vataja jvara, Jvara, Nasagata raktapitta

Root: Raktapitta, Trṣṇāroga, Dāharoga, Visarpa, Tvakaroga, Arocaka, Duḥswapna, Bhūtaroga, Raktapitta, Chardi, Mūrcchā, Raktapradara, Mūtra dāha.

Used for hemorrhagic diseases, excessive thirst, emesis, burning sensation and syncope (whole plant and root); erysipelas, vitiated blood, skin diseases, diarrhea, fevers and epistaxis (whole plant); tastelessness, unnatural dreams, ghost syndrome, emesis, syncope, menorrhagia/metrorrhagia and burning micturition (root).

(Therapeutic uses of whole plant based on texts from 1000 BC to sixteenth century. Instead of the root, properties of the seeds have been quoted in API, Vol. III, page 328.)

IMPORTANT FORMULATION/ APPLICATIONS

Whole plant: Classical formulations not quoted.

Root: Balāshvagandhā Lākshādi Taila, Madhuyashtyādi Taila, Marma Gutikā, Mānas Mitra Vataka, Chandrakalā Rasa. All of these compounds contain the Dūrva plant, not the root (AFI).

Whole plant-expressed juice is used as an anti-catarrhal, anti-diarrheal, anti-dysenteric, astringent, demulcent, diuretic, styptic, and anti-epileptic.

Cold infusion of plant and root stops bleeding from piles and relieves dysuria and hematuria.

Root decoction is used in vesicle calculus and secondary syphilis.¹⁵

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Whole plant: Svarasa: 10–20 ml.

Root: 5–10 mL (Svarasa).

Cyperus rotundus Linn.

Mustā

BOTANICAL SOURCE(S)

Cyperus rotundus Linn.
(Fam. Cyperaceae)

Cyperus scariosus R. Br. is equated with Nāgara mustaka, Bhadramustaka.³⁶

PHARMACOPEIAL AYURVEDIC DRUG

Mustā (Dried rhizome).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Mustaka, Vārīda.

Abda, Abhra, Ambuda, Ambhoda, Ambhodhara, Gāngeya, Gāngeyī, Ghana, Jalada, Toya.³⁰
Bhadra-musta, Musta and Nāgara mustaka in Ayurvedic texts share similar properties.

HABITAT

Common in waste grounds, gardens and roadsides, up to an elevation of 1800 m.

REGIONAL LANGUAGE NAMES

Eng: Nut grass;
Assam: Mutha, Somad koophee;
Beng: Mutha, Musta;
Guj: Moth, Nagarmoth;
Hindi: Motha, Nagarmotha;
Kan: Konnari gadde;
Mal: Muthanga, Kari mustan;
Mar: Moth, Nagarmoth, Motha, Bimbal;
Punj: Mutha, Motha,
Tam: Korai, Korai-kizhangu;
Tel: Tungamustalu;
Urdu: Sad kufi.

CONSTITUENTS

Volatile oil.

Volatile oil contains cyperene I and II, cyperol, cyperone, mustakone, copadiene, (+)-epoxyguaiene, (–)-rotundone, cyperolone, isopatchoulene, beta-sitosterol, pinene, and patchoulene.

Tuber yielded terpenoidal and flavonoidal constituents.^{20(h)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Ajirna, Trṣṇā, Jwara, Sangrahaṇi, Śwāsa, Kāsa, Mūtrakṛcchra, Vamana, Stanyavikāra, Sutikaroga, Atisāra, Āmavāta, Kṛimiroga

Used for loss of appetite, indigestion, excessive thirst, fever, irritable bowel syndrome, dyspnea, cough, dysuria, emesis, lacteal disorders, puerperal disorders, diarrhea, rheumatoid arthritis, and worm infestations (therapeutic used based on texts from the thirteenth to sixteenth centuries).

Experimentally, the following activities have been documented: lipolytic (tuber); liver protective (plant); anti-rheumatic and anti-inflammatory (tuber and plant); diuretic and anti-pyretic (rhizome); diuretic and anti-emetic (root);

hypotensive and anti-histaminic (root); used in diarrhea, dysentery, and colic (rhizome).^{2(c),15}

IMPORTANT FORMULATION/ APPLICATIONS

Mustakārishta (Bhaishajya Ratnāvali, seventeenth century), Mustakādi Kwāth (Sahasrayoga, a non-Samhitā, Kerala Masteria Medica) and Mustakādi Churna (Sahasrayoga) contain Mustaka as the main drug. Prescribed for diarrhea, dysentery, and digestive disorders.

Mustakādi Lehya (Bhaishajya Ratnāvali) is prescribed for cough due to chest diseases.

Mustaka is a supportive drug in all other quoted compounds.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g (Powder). 20–30 mL (Kwatha).

Decoction: 50–100 g rhizome. Powdered tuber capsules (500 mg) twice a day.

In alcoholism: water boiled with Musta rhizome.

In diarrhea: decoction of Musta alone with honey.

30 obese persons of different age groups were treated with 450 mg capsules of tuber powder twice a day for 90 days, and exhibited weight reduction and decreases in cholesterol and triglycerides.¹⁵

BOTANICAL SOURCE(S)

Dalbergia sissoo Roxb.
(Fam. Fabaceae)

Two varieties of Śimśapā are mentioned in Ayurveda (Dhanvantari Nighantu, prior to the thirteenth century). The second variety is equated with *D. latifolia* Roxb. In Kerala, heart wood of *Xylia xylocarpa* Roxb. Taub. is used as Śimśapā.³

PHARMACOPOEIAL AYURVEDIC DRUG

Śimśapā (Stem bark).

API, Part I, Vol. III.
Śimśapā (heart wood).
API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Kṛṣṇa sāra, Śyāmā.

Kapilā, Maṇḍalpatrikā.⁴
Syn. of second variety: Kusimsipā, Bhasma pingalā, Vishodhini.⁴

HABITAT

Western Himalayas up to 1220 m altitude and from Sikkim to upper Assam, planted throughout India.

Cultivated in Punjab, Uttar Pradesh, Bengal, and Assam.

REGIONAL LANGUAGE NAMES

Eng: Sissoo tree;
Beng: Shishu;
Guj: Sisam;
Hindi: Seesam;
Kan: Eragundimavu, Bindi;
Mal: Irupoola;
Mar: Sisu, Shisav;
Ori: Sisu, Sinsapa;
Punj: Sheesham;
Tam: Irupoolai;

Tel: Irugudu, Virugudu, Sissoo;
Urdu: Sheesham.

CONSTITUENTS

Stem bark: Flavonoids.

Dalbergenone, dalbergin, Me-dalbergin, a-4-Ph-chromene and dalbergichromene; fresh bark, iso-tectorigenin.^{20(i),33(b)}

Heart wood: fixed oil, essential oil, tannins, and flavonoids.

Dalbergin, O-Me-dalbergin and dalbergenone; hydroxy- and O-Me-dalbergenones; dalbergichromene, nordanbergin and isodanbergin; allylphenol of latifolin and dalbergiphenol; OH-trans-stilbene and biochanin A.^{20(i),33(b)}
Fixed oil 5.35%; essential oil 0.24%.²⁰⁽ⁱ⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Stem bark; Kuṣṭha, Svitra, Kṛmi, Bastiroga, Duṣṭa, Vṛana, Dāha, Kaṇḍu, Hikkā, Śopha, Visarpa, Pinasa

Heart wood: additionally for Mūtrasarkara, Prameha, Arśa, Gulma, Aśmari, Atisāra, Rakta vikāra, Pāṇḍu, Chardi, Vasāmeha, Sarvajwara.

Stem bark: obstinate skin diseases including leprosy, leucoderma, worms, urinary diseases, non-healing ulcers, peripheral neuritis, pruritus, hiccough, swelling, erysipelas, and sinusitis.
Heart wood: additionally for urinary gravel, diabetes, piles, abdominal lumps, lithiasis, diarrhea, blood diseases, cachexia, anemia, emesis, lipuria, and all types of fevers.

IMPORTANT FORMULATION/ APPLICATIONS

Ayaskṛi (correct name: Ayaskṛti, Ashtāngahridaya, seventh century) and Narsimha ghrīta Rasāyana (Ashtāngahridaya) are iron tonics, astringent and hematinic. Contain heartwood of Shimshapā as one of the main drugs.

Mahākhadira Ghrita (Bhaishajya Ratnāvali, not in the AFI) contains Shimshipā bark as the main supporting drug to the principal drug, *Acacia catechu* heart wood. Used for obstinate skin diseases.

Heart wood, boiled in milk and water (1:2), reduced to the milk's quantity, was given in all types of fevers. The decoction was given for lipuria (Sushruta Samhitā, 1000 BC).

Bark decoction, reduced to one-eighth as linctus, was a remedy for sciatica (Bangasena, eighteenth century).^{16(a)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

Stem bark: 3–6 g of the drug in powder form. 50–100 ml of the drug for decoction.

Heart wood: 1.5–10 g of the drug in powder form; 10–20 g for the decoction.

Decoction: drug–water proportion 1:4 if the bark or heart wood is soft, or 1:8 if they are moderately hard. Boil and reduce to one-fourth. Dose: 50–100 mL.

D

***Datura metel* Linn. Plant Dhattūra**

BOTANICAL SOURCE(S)

Datura metel Linn.; Syn. *D. fastuosa* L., *D. alba* Ramph, *D. cornucopia* Hort. (Fam. Solanaceae). (API, Vol. III, IV.)

Indian Dhattūra species contain alkaloids hyoscyamine and hyoscyne, but *D. metel*, in addition, contains meteloidine, as a specific characteristic.²⁰⁽ⁱ⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Dhattūra (Whole plant).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Kanaka, Unmatta, Dhāstūra.

Kitava, Dhūrta, Devatā, Madana, Saṭha, Mātula, Turī, Tarala, Kanakāhvya.⁴

Dhuttura, Dhatturaka.³⁰

Mātulaputraka, Maheshapriya, Pramāda.³

HABITAT

Wild, throughout India.

REGIONAL LANGUAGE NAMES

Eng: White thorn apple;

Assam: Dhatura; Beng: Dhatura;

Guj: Dhanturo;

Kan: Ummatti, Madagunaki, Dathura;

Mal: Umman, Ummatt, Ummattu;

Mar: Dhotra; Ori: Dudura;

Punj: Dhatura;

Tam: Ummattai;

Tel: Tella-ummettha;

Urdu: Dhatura.

CONSTITUENTS

Alkaloids (Hyoscyne) and two withanolide Glucosides (Dhaturametelin A&B).

Plant accumulates more hyoscyne (scopolamine) than hyoscyamine. Hyoscyne content of dried leaves and flowering tops is recorded as being between 0.02% and 0.55%. Stem gave 0.4% alkaloid content; alkaloids include nicotianamine and hyoscyamine.^{33(b)}

Leaves contain norhyoscyamine, datumetine, datumetelin, datumalin¹⁵; several withanolides viz. withametelin (daturilin), datumetine, datumetixone, daturilinol, and dataurametelins A to G.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kasa, Swasa, Jwara, Kustha, Vrana, Mutrakrecchra, Twak dosa, Yika liksa, Krmi, Alarka, Visa, Karma, Nadi, Kandu, Indralupta, Padadaha, Stanuthita pida, Unmada

Used for cough, dyspnea, fever, leprosy, wounds, dysuria, skin diseases, hair lice, worm infestations, rabies, poisoning, sinus fistulae, pruritus, baldness, burning sensation in the feet, mastalgia, and insanity (therapeutic uses based on texts from the eleventh to sixteenth centuries).

Leaf extract exhibited anti-bacterial, nematocidal, and insecticidal activities. A 10% w/w formulation of alcoholic extract of leaves showed wound healing activity.

Withanolides showed anxiolytic and anti-ulcer activities.

Leaf extract and scopolamine possess anti-spasmodic activity.¹⁵⁽ⁱ⁾

For details, see Reference 15(i).

IMPORTANT FORMULATION/ APPLICATIONS

Kanakāsava (Bhaishajya Ratnāvali, seventeenth century) contains Dattūra plant as a major constituent.

For bronchial asthma and bronchitis.

Laghu Vishagarbha Taila and Vishatinduka Taila (Bhaishajya Ratnāvali) contain leaf juice of Dhattūra as a major constituent. Both are for external application in rheumatism and neurological afflictions.

Dhastūra Tailam (Bhaishajya Ratnāvali) contains Dhattūra leaf juice. Used for hair lice.

Dhatturadi Tailam (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains leaf and seed. Used as an oil for head massage in alopecia.

Other quoted compounds are mercury-based herbo-mineral drugs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

100–200 mg.

A narcotic and toxic drug. To be used only under medical supervision.

Datura metel Linn.

Seed

Dhattūra

BOTANICAL SOURCE(S)

Datura metel Linn. Syn. *D. fastuosa* L., *D. alba* Ramph, *D. cornucopaea* Hort (Fam. Solanaceae). (API, Vol. III, IV.)

Indian Dhattūra species contain alkaloids hyoscyamine and hyoscyne, but *D. metel*, in addition, contains meteloidine, as its specific characteristic.²⁰⁽ⁱ⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Dhattūra (Seed).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Kanaka, Unmatta, Dhastūra.

Kitava, Dhūrta, Devatā, Madana, Saṭha, Mātula, Turī, Tarala, Kanakāhvya.⁴

Dhuttura, Dhatturaka.³⁰

Mātulaputraka, Maheshapriya, Pramāda.³

HABITAT

Wild, throughout India.

REGIONAL LANGUAGE NAMES

Eng: White thorn apple;

Assam: Dhatura;

Beng: Dhutura, Dhutra;
 Guj: Dhaturō;
 Hindi: Dhatura;
 Kan: Umbe;
 Mal: Ummam;
 Mar: Dhatra;
 Ori: Dudura;
 Punj: Dhatura;
 Tam: Oomattai, Umattai;
 Tel: Ummettha, Erriummetta;
 Urdu: Dhatura.

CONSTITUENTS

Alkaloids – Tropane Alkaloids – Hyoscyamine etc. and fixed oil.

Seeds gave alkaloids 0.19% (in pericarps 0.8%), mainly hyoscyine (scopolamine) and hyoscyamine;^{33(b)} fastudine, fastunine, fastusic acid, fastusidine, fastusinine, daturanolone, citrostadienol, cycloeucalenol, lophenol, and obtusifoliol; allantoin, caproic, alpha- and beta-linolic, linoleic, and oleic acids.¹⁵

Seed oil contains alpha-Me-sterols.^{33(b)} Fixed oil: 7.165%.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmi, Yukā, Likṣā

Used for worm infestation and hair lice (therapeutic uses based on texts from the eleventh to sixteenth centuries).

Water extract of seeds are sedative in normal and stressed rats; also activated the digestive enzyme amylase *in vitro*.²⁰⁽ⁱ⁾

Seeds and roots are used in prescriptions for insanity.

Seeds were used in increasing doses with cold water for filaria (Bangasena, eighteenth century).

Pills (30 mg) made of seeds with a decoction of Kushtha (*Saussurea lappa* root) were given (for 8 days) to treat coryza.^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Kanakāsava (Bhaishajya Ratnāvali, seventeenth century), does not contain Dhattūra seeds (AFI).

Dugda Vati (Bhaishajya Ratnāvali) contains Dhattura seeds and leaf juice. Used for jaundice, anemia, and edema.

Other quoted compounds are mercury-based herbo-mineral drugs, a part of Ayurvedic specialities, prescribed only in well-diagnosed conditions under medical supervision.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

30–60 mg.

Contraindicated in tachycardic arrhythmia and glaucoma.

Seed purification process: Seeds are soaked in cow's urine for 12 hours, then washed with water and subjected to *svedana* in *dolā yantra* containing cow's milk for 3 hours. After this process, seeds are used after removing the testa (AFI).

Dendrophthoe falcata (Linn.f.) Etting.

Vandā

BOTANICAL SOURCE(S)

Dendrophthoe falcata (Linn.f.) Etting.

Syn. *Loranthus falcatus* Linn. f. (Fam. Loranthaceae).

D. falcata grows on different host trees. It is used for improving cognitive functions (when the host tree is *Calotropis gigantea*); for treating

impotence (when the host tree is *Tamarindus indicus*); for paralysis (when the host tree is *Shorea robusta*); for malarial fever (when the host tree is *Aegle marmelos*); for filaria (when the host tree is *Trevis nudiflora*); and for female infertility (when the host tree is *Ficus racemosa*).^{16(a),33(b),105}
 Also used for its cardiac glycosides when the host tree is *Nerium oleander*.¹⁰⁸

PHARMACOPOEIAL AYURVEDIC DRUG

Vandā (Leaf, Stem, Aerial Root, Flower, Fruit).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Vṛkṣādānī, Bandāka, Vṛkṣaruhā, Saṁharṣā.

Vandāka, Shekhari, Kāma-vṛkshaka, Kāma-taru, Kāmini, Āpadā-rohini.⁴

HABITAT

A semi-parasite, mostly on fruit trees, distributed throughout India.

Indigenous to tropical regions. Also found in Sri Lanka, Thailand, China, Australia, Bangladesh, Malaysia, and Myanmar.

Dendrophthoe comprises about 31 species and has around 401 host plants (Flora of China, 2003).

Found in Southeast Asia to Australia.¹

REGIONAL LANGUAGE NAMES

Eng: Mistletoe;

Beng: Maandaa;

Guj: Baando;

Hindi: Bandaa;

Kan: Bandanike, Bandhulu;

Mal: Ittikanni, Itil;

Mar: Baandagul, Banda;

Ori: Vrudhongo;

Tam: Pulluri;

Tel: Baadanikaa, Jiddu.

CONSTITUENTS

Leaves contain flavonoids such as Quercetin, quercetrin; Tannins comprising of gallic and chebulinic acid. (While quoting constituents of all plant parts, host tree is not mentioned.)

HPTLC of *D. falcata* leaves (hosts: *Mangifera indica*, *Melia azedarach*, *Wrightia tinctoria*, and *Callistemon lanceolatus*) showed that (+)-epicatechin, caffeic acid, and kaempferol were present in all four samples, while ellagic acid was present only in the *Mangifera* sample, and gallic acid was absent in the *Melia azedarach* sample.¹⁰³

Flavonoids from *D. falcata* of six different hosts: quercitrin, quercetin, kaempferol,

quercetagenin, hyperoside, myricetin, meratin and rutin,^{20(i),104} in addition to tannins.²⁰⁽ⁱ⁾

D. falcata fruit (host: *Shorea robusta*) contains:

3-beta-acetoxy-1 beta-(2-hydroxy-2-propoxy)-1 alpha-hydroxyolean-12-ene; 3-beta-acetoxy-11 alpha-ethoxy-11-alpha-hydroxy olean-12-ene; 3-beta-acetoxy-11 alpha-ethoxy-1 beta-hydroxy-olean-12-ene and 3-beta-acetoxy-1 beta-hydroxy-11 alpha-methoxy olean-12-ene and nine known compounds (for details see ref. 108).

THERAPEUTIC AND OTHER ATTRIBUTES

Leaf, stem, aerial root, flower, fruit: Raktapitta, Vraṇa, Viṣaroga, Vandhyatva, Hikkā, Viṣamajvara, Bhagandara, Vātā-smari, Mūtraroga

Used for bleeding disorders, ulcers, diseases due to poison, infertility, hiccup, intermittent fever, fistula-in-ano, calculus, and urinary disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

The original source of Vandā seed is not known as it is dispersed through fecal excretion of flower-peckers or birds. Thus unique chemical constituents and therapeutic activities depend upon the synergistic outcome of the seed and the host tree, which will differ widely.

Classical Ayurvedic attributes should be classified on the basis of the host tree.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 ml juice.

Before using Vandā in medicine, its chemotype should be ascertained. Variations in chemical constituents and in quantities of phenolic biomarkers, because of the plant's interaction with the host tree, have been reported.¹⁰³

Flavonoids from parasitic plants growing on six different host trees have been isolated.¹⁰⁴

Research potential: wasting, chronic and drug-resistant diseases, including cancer. Emphasis should be on bitter, astringent, and toxic host tree parasites.

Sālaparṇī

Gangetin, isolated from the hexane extract of the root, showed significant anti-inflammatory activity in rats.

The dried root can be used in cerebrospinal meningitis, associated with headache. Root extract exhibited significant anti-fertility activity in rats (50 and 100 mg/kg).^{2(c)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

5–10 g of the drug in powder form.
10–20 g for decoction.

From the Dashamūla group of classical Ayurveda, bigger roots have been treated equally with stem bark in the AFI. This important group of ten roots is now extinct. All compound preparations containing Dashmūla or Panchamūla, in modified forms, are new entities. It is not ethical to sell modified compounds as Dashmūla or Panchamūla drugs. These should be treated as new drugs and should be revalidated.

Desmodium gangeticum DC. Plant Śālaparṇī

BOTANICAL SOURCE(S)

Desmodium gangeticum DC.
(Fam. Fabaceae)

Syn. *Hedysarum gangeticum* Linn.¹⁵

The drug is sometimes adulterated or even substituted with the roots of *Desmodium pulchellum* Benth. ex Baker (especially in material coming from Garhwal hills). Roots of *Flemingia chapar* Ham. and *F. semialata* Roxb. are also used as substitutes.³⁶

Kerala physicians, by and large, accepted *Psuedarthria viscida* (L.) W. & A. as the source plant of Śālaparṇī.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Śālaparṇī (Whole plant).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Sthirā, Triparṇī, Vidārigandhā, Amṣumatī.

Atiguhā, Shālaparṇi, Shālīparṇi.³⁰

Dhruvā, Saumyā, Triparni, Pitani, Dirghamūlā.⁴

HABITAT

Growing wild almost throughout India in the plains and Western Ghats, and up to 1,500 m in the north, up to Sikkim.

REGIONAL LANGUAGE NAMES

Ben: Shalparni;
Guj: Saalvan, Sameravo;
Hindi: Sarivan, Saalapaani, Salpan;
Kan: Murelchonne, Kolakannaru;
Mal: Orila;
Mar: Saalvan Sarvan;
Ori: Saloparnni, Salpatri;
Pun: Sarivan, Shalpurni;
Tam: Pulladi, Orila, Moovilai;
Tel: Kolakuponna, Kolaponna;
Urd: Shalwan.

Eng: Ticktrefoil.²⁷

CONSTITUENTS

Alkaloids, flavonoids, desmocarpan, desmocarpin, pterocarpan, desmodin, gangetin, gangetinin; others: 2-N N-dimethylamino) acetophenone.

Compounds isolated from the whole plant:

trans-5-hexadecenoic acid; 1-tritriacontanol; 1-heptadecanol; beta-sitosterol; beta-amyrone; gangetin; glycosphingolipid; 5-methoxy-N, N-dimethyltryptamine; 8C-prenyl-5, 7, 5'-trimethoxy 3'-4'-methylenedioxyflavone; salicylic acid; 5-O-methyl genistein 7-O-beta-D-glucopyranoside; 3, 4-dihydroxybenzoic acid; kaempferol 7-O-beta-D-glucopyranoside; rutin; quercetin 7-O-beta-D-glucopyranoside; uridine triacetate; and a new compound aminoglucosyl glycerolipid.²⁰⁽ⁱ⁾

D

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa (piles), Atisāra (diarrhoea), Chardi (emesis), Jvara (fever), Kāsa (cough), Kṛmi (worm infestation), Kṣata (wound), Mūtrakṛcchra (dysuria), Prameha (metabolic disorder), Santāpa (emotional stress), Śośa (cachexia), Śoṭha (inflammation), Śukradaurbalya (seminal stress), Śvāsa (Asthma), Vātaroga (disease due to Vāta doṣa), Viṣamjvara (intermittent fever), Viṣavikāra (disorders due to poison). (Therapeutic uses based on texts, 1000 BC to sixteenth century.)

The plant is used in diarrhea, chronic fever, biliousness, cough, and vomiting.^{2(c)}
Charaka (1000 BC) used a decoction of the leaves in prescriptions for constipation, diarrhea, edema, and fever.²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Dashamūlārishta (Shārangadhara Samhitā, thirteenth century) and Dashmāla Kvātha

(Bhaishajya Ratnāvali, seventeenth century), due to change in plant parts, need revalidation. (See *Desmodium gangeticum* root monograph, section 9.)

Shālaparnyādi Churna (Shārangadhara Samhitā) was assessed for irritable bowel syndrome in a clinical trial. Positive results were obtained in all cases.^{2(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (Powder): 6 to 12 g. Kvatha (decoction): 50 to 100 ml.

Gangetin showed significant anti-inflammatory and analgesic activities in albino rats.^{2(d)}
Mineral elements present in the plant are:
Ca 1.84%; Cu 0.002%; Fe 0.2054%; K 1.197%; Mg 0.3155%; Mn 0.007%; Na 0.198%; Ba 0.0048%; Al 0.903%; Ce 0.0381%; Sr 0.02434%; V 0.0008%; Hg 0.00005%; Cr 0.00004%; Co 0.0015%, and Zn 0.0083% (dry weight basis).^{2(c)}

Desmostachya bipinnata Stapf.

Kuśa

BOTANICAL SOURCE(S)

Desmostachya bipinnata Stapf.
(Fam. Poaceae)

Syn. *Eragrostis cynosuroides* Beauv.²⁰⁽ⁱ⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Kuśa (Root stock).

API, Part I, Vol. III.
Kusha and Darbha are not synonyms.³
Kusha has smaller, softer, and pointed leaves.
Darbha has thicker, longer, and scabrid leaves.³⁰
Darbha is now equated with *Imperata cylindrica* Beauv.
Not to be confused with Kusha-pushpaka, which was one of the vegetable poisons.³⁰

AYURVEDIC SYNONYMS

Yagyabhūsaṇa, Sūcyagra.

HABITAT

Throughout India in hot and dry places.
Distributed from North Africa to South Asia.

REGIONAL LANGUAGE NAMES

Eng: Saved gram;*
Assam: Kush;
Beng: Kush;
Guj: Dabb;
Hindi: Kush;
Kan: Darbha hullu;

* Illegible English synonym.

Mal: Darbha, Darbhapullu;
 Mar: Darbha;
 Ori: Kusha;
 Punj: Kush, Dale;
 Tam: Darbaipul;
 Tel: Darbhagaddi.

CONSTITUENTS

Terpenes.

Flavonoids, glycosides, kaempferol, quercetin, quercetin-3-glucoside, trycin, trycin-7-glucoside; coumarins including scopoletine and umbelliferone, sugars, amino acids, carbohydrates¹¹⁰ and a new xanthine (2, 6-dihydroxy-7-methoxy-3*H*-xanthen-3-one);¹¹¹ sugars, amino acids, carbohydrates, and terpene.¹⁰⁹

THERAPEUTIC AND OTHER ATTRIBUTES

Mūtrakṛcchra, Visarpa, Daha, Aṛmarī, Tṛṣṇā, Bastiropa, Pradararoga, Raktapitta

Used for dysuria, erysipelas, burning sensation, calculus, thirst, renal diseases, menstrual irregularities, and bleeding disorders (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Quoted texts pertain to Darbha-dwya or Darbha-yugma (two varieties of Darbha).

Darbha is equated with *Imperata cylindrica* Beauv. (AFI, page 311), while Kusha is equated with

D. bipinnata (AFI, page 318). Kusha and Darbha are separate grasses.³

In the *Viratarvādi* group of Ayurvedic herbs (used for dysuria and lithiasis) and in the *Pancha-tr̥ṇmamula* group of Ayurveda, Kusha and Darbha are separate herbs.⁴

IMPORTANT FORMULATION/ APPLICATIONS

Ashmarihara Kashāya Churna (Siddha Yoga Samgraha), contains 15 herbs in equal proportion, Kusha is one of them. For lithiasis. Sanyajanana Kashāya Churna (Charaka Samhitā, 1000 BC) contains ten herbs, including Kusha and Darbha. Used for lactal disorders. Sukumāra Ghrita (Sahasrayoga, a non-Samhitā, Kerala Material Medica) contains *Boerhaavia diffusa* root as the main herb; both Darbha and Kusha roots are among the 19 supporting herbs. Used for splenic, intestinal, and rheumatic afflictions.

Other quoted compounds contain both Darbha and Kusha roots as supporting herbs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50–100 g of powder for decoction.

For further study: trycin and trycin-7-glucoside are reported to be anti-ulcerogenic.

Dioscorea bulbifera Linn.

Vārāhi

BOTANICAL SOURCE(S)

Dioscorea bulbifera Linn.
 (Fam. Dioscoreaceae)

D. crispata Roxb.
D. pulchella Roxb.
D. sativa Thunb non L.
D. versicolor Buch.-Ham. ex Wall.

PHARMACOPOEIAL AYURVEDIC DRUG

Vārāhi (Rhizome).

API, Part I, Vol. IV.

Used as a substitute of Vriddhi of *Ashtavanga*, the “Group of Eight Tonic Herbs” of Ayurveda.

AYURVEDIC SYNONYMS

Varahi kanda.

Vārāhākanda.³⁰
 Mādhavi, Gr̥shti.⁴
 Tuber: Shaukara.⁴

HABITAT

Throughout India, up to 1800 m in the Himalayas.

Native to the tropics of the Old World; occurs in rainforests extending from the West coast of Africa to the farthest islands in the Pacific. It does not thrive in drier parts of India.

REGIONAL LANGUAGE NAMES

Beng: Ratalu;
Guj: Dukkarkanda;
Hindi: Varahi kanda, Genthi;
Kan: Kunta genusu, Heggenusu;
Mal: Varahi;
Mar: Dukarkanda;
Tel: Kaya pendazam.

Eng: Potato yam, Air potato.^{2(a)}
Hindi: Rataalu, Banaalu.

CONSTITUENTS

Saponins – Steroidal Saponins.

The tuber yielded beta-sitosterol, diosgenin, lutein, neoxanthin, violaxanthin, zeaxanthin, auroxanthin, cryptoxanthin and D-sorbitol, furanoid norditerpenes, diosbulbin B and D and two new compounds, 2, 4, 6, 7-tetrahydroxy-9, 10-dihydroxyphenanthrene and 2, 4, 5, 6-tetrahydroxyphenanthrene.^{25,32}

Two new *p*-hydroxy acetophenone derivatives, 4-hydroxy-(2-*trans*-3', 7'-dimethylocta-2', 6'-dienyl)-6-methoxyacetophenone, and 4, 6-dihydroxy-2-O-(4'-hydroxybutyl) acetophenone, were also isolated.²⁰⁽ⁱ⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Kustha, Kandu, Prameha, Krmī

Used for obstinate skin diseases including leprosy, pruritus, urinary disorders, and worm infestations (therapeutic uses based on texts from 1000 BC to sixteenth century).

Dried and pounded tubers are used as an application for swellings, boils, and ulcers. Roasted tubers are used in dysentery, piles, and venereal sores.

Sushruta prescribed Vārāhi with honey and milk for rejuvenation.^{16(a)}

Wild tubers contain nearly 83% starch, methylphenidate and cocaine, reduce food intake and exhibit hunger-suppressing properties.^{7,20(i)}

IMPORTANT FORMULATION/ APPLICATIONS

Narasimha Churna (Bhaishajya Ratnāvali, seventeenth century), contains 10 herbs; Vārāhi rhizome is among main herbs. Used for a number of debilitated conditions.

In Vastyamayantaka Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) and Panchnimba Churna (Bhaishajya Ratnāvali), Vārāhi root tuber is a minor supporting herb.

Vārāhyādighṛḍam (Sahasrayoga, CCRAS text, not quoted in the API), contains Vārāhikanda as the main drug, with five supporting herbs. Used for acute and chronic jaundice.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

LD₅₀ of ethanolic extract of tuber was found to be >1000 mg/kg i.p. in rats.²⁰⁽ⁱ⁾

Diospyros exsculpta Buch.-Ham.

Viralā

BOTANICAL SOURCE(S)

Diospyros exsculpta Buch.-Ham.
Syn. *D. tomentosa* Roxb.
(Fam. Ebenaceae).

Diospyros melanoxylon Roxb.

D. embryopteris Pers.³⁰

D. peregrina (Gaertn.) Guerke.^{16(a)}

AFI equated Tinduka with *Diospyros embryopteris* Pers. syn. *D. malabarica* (Desr.) Kostel (page 327);

Viralā with *D. tomentosa* Roxb. syn. *D. exsculpta* Buch.-Hem. (page 329).
D. embryopteris and *D. tomentosa* are not synonyms.

PHARMACOPEIAL AYURVEDIC DRUG

Viralā (Stem bark).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Tindukah, Tinduki.

Kālaskandha, Sphurjaka,³⁰ Nilāsāra.²⁷
 (Vishatinduka: drug source was *Diospyros montana* before the medieval period, *Melia azedarach* during the medieval period and *Strychnos nux-vomica* after the sixteenth century.)^{16(b)}

HABITAT

Distributed in sub-Himalayan tract, Rajasthan, Madhya Pradesh, Bihar, and Orissa.

REGIONAL LANGUAGE NAMES

Eng: Gaub persimon, Indian persimon;
 Beng: Kend, Gaab;
 Guj: Timbaru;
 Hindi: Gaabh, Tendu, Kendu;
 Kan: Holitupare, Kushaarta;
 Mal: Panchchi, Pananchi, Panachcha;
 Mar: Temburani;
 Punj: Tendu;
 Tam: Panichchai, Tumbika;
 Tel: Tinduki, Tumikechettu.

Eng: False Mangosteen,²⁷ Nepal Ebony
 Persimmon.^{2(a)}

CONSTITUENTS

D. exsculpta: Triterpenoids (Lupeol, Betulin, Butulinic acid, Oleanolic acid) and Sterol.

Bark contains 17% tannins.²⁰⁽ⁱ⁾

D. embryopteris: in the stem bark, betulinic acid is the major constituent, together with betulin, lupeol, and beta-sitosterol.²⁰⁽ⁱ⁾

Stem yielded a new leucoanthocyanin, leucopelargonidin-3-*O*-alpha-L-rhamnopyranoside, and an aliphatic ketol nonadecan-7-ol-2-one.²⁰⁽ⁱ⁾
 Bark contains 12% tannins.²⁰⁽ⁱ⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Udarda, Prameha, Raktapitta, Aruci, Atisāra, Vibandha, Pittaroga, Karnasrāva, Vraṇa, Agnidagdha vraṇa, Atidagdha vraṇa, Bhagna, Tr̥ṣa, Dāha, Yoniroga, Medoroga

Used for urticaria, urinary disorders, bleeding disorders, anorexia, diarrhea, constipation, hyperacidity, otorrhea, ulcers, major burns, vulvitis, excessive thirst, burning sensation, gynecological disorders, and obesity (therapeutic uses based on texts from 1000 BC to seventh century).

Sushruta gave pulverized bark in hemoptysis and excessive menstrual and other vaginal discharges; externally, and as a plaster in major burns and erysipelas.²⁸

Paste of Tinduka bark, mixed with *ghee*, was a healing paste for all sorts of burns.

IMPORTANT FORMULATION/ APPLICATIONS

Nayagrodhādi (Nyagrodhādi) Kwātha Churna (Ashtāngahridaya, seventh century), contains 10 stem barks and 2 roots in equal proportion, Viralā stem bark is one of them. For malabsorption syndrome, bleeding and gynecological disorders.

D. embryopteris: anti-ulcerogenic; prevented hepatotoxicity and leukocytosis in experimental animals; diuretic, anti-protozoal; showed inhibition of P-388 leukemia growth, inhibited KG cell growth; radical scavanging property in *in vitro* models.^{2(c),20(i)}

Paste is applied to boils and tumors.¹⁵

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

LD₅₀ of the ethanolic extract of the plant (excluding root) was found to be 500 mg/kg i.p. in mice.²⁰⁽ⁱ⁾

Research potential: use of bark in ointments for major burns. (The source of Tinduka bark, which was specific for major burns during the classical period, should be identified.)

Diospyros peregrina Gurke

Fruit

Tinduka

BOTANICAL SOURCE(S)

Diospyros peregrina Gurke
Syn. *Diospyros embryopteris* L.
(Fam. Ebenaceae).

Syn. *D. malabarica* Kostel.
Viralā is a common synonym of Tinduka in API, Vol. V (*Diospyros exsculpta* syn. *D. tomentosa*) and in Vol. VI (*D. peregrina* syn. *D. embryopteris*).
A number of *Diospyros* spp. are being used for the Ayurvedic drug Tinduka. However, *D. melanoxylon* and *D. malabarica* syn. *D. peregrina* have been confirmed as common botanical sources of the Ayurvedic drug Tinduka.²⁰⁽ⁱ⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Tinduka (Fruit).
API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Viralā, Asitakāraskara, Kālaskandha, Sphūrjaka.
Tinduka: Syandana, Sphaurya, Kūla sāra, Rūvana, Kūka pilu,⁴ Markaṭa tiṇḍuka.¹³⁰

HABITAT

Distributed throughout India.
Found in shady, wet places and near streams.
D. tomentosa: distributed in the sub-Himalayan tract from Ravi to Nepal, Rajasthan, Madhya Pradesh, Bihar, and Odisha; extending towards the south.

REGIONAL LANGUAGE NAMES

Eng: Indian gaub, Persimon;
Assam: Kendu;

Ben: Gab;
Guj: Timbaravo, Temru;
Hindi: Tendu, Gaabh, Maakaatendu;
Kan: Holetupare, Kusharta;
Mal: Panachi, Panachchi, Pananchi;
Mar: Temburni;
Ori: Kendu;
Tam: Kattatti, Kavikattai, Tumbi, Paanicikaa, Tumbika;
Tel: Tumiki, Gaara;
Urdu: Tendu.
Eng: Riber ebony.³²

CONSTITUENTS

Alkanes and triterpenoids. Seed contains hexacosane and β -sitosterol, β -sitosterol glucoside, gallic acid and betulinic acid. Fatty oil (32%), unsaponified matter and β -amyrin.
Fruits: betulin, marsformosanone, and lupeol.
Fruit pulp and seeds: lupeol, betulin, gallic acid, betulinic acid, hexacosane, hexacosanol, sitosterol, beta-D-glucoside of sitosterol, and a terpene ketone.³² The iodine and fluorine contents of the fruits were found to be 0.79 and 2.9 ppm dry edible matter, respectively.

THERAPEUTIC AND OTHER ATTRIBUTES

Pakva phala (Ripe fruit): Āśmarī (Calculus), Aruci (tastelessness); Kapharoga (disease due to Kapha doṣa), Prameha (metabolic disorder), Raktadoṣa (disorders of blood).
Apakva phala (Unripe fruit): Atisāra (diarrhea), Bhagna (fracture), Dāha (burning sensation), Kuṣṭha (leprosy/diseases of the skin), Śoṭha (edema), Medoroga (obesity), Pravāhikā (dysentery), Raktapitta (bleeding disorders), Udarda (urticaria) and Vraṇa (ulcers). Used as a single drug.
Therapeutic uses based on texts from 1000 BC to sixteenth century.

IMPORTANT FORMULATION/ APPLICATIONS

Fruits were used alone for urticaria, phlegm, excessive bile secretion, piles. (Charaka Samhitā, 1000 BC.)²⁷
Unripe fruits are acrid, bitter, and oleaginous and used as gargles in aphthae and sore throat. The juice is applied to wounds and ulcers. The seed oil is used in diarrhea and dysentery.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Pakva phala (ripe): Cūrṇa (powder): 5 to 10g.
Apakva phala (unripe): Cūrṇa (powder): 4 to 8 g.

Ether and acetate buffer of the fruits revealed anti-bacterial activity only against *E. coli*.²⁰⁽ⁱ⁾

D

Doronicum hookeri C.B. Clarke

Vṛścikakanda

BOTANICAL SOURCE(S)

Doronicum hookeri C.B. Clarke
(Fam. Asteraceae)

Roots of *D. roylei* DC., *D. falconeri* Hook. f. and the European species, *D. pardalianches* Linn., syn. *D. scorpioides*, are imported into India and are also used as Darūnaj aqrabi.

PHARMACOPOEIAL AYURVEDIC DRUG

Vṛścikakanda (Rhizome).

API, Part I, Vol. VI.

A Sanskritized version of the Unani drug Darūnaj aqrabi. (Aqrabi = Vṛschika = scorpion). (The root looks like a scorpion's tail.)

AYURVEDIC SYNONYMS

Not a drug of Ayurvedic texts.

HABITAT

Sikkim and Himalaya region between 3500 to 4200 m.)

D. roylei (Punjab); *D. falconeri* (Northwestern Himalyas); and the imported species, *D. pardalianches* (Southeastern Europe).

REGIONAL LANGUAGE NAMES

Pun: Daarunaj-akrabi;
Urdu: Darunaj aqrabi.

Correct spelling is Darūnaj aqrabi.³⁷
Eng: Leopard's bane.⁷

CONSTITUENTS

Essential oil.

D. hookeri root methanolic extract possessed high phenolic content, thus higher free radical scavenging and reducing activities, similar to standard BHT (~85%) at a concentration of 0.5 mg/mL; it also exhibited more than 90% inhibition of ABTS radicals at concentrations above 0.3 mg/mL, higher than the dichloromethane extract. Dichloromethane extract was, however, rich in flavonoids and showed considerable metal chelating and nitric oxide and superoxide radical scavenging activities.²⁶³

Anti-bacterial and anti-fungal activities have been reported.²⁶⁴

D. pardalianches root gave the alkaloid otosenine.²⁰⁽ⁱ⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Ānāha (distension of abdomen due to intestinal obstruction), Ardita (facial palsy), Damśaviṣa (poisoning due to bites), Garbhāśayaśūla (uterine pain), Hṛdroga (heart disease), Pakṣavadha (paralysis/hemiplegia), Udaraśūla (pain in the abdomen), Vṛścika damśa (scorpion bites), Vātaroga (disease due to vāta doṣa), Vātika unmāda (mania/psychosis), Granthikajvara (Bubonic plague).

Used as a single drug.
For therapeutic uses, classical or Unani texts are not quoted.

IMPORTANT FORMULATION/ APPLICATIONS

Used as a constituent of cardiac and nerve tonics of Unani medicine. Also acts as a stomachic and dissolves trapped gases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 1 to 3 g.

Dracaena cinnabari Balf. f.

Lohitaniryāsa

BOTANICAL SOURCE(S)

Dracaena cinnabari Balf. f.
(Fam. Agavaceae)

The original source of Dragon's blood was *Dracaena cinnabari* (from Socotra). By the medieval period, alternative genera were introduced: *Dracaena draco* (Canary Islands), *Daemonorops* (Southeast Asia) and *Croton lechleri* Muell.-Ag. (South America).

PHARMACOPOEIAL AYURVEDIC DRUG

Lohitaniryāsa (Exudate).

API, Part I, Vol. VI.

Sanskritized, non-classical synonym of the Unani drug Damm-ul-Akhwain.³⁷

Earlier, the Unani folk name Khoon-kharābā was Sanskritized as Raktaniryās and a Sanskrit *shloka* was also composed based on its properties. It was equated with *Daemonorops draco* Blume.^{16(c)}

Not even a single study on this was quoted by the Indian Council of Medical Research in *Reviews on Indian Medicinal Plants*, Vol. 9, 2009.

AYURVEDIC SYNONYMS

Śonitavarṇā, Lohita kṣīrī.

Sanskritized, non-classical synonyms.

Common name: Khoonkharabā, Hirādokhi.^{16(c)}

HABITAT

The Indian Ocean island of Suqutra (Socotra), off the coast of Somalia in Africa. Imported into India.

Daemonorops draco is distributed in the Indo-Malayan region. The resin is imported into India from Sumatra and Borneo.⁷

D. kurzianus Hook f. has been suggested as an Indian species (found in the South Andaman Islands).^{16(c)} Its resinous extract is not available.

REGIONAL LANGUAGE NAMES

Eng: Dragon's blood;
Guj: Hiraadakhana;
Hindi: Hiraadokhi, Khoonkharaabaa;
Kan: Khunkhaaraa;
Mal: Kandamurgarittam;
Mar: Khunkharaabaa;
Pun: Khoonakharaabaa;
Tam: Kandamurgarittam;
Urdu: Damm-ul-Akhwain.

Eng: Zangibar Drop, Socotra.^{2(a)}

Daemonorops draco:

Eng: East Indian Dragon Blood.⁷

CONSTITUENTS

2-Hydroxychalcone, 7-hydroxy-3-(3-hydroxy-4-methoxybenzyl) chroman, S)-7, 3'-dihydroxy-4'-methoxyflavan and 4-hydroxy-2-methoxy dihydro-chalcone.

D. draco contains 50% abietic acid in addition to two chromophores, dracorhodin and dracorubin, while *D. cinnabari* is mainly composed of bioflavonoids and dihydrochalcones such as cinnabarone, dracoflavylum, and dracoresinotannol. Two different substances, dracoflavylum and 7, 4'-dihydroxyflavylum, were isolated from *D. draco* and *D. cinnabari*. (For *Croton lechleri*, also a source of Dragon's blood used in South America, see Reference 112, pages 144–145; 407–411.)

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra (diarrhoea), Pravāhikā (dysentery), Raktārśa (bleeding piles), Raktapitta (bleeding disorder), Rakta-pradara (menorrhagia or metrorrhagia or both), Raktasrāva (bleeding disorder), Vṛana (ulcer). Used as single drug.

Used by practitioners of Unani medicine.

IMPORTANT FORMULATION/ APPLICATIONS

Croton lechleri red latex, is used as Dragon's Blood in USA for cancer, diabetic neuropathy, eczema, fungal infections (skin, nail, foot), hemorrhages, inflammation, insect bite, itching, pain, rashes, ulcers (intestinal, mouth, skin, stomach), wounds, and as an antiseptic.¹¹²

Croton lechleri entered into herbal medicine as Dragon's blood in 1979.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 1 to 2 g.

D

Dryopteris filix-mas (L.) Schott.

Sphītakīṭārī

BOTANICAL SOURCE(S)

Dryopteris filix-mas (L.) Schott.
Syn. *Aspidium filix-mas* L.
(Fam. Dryopteridaceae).

PHARMACOPOEIAL AYURVEDIC DRUG

Sphītakīṭārī (Rhizome).

API, Part I, Vol. VI.

Sphita kita (tape worm), *ari* (enemy). A non-classical Sanskritized version.

AYURVEDIC SYNONYMS

Salka parṇāṅga (?), Granthi-pādikā.

(Non-classical Sanskritized synonyms.)

HABITAT

The drug is imported into India.

Indian species: *D. odontoloma* (Moore) C. Chr. (Himalayas; throughout the Kashmir valley, particularly in moist regions); *D. marginata* (Wall.) Christ (in regions with comparatively less moisture); *D. barbigera* (Moore) Kuntze (in alpine meadows; from Kashmir to Sikkim); *D. schimperi* (Hochst.) C. Chr. (common in Mussoorie). *D. dentata* (Forsk.) C. Chr. = *Cyclosorus dentatus* (Forsk.) Ching is found wild throughout India in the plains, as well as on the hills.^{2(a),33(a)}

REGIONAL LANGUAGE NAMES

Eng: Male fern;

Ben: Pankharaaj;

Hindi: Keeldaaru, Bisauraa;

Tam: Iruvi;

Urdu: Sarakhsa.

CONSTITUENTS

Filicin, α -flavaspidic acid; albaspidin; filixic acid; hexadeca aspidinol; dropterin; filmarone; β -aspidin; 9-aliphatic alcohols and 3 sterols.

D

D. filix-mas: filicin is mainly composed of aspidin, filicinic acid, filicylbutanone, aspidinol, albaspidin, flavaspidic acid, paraspidin, desaspidin, and triterpenes such as 9(11)-fernene, 12-hopene, and 11-13(13)-hopadiene; n-alkanes, mainly C₂₉ and C₃₁; volatile oil and resins.³¹

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara (fever), Sphita kṛmi (tape worm), Vātarakta (Gout).

Used as a single drug.
For therapeutic uses, classical sources are not quoted.

Filicin:
D. filix-mas: 25%.
D. odontoloma: 2.3%.
D. marginata: 2.1%.

D. barbigera: 2.1%.
D. schimperiana: 4.4%.^{33(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Taenifuge, vermifuge; often used in conjunction with saline purgative; not to be used with castor oil as it increases the absorption and toxicity. Main active constituents against intestinal worms are thought to be flavaspidic acid and desaspidin.³¹
Unproven uses include the use of preparations externally for rheumatism, sciatica, muscle pain, and neuralgia.¹⁴

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 1 to 3 g.
Dried rhizome 4–15 g or equivalent extract as a single dose.³¹ Extract of 6–8 g is used.¹⁴ Not to be repeated within a few weeks. Not to be administered to children under 4 years of age, nor to elderly persons; not to be used during pregnancy.¹⁴

BOTANICAL SOURCE(S)

Eclipta alba Hassk.

(Fam. Asteraceae)

Syn. *E. prostrata* Roxb., *E. erecta* Linn.

Three varieties are mentioned in the texts, *shvetapushpi* (white-flowered), *nilapushpi* (blue-flowered) and *pitapushpi* (yellow-flowered). In practice, no distinction is made between white- and blue-flowered varieties, which are equated with *E. alba*. The yellow-flowered variety is considered to be a different drug and is equated with *Wedelia chinensis* (Osbeck) Merr. syn. *W. calendulacea* (Linn.) Less. non-Rich.⁵

*Heliotropium brevifolium*²⁰⁽ⁱ⁾ is equated wrongly with the white variety of Bhr̥ṅgarāja.

PHARMACOPEIAL AYURVEDIC DRUG

Bhr̥ṅgarāja (Whole plant).

API, Part I, Vol. II.

The adulterants consist mainly of *Ageratum conyzoides*, *Caesulia axillaris*, and *Alternanthera sessilis*.^{2(c),113}

The herb's active principles are lost due to aerial oxidation during sun drying or drying under reduced pressure below 40°C. It should be dried at room temperature under shade.^{2(c)}

AYURVEDIC SYNONYMS

Keśarāja, Tekarāja, Bhr̥ṅga, Mārkaṇḍa, Bhr̥ṅgaja

Bhr̥ṅgaraka, Bhr̥ṅgāra.⁷

Yellow-flowered variety is known as Kesharāja or Kesharāga.³

HABITAT

As a weed of moist places found throughout India ascending up to 1700 m.

REGIONAL LANGUAGE NAMES

Assam: Bhr̥ṅgaraja;

Beng: Bheemraja, Kesuriya, Kesari;

Guj: Bhangaro, Bhangro;

Hindi: Bhangara, Bhangaraiya;

Kan: Garujalu, Gurugada soppu, Keshavardhana, Kodigaraju;

Mal: Kayyonni, Knnunni;

Mar: Bhangra, Bhr̥ṅgiraja, Maka;

Punj: Bhangra;

Tam: Karisalankanni, Karisalangani, Karisalai;

Tel: Guntakalagara, Guntagalagara;

Urdu: Bhangra.

CONSTITUENTS

Alkaloids, Ecliptine and Nicotine.

Major components: wedelolactone and desmethylwedelolactone, in addition sulfur-containing peptides, alpha-terthienylmethanol, beta-amyrin, and stigmasterol.

Polypeptide gave amino acids, cysteine, glutamic acid, phenylalanine, tyrosine, and methionine.^{20(j),25}

Ascorbic acid: stem 83.7 mg/100 g, leaf 86.5 mg/100 g, fruit 83.7 mg/100 g and root 109.6 mg/100 g fresh weight.

THERAPEUTIC AND OTHER ATTRIBUTES

Yakṛdṛoga, Kṛmiroga, Śoṭha, Pāṇḍu, Śvāsa, Kāsa, Śirāḥ śūla, Hṛdṛoga

Used for liver disorders, worm infestations, edema, anemia, asthma, cough, headache, and heart diseases (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Charaka prescribed the plant juice with honey for treating cough, gray hair, and senility.²⁷

Whole plant is considered to be an effective drug for hepatotoxicity and to be a deobstruent in hepatic and spleen enlargement.¹⁵ Wedelolactone and desmethylwedelolactone possess potent anti-hepatotoxic properties. Immunoactive properties have been observed against the surface antigen of hepatitis B virus. It is reported to be effective in the treatment of peptic ulcers.

IMPORTANT FORMULATION/ APPLICATIONS

Bhr̥ṅgarājāsava (not in AFI, Part I and II, Gadanigraha, twelfth century), contains juice of Bhr̥ṅgarāja plant with 8 supporting herbs. Prescribed in enlargement of liver and spleen, cough, bronchitis, anemia, fever, wasting diseases.

Tekarāja Maricha (could not be traced).

Tekarāja Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains extracts of Bhr̥ṅgarāja plant with *Terminalia chebula* in oil. Used internally and externally in cough, asthma, and bronchitis.

Bhr̥ṅgālarkādi Tailam (Sahasrayoga; not in the API and AFI) contains Bhr̥ṅgarāja,

Calotropis, *Adhatoda vasica*, and *Solanum xanthocarpum* with 28 other herbs. Given internally for “all the five types of” cough, asthma, and edema.

Quoted oils are used for retarding baldness, for promoting hair growth and for head massage.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 mL of the drug in juice form. 12–36 g of the drug in powder form for decoction.

Water extract of *E. alba* plant, 500 mg, thrice a day, cured 55% cases of hepatocellular jaundice.^{20(j)}

Elaeocarpus sphaericus Gaertn. K. Schum Rudrāksha

BOTANICAL SOURCE(S)

Elaeocarpus sphaericus Gaertn. K. Schum (Fam. Elaeocarpaceae).

Syn. *E. ganitrus* Roxb. ex G. Don., *Ganitrus sphaericus* Gaertn.

PHARMACOPOEIAL AYURVEDIC DRUG

Rudrāksha (Seed).

API, Part I, Vol. IV.

First description of Rudrāksha is found in Rājanighantu (fourteenth century); first reference is found in Nighantushesha (twelfth century).^{16(b)}

AYURVEDIC SYNONYMS

Bhūtanāshana, Pāvana, Shivākshā.²⁰⁽ⁱ⁾

(Non-classical Sanskritized synonyms.)

HABITAT

The lower Himalayas and in the Western ghats at higher elevation.

Found in Nepal, West Bengal, Madhya Pradesh, Maharashtra, Odisha, Andhra Pradesh, and Western Ghats.⁷

Elaeocarpus serratus Linn.: found in the Eastern Himalayas and Western Ghats up to 1000 m.⁷

E. oblongus Mast., non-Gaertn. syn. *E. glandulosus* Wall, ex Merrill: found in the Western Ghats. (The fruit is used in mental disorders and tetanus).^{2(c)}

E. tuberculatus Roxb.: found in the Western Ghats from Kanara southwards.⁷

All of the species are the sources of Rudrāksha (fruit seed).

REGIONAL LANGUAGE NAMES

Beng: Rudrakya;

Guj: Rudraksh, Rudraksha;

Hindi: Rudraki;

Kan: Rudrakshi mara, Rudrakshi;

Mal: Rudraksha;

Mar: Rudraksha;

Punj: Rudraksh;

Tam: Rudraksha;

Tel: Rudraksha.

Eng: Utrasum bead tree.

E. serratus:

Eng: Wild olive tree, Ceylon olive.⁷

CONSTITUENTS

Fixed oil and Fatty acids.

Seed oil contains the fatty acids, myristic, palmitic, stearic, oleic and linoleic acids.

Different extracts of fruits showed the presence of phytosterols, fats, alkaloids, flavonoids, carbohydrates, proteins, and tannins.

Leaves were found to contain alkaloids, elacocarpine, isoelacocarpene and rudrakine, with quercetin and gallic and ellagic acids.^{20(j)}

THERAPEUTIC AND OTHER ATTRIBUTES

Matisudhikar, Uccaractacapa, Prgyaparadha, Hrdyaroga, Romantika, Manasroga, Anidra

Used for vitiated mental functions, hypertension, perverted thinking, disturbed cardiac functions, viral eruptions, mental diseases, and insomnia (therapeutic uses based on Rājānighantu, expanded by Sanskrit *shlokas* composed by contemporary scholars).

Aqueous extract of fruits: hypotensive; seeds: anti-convulsant, spasmolytic, choleric, bronchodilatory, and cardiostimulant.¹¹⁴

Seed extracts showed hypotensive, CNS-depressant, anticonvulsant, smooth muscle-relaxant, analgesic, and anti-inflammatory effects.

Fatty acids showed myocardial-stimulant properties.^{20(j)}

IMPORTANT FORMULATION/ APPLICATIONS

Not even a single compound from classical Ayurvedic texts (from Charaka Samhita to Bhāvaprakāsha) could be quoted. All but one quoted compounds are from Sahasrayoga, a non-Samhitā, Kerala Materia Medica.

Chukkum-pipplyādi Gutikā (for fevers, chest diseases, and heart diseases); Dhanvantara Gutikā (for cough, asthma, chest diseases, and heart diseases); Mr̥tasanjivani Gutikā (for epilepsy, mental disorders, and toxic conditions).

Svarnamukladi Gutika (could not be traced).

Gorochanādi Vati (Vaidyayoga Ratnāvali, 1953; latest edition does not contain the compound), is an obsolete drug.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

LD₅₀ of the alcoholic extract of the fruit was found to be >1000 mg/kg i.p. in mice.^{20(j)}

Elettaria cardamomum (Linn.) Maton

Sūkṣmailā

BOTANICAL SOURCE(S)

Elettaria cardamomum (Linn.) Maton and its varieties
(Fam. Zingiberaceae)

E. cardomomum Maton var. *minuscule* Burkill
(Cardamom hills in Travancore-Cochin).

PHARMACOPEIAL AYURVEDIC DRUG

Sūkṣmailā.

API, Part I, Vol. I.

International Pharmacopoeial name: *Semen cardamoni*,¹⁰⁽⁴⁾ *Cardamomi fructus*.⁸

AYURVEDIC SYNONYMS

Truṭi, Elā.

Bhṛṅgaparnika,²⁷ Chandravālā, Bahulā, Niskuti, Dvijā, Kapotvarṇā, Varatī, Drāviḍi, Sakhi.⁴

Elādwyā of Ayurveda: Suksmailā and Sthulailā

(Syn. Triputā, Kanyā, Bhadrailā, Tridivodbhavā).⁴

Elāparni is a different drug, equated with Rāsnā of South India, *Alpinia galanga* Willd.³⁰

HABITAT

Moist forests of western ghats up to 1500 m, also cultivated in many other parts of south India at an elevation from 750–1500 m.

Seven species are known from India to Malesia.¹ It is native to India.¹⁰⁽⁴⁾

REGIONAL LANGUAGE NAMES

Eng: Cardamom;
Assam: Saroopplaachi;
Beng: Chota elaichi;
Guj: Elchi, Elachi, Elayachi;
Hindi: Choti ilayachi;
Kan: Elakki, Sanna yalakki;
Mal: Elam, Chittelam;
Mar: Velloda, Lahanveldoda, Velchi;
Ori: Gujurati, Chotaa leicha, Alaicha;
Punj: Illachi, Chhoti lachi;
Tam: Siruelam;
Tel: Chinne elakulu, Sanna elakulu;
Urdu: Heel khurd.

Eng: Lesser cardamom.

CONSTITUENTS

Essential oil.

The dried ripe seed contains 2%–8% essential oil with 1, 8-cineole 20%–40%, (+)-alpha-terpinyl 30%–42%, alpha-terpineol 4%–45%, limonene 6% and smaller amounts of linalool and linalool acetate, among others.¹⁰⁽⁴⁾

A wide spectrum of anti-bacterial and anti-fungal activity has been recorded.²⁴⁽²⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Kāsa, Śvāsa, Aruci, Chardi, Mūtrakṛcchra

Used for cough, asthma, anorexia, emesis, and dysuria (therapeutic uses based on texts from 1000 BC to sixteenth century).

In dysuria, elā with the juice of Āmlaka (Sushruta Samhitā, 1000 BC) or with curd water (Gadanigraha, twelfth century) was given.

Elā with wine was used as a diuretic (Sushruta Samhitā, Ashtāngahridaya, Vṛndamādhava and Gadanigraha).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Elādi Modaka (Bhaishajya Ratnāvali, seventeenth century), contains 17 herbs in equal proportion. For excessive intoxication, alcoholism, emesis.

Elādi Churna (Bhaishajya Ratnāvali) contains ten herbs in equal proportions. Used for cough and asthma.

Sitopalādi Churna (Shārangadhara Samhitā, thirteenth century) contains sugar candy, bamboo manna, *Piper longum*, elā and cinnamon bark (16:8:4:2:1 proportions). Used for cough and cold.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

250–500 mg of the drug in powder form.

Average daily dose: 1.5 g of the drug in equivalent preparations.

In dyspepsia: daily dose of 1–2 g.⁸

Aqueous or methanolic extract caused significant decreases in the secretion of gastric juices, acid and papsin in 3–5 hours after oral administration to rabbits.²⁴⁽²⁾

The drug is not advisable in cases of gallstones (due to its cholagogue action).²⁴⁽²⁾

***Eleusine corocana* (L.) Gaertn.**

Root

Madhūlikā

BOTANICAL SOURCE(S)

Eleusine corocana (L.) Gaertn.
(Fam. Poaceae).

Spelt wrongly in API.

For *E. corocana* (Rāgi) and *E. indica* (L.) Gaertn. (Thippa Rāgi), the Indian Council of Medical Research screened 117 Indian studies. Chemical constituents of the root were not available.

PHARMACOPOEIAL AYURVEDIC DRUG

Madhūlikā (Root).

API, Part I, Vol. V.

Pharmacopoeial name should have been Madhūli (plant or seed).

Madhūlikā was a variety of *surā* (wine). (Charaka Samhitā, Su. 27, 187; Sushruta Samhitā, Su. 45, 179). (A fermented drink of Rāgi grain is still prepared.)

During the classical period, it was used for dyspnea, asthma, renal diseases, and convulsions during high fevers.

In the text quoted in the API, Madhūli (not Madhulikā) is grouped with Nandimukhi, Nṛtyakundala, Nartaka and Ragi (all cereal grasses).^{16(b),30}

AYURVEDIC SYNONYMS

Rāgi, Madhūli, Markatahastatṛṇa.

Alpa-godhūma.

Madhulikā, Madhulaka (wine of Madhuli).

Madhūlika was also a synonym of Jalaja

Maduka^{4,16(b)} (aquatic licorice). Its fruit was used in high fever with convulsions.³

HABITAT

Cultivated throughout India.

Considered to be of Indian or African origin.¹

There are six diploid and three polyploidy types.¹ (Fermented for alcoholic drinks since 3000 BC.)¹

REGIONAL LANGUAGE NAMES

Eng: Finger millet, Ragi;

Beng: Marua;

Guj: Naagali-baavato;

Hindi: Manduaa, Makaraa, Raagi;

Kan: Raagi;

Mal: Muttari, Raagi;

Mar: Naachnee;

Punj: Madua, Koda, Kodra;

Siddha: Kejhavaragu;

Tam: Raagi;

Tel: Raagulu, Tagidelu.

Eng: Coracan, Kurrakan, Ragi.¹

CONSTITUENTS

Flavonoids, orientin, isoorientin, vitexin, isovitexin, violanthin, lucenin-1, tricin, keto acids; polysaccharide and the free sugars, β -sitosterol glucoside.

The chemical constituents quoted above were isolated from the plant.^{2(d),15}

Seeds yield alpha-amylase inhibitors; proteins albumin, globulin and prolamin; arginine, cystine, histidine, lysine, methionine, phenyl-alanine, threonine, and tryptophan; beta-sitosterol and its glycoside stigmasterol; and phospholipids.

A cyanogenic glucoside triglochinin and ochratoxin A were isolated from the plant.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Tṛṣṇā, Karapāda dāha, Vṛkāśmari, Śvāsa, Kāsa, Jvaropdrava

Used for excessive thirst, burning sensations in the palm and soles, renal calculi, dyspnea, cough, convulsions and metabolic distress during high fever (therapeutic uses partially covered in the quoted text).

Rāgi *surā* (wine) was used for dyspnea, asthma, renal diseases, convulsions, and metabolic distress during high fever.^{16(b),30}

Ragi fermentation, using endogenous grain microflora at 30°C, showed decreases in fat content (42.9%) and pH (2.1 units), which led to increases in lactic and acetic acid content by 6.5 and 3.7 times, respectively.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Amlapittāntaka Modaka, Amṛta Guggulu, Kushthādi Kwātha, Katutumbyādi Taila (all these compounds are not covered in AFI Part I and II).

Ashvagandhādi Lehya (AFI) does not contain Madhulikā root.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

Ragi grain is used for its nutritional properties, while its fermented drink (Madhūlika of

Charaka and Sushruta) can be clinically tried to validate the attributes quoted in the API.

E

Embelia ribes Brum. f.

Vidāṅga

BOTANICAL SOURCE(S)

Embelia ribes Brum. f.
(Fam. Myrsinaceae)

Embelia tsjeriam-cottam A. DC. syn. *E. robusta*
C. B. Cl. is a commonly employed substitute of
Viḍaṅga.
Fruit of *Myrsine africana* Linn. is the main
adulterant.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Viḍaṅga (Fruit).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Jantughna, Kṛmighna, Vella, Kṛmihara, Kṛmiripu
Bhūtaghni, Karāla.⁴

HABITAT

Throughout hilly parts of India up to 1600 m.

Embelia: indigenous to Indo–Malesia (India to
New Guinea)¹ and tropical and subtropical
regions of the Old World.^{2(a)} Two species in
India: *E. ribes* and *E. tsjerium-cottam*.^{2(a)}

REGIONAL LANGUAGE NAMES

Assam: Vidang;
Bang: Vidang;
Guj: Vavding, Vavading, Vayavadang;
Hindi: Vayavidanga, Bhabhiranga, Baberang;
Kan: Vayuvīdanga, Vayuvilanga;
Kash: Babading;
Mal: Vizhalari, Vizalari;
Mar: Vavading, Vavding;
Ori: Bidanga, Vidanga;
Punj: Babrung, Vavaring;

Tam: Vayuvilangam, Vayuvīdangam;
Tel: Vayuvīdangalu;
Urdu: Baobarang, Babrang.

CONSTITUENTS

Benzoquinones, alkaloid (christembine), tannin
and essential oil.

Embelin, a *p*-quinone isolated from dry berries
(2.5%–3.1%); raponone, homoembelin, homora-
panone and vilangin; quercitol (1.0%); fatty
ingredients (5.2%), an alkaloid christembine, a
resinoid, tannins and a minute quantity of an
essential oil. The fatty oil is reported to be similar
to linseed and rapeseed oils in its properties.^{2(a)}
It is spermicidal and ascaricidal.³²

**THERAPEUTIC AND OTHER
ATTRIBUTES**

Kṛmiroga, Ādhmāna, Śūla, Udararoga

Used in worm infestations, flatulence, colic, and dis-
eases of the abdomen (therapeutic uses based on
texts from the thirteenth to sixteenth centuries).
According to Charaka and Sushruta (1000 BC),
Viḍaṅga is the best remedy for worms and
excels as an anthelmintic (given in the early
morning during fasting, with milk or syrup,
followed by a purgative).¹⁸
Embelin impairs spermatogenesis and reduces
sperm count.
It is reported to be effective against tapeworm, as
well as in giardiasis.
Potassium embelate is analgesic. Embelic acid is a
tryptin inhibitor.^{2(a,c,d)}

**IMPORTANT FORMULATION/
APPLICATIONS**

Vidangārishta (Shārangadhara Samhitā, thirteenth
century), contains Viḍaṅga among 5 main

herbs and 14 supporting herbs. Prescribed for intestinal worms, fistula-in-ano, scrofula, and abscesses.

Vidang Lauha (Rasendra Sārsamgraha, period not known) contains mercury, sulfur, borax (ore), orpiment, and iron with Vidanga and the three pungents. Used for helminthiasis.

Vidangādi Lauha (Bhaishajya Ratnāvali, seventeenth century) contains calcined iron, Vidanga and 11 other herbs in equal proportions. Used for jaundice, anemia, and inflammations. (Not quoted in the API.)

DOSAGE/USAGE/CAUTIONS/COMMENTS

5–10 g of the drug in powder form.

Fruit powder (200 mg/kg) taken with curd on an empty stomach expelled tapeworms (100%) within 6–24 hours and was also found effective against *Giardia*.^{33(b)}

As a contraceptive: clinical trials have been undertaken at the National Institute of Immunology, New Delhi.

For British patents, 10,25,372 (1966) and 14,45,599 (1976) and other patents can be searched for in chemical abstracts or related websites.

E

Emblica officinalis Gaertn.

Fresh fruit

Āmalakī

BOTANICAL SOURCE(S)

Emblica officinalis Gaertn.
Syn. *Phyllanthus emblica* Linn.
(Fam. Euphorbiaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Āmalakī (Fresh fruit pulp).

API, Part I, Vol. I.

International Pharmacopoeial name: *Phyllanthi fructus*.

AYURVEDIC SYNONYMS

Āmalaka, Amṛtaphala, Dhātṛīphala.

Āmalā, Vayasyā,³ Śrīphala, Śiva.⁴

HABITAT

Mixed deciduous forests of India, ascending to 1300 m on hills, also cultivated in gardens and homeyards.

REGIONAL LANGUAGE NAMES

Eng: Emblic Myrobalan;
Assam: Amalaku, Amlakhi, Amlakhu;

Beng: Amla, Dhatri;
Guj: Ambala, Amala;
Hindi: Amla, Aonla;
Kan: Nellikayi;
Kash: Embali, Amlī;
Mal: Nellikka;
Mar: Anvala, Avalkathi;
Ori: Anala, Ainla;
Punj: Aula, Amla;
Tam: Nellikai, Nelli;
Tel: Usirika;
Urdu: Amla, Amlaj.

Eng: Indian gooseberry.^{2(a)}

CONSTITUENTS

Ascorbic acid and tannins.

Fresh fruit pulp contains vitamin C 600 mg/100 g; minerals: Ca 0.05%, P 0.02%, iron 1.2% and niacin 0.26%; amino acids include alanine 5.3% and proline 14.6%.

Fruit contains tannins 28%, which include gallic acid, ellagic acid, and glucose.

Fruit also contains phyllembin and curcuminoids, an antiaging principle and superoxide dismutase 482.14 units/g fresh weight.^{2(a,c,d)}

Putranjivain A, isolated from the fruit in Egypt, showed potent inhibitory activity against HIV-1 RT.^{2(d),116}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Amlapitta, Prameha, Dāha

Used for hemorrhagic diseases, hyperacidity, urinary disorders and burning sensation (therapeutic uses based on texts from 1000 BC to sixteenth century).

Āmalaki rasāyana (tonic) is popularly used in two forms, Chyavanaprāsha and Morawala.¹¹⁵ Morawala is Āmalaki fruit jam free from additives; it is considered to be a good tonic, especially during the hot season; it is also given in chronic low fevers, anemia, and hyperacidity.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Chyavanaprāsha (Charaka Samhitā, 1000 BC), contains Āmalaka fruits as main constituent

with 40 plant drugs; Bamboo manna and Kesara/keshara (both equated with *Mesua ferrea*, API, Part I, page 317). The only all-in-one tonic confection of Indian medicine, used as an age-sustaining and rejuvenating drug, especially during winter. A number of modified products have overshadowed the original drug. Brahma Rasāyana (Ashtāṅgahridaya, seventh century) contains Āmalaka fruit and Haritaki (*Terminalia chebula* fruits) as the main constituents with 39 herbs. It is prescribed as an invigorating and intellect-promoting tonic. (Not quoted in the API.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10-20 g of the drug. 5–10 ml of fresh juice.

Even only partially fresh Amla can provide more than 50 mg of ascorbic acid, which equates to the minimum daily requirement of vitamin C of an adult.^{2(d)}

Emblca officinalis Gaertn.

Dried fruit

Āmalakī

BOTANICAL SOURCE(S)

Emblca officinalis Gaertn.

Syn. *Phyllanthus emblica* Linn.

(Fam. Euphorbiaceae)

The three *Triphalās* (three groups of fruits, known as *Triphalā* or *Tri-triphalā*):

- Búkuchi, Vidanga and Tuvarka (*Psoralea corylifolia*, *Embelia ribes* and *Hydnocarpus kurzii*).
- Bhallataka, Tejini and Indrayava (*Semecarpus anacardium*, *Marsdenia tenacissima*, and *Holarrhena antidysenterica*)
- Āmalakī (dried fruit) with two other members of the three Myrobalans.

All three *Triphala* groups were specific for obstinate skin diseases (Sahasrayoga, CCRAS text, page 258).

PHARMACOPOEIAL AYURVEDIC DRUG

Āmalakī (Dried fruit).

API, Part I, Vol. I.

International Pharmacopoeial name: *Phyllanthi fructus*.

AYURVEDIC SYNONYMS

Āmalaka, Amṛtaphala, Dhātrīphala.

Āmalā, Vayasyā,³ Śrīphala, Śiva.⁴

HABITAT

Mixed deciduous forests of India, ascending to 1300 m on hills, also cultivated in gardens and homeyards.

REGIONAL LANGUAGE NAMES

Eng: Emblic Myrobalan;
Assam: Amalaku, Amlakhi, Amlakhu;
Beng: Amla, Dhatri;
Guj: Ambala, Amala;
Hindi: Amla, Aonla;
Kan: Nellikayi;
Kash: Embali, Amlī;
Mal: Nellikka;
Mar: Anyala, Avalkathi;
Ori: Anala, Ainla;
Punj: Aula, Amla;
Tam: Nellikai, Nelli;
Tel: Usirika;
Urdu: Amla, Amlaj.

Eng: Indian gooseberry.^{2(a)}

CONSTITUENTS

Ascorbic acid and gallotannins.

Dried fruit loses 20% of its vitamin C in 375 days when kept under refrigeration; it loses 67% if stored at room temperature.^{2(a)} Being heat labile and water soluble, most of the vitamin C is lost during processing. During preservation as *murabhā* (jam), 48.3% vitamin C and 18.5% tannins are leached out into the syrup.^{2(d)}

Fruits retain 55.33% vitamin C even after drying at 55–60°C.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Amlapitta, Prameha, Dāha

Used for hemorrhagic diseases, hyperacidity, urinary disorders, and burning sensation (therapeutic uses based on texts from 1000 BC to sixteenth century).

Dried fruit extract inhibits emesis induced by apomorphine.

The ethanol and acetone extracts of *Triphala* show anti-microbial activity against *Salmonella typhi*, *Shigella dysenteriae*, *Vibrio cholerae*, *Staphylococcus aureus*, and *Klebsiella aerogenes*.

IMPORTANT FORMULATION/ APPLICATIONS

Chyavanprāsha should contain fresh fruit, when fresh fruits are not available dried fruits are used.⁶

Dhātri lauha (Bhaishajya Ratnāvali) contains dried Āmalaka as the main plant drug with calcined iron. Used for jaundice and hyperacidity.

Dhātryādi Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Āulaka decoction as one of the main drugs with *Pueraria tuberosa* tuber juice. Prescribed for alcoholism, insanity, and syncope.

Triphala Churna (Bhāvaprakāsha, sixteenth century) contains Haritaki, Bibhitaki and Āmlaki (the “Three Myrobalans”) in equal quantities (AFI), or in 1:2:4 proportions in Shārangadhara Samhitā (thirteenth century). Used for regularizing digestion and relieving constipation; the water extract is used externally as an astringent and antiseptic.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Nishamlaki Churna (Ashtangahridaya, seventh century) (not included in the API and AFI) contains Amlaki dried fruits and Nisha (*Curcuma longa*/*C. caesia*, the black var. of West Bengal) in equal proportions. It should be examined as an anti-diabetic drug.

Enicostemma axillare (Lam.) A. Raynal.

Nāhī

BOTANICAL SOURCE(S)

Enicostemma axillare (Lam.) A. Raynal.
Syn. *E. littorale* Blume, *E. hysoppifolium* (Willd.)
Verd.
(Fam. Gentianaceae)

The smaller variety, *Enicostemma verticillatum*
Blume is equated with Vellargu of Siddha
medicine.⁷

PHARMACOPOEIAL AYURVEDIC DRUG

Nāhī (Whole plant).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Māmajjaka, Nāgajihvā.

Nāhikā, Katu-Nāhi.³⁰

Nahikā is also mentioned as a synonym of
Shukanāsā.

Nāhi, Nāgajihvā and Māmajjaka were synonyms
in Sodhala Nighantu (twelfth century).

HABITAT

Throughout the greater parts of India up to an alti-
tude of 500 m, more commonly in coastal areas
and damp habitats.

REGIONAL LANGUAGE NAMES

Guj: Maamijvaa, Maamejvaa;
Hindi: Naay, Naai, Chhotaa kiraayataa;
Kan: Karibandit, Sogade;
Mal: Vellaruku, Vellari;
Mar: Kadvi naai;
Pun: Bahuguni;
Tam: Vellaruku;
Tel: Chhevvu-kurti, Gulvidi;
Urdu: Naay.

Eng: Indian Gentian.³²

CONSTITUENTS

Flavonoids like genkwanin, apigenin, isovitexin,
swertisin, saponarin, swertiamarin, betulin, enico-
flavin, gentiocrucine, gentianine, erythrocentaurine,
ephelic acid glycoside, sylswertisioside, isoswerti-
sin-5-*O*-glucoside; sylswertisin-5-*O*-glucoside.

The alkaloid gentianine was found to be an
artefact. Its precursor was identified as
swertiamarin.²⁰⁽ⁱ⁾

Ophelic acid is also present in Chiretta as a
hydrolytic product of chiratin.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmi (worm infestation), Śoṭha (oedema),
Madhumeha (diabetes mellitus), Medoroga (obe-
sity), Prameha (metabolic disorder), Raktavikāra
(disorders of blood), Tvakroga (skin diseases),
Viṣamajvara (intermittent fever), Vibandha
(constipation), Yakṛtdaurbalya (poor function of
liver)

(The anthelmintic activity of the alkaline ash is
based on Shodhala Nighantu and Shaligarām
Nighantu; other properties have been
described in non-classical Sanskrit *shlokas*
added by contemporary scholars.)

The plant is used as a substitute for *Swertia chi-
rayita* and is reported to be effective against
malaria. The root extract showed anti-malarial
activity both *in vitro* and *in vivo*.^{2(a)} The plant
inhibited carrageenan- induced edema; its
anti-inflammatory activity was found to be
comparable to that of hydrocortisone.^{2(c)} It is
also used as a Rasna substitute.³

The glycoside swertisioside is hypotensive.^{33(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Vāyuchhāya-surendra Taila (Ayurveda sangraha,
a contemporary compound, incorporated in

AFI, Part II); contains 31 herbs. Main herb is Balā (*Sida cordifolia*) root with 10 other herbs. Nāgajihvā is among 19 supporting herbs. It was composed for epilepsy, insanity and a number of neurological diseases. An obscure drug.

Validity not known.

The classical drug, Nāhi, was specific as an anthelmintic (Sodhal Nighantu, twelfth century; Shāligaram Nighantu, nineteenth century). The plant's alkaline ash was used, while the plant, which has been identified as Nāhi, is used as a substitute of Chiretta (anti-periodic,

anti-rheumatic, blood purifier, anthelmintic, laxative and bitter tonic).³²

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (powder): 1 to 3 g.

Used in quantities of 3–5 g.

The powdered drug is given with honey as a blood purifier and in dropsy, rheumatism, hernia, and swellings.^{33(a),63}

Erythrina indica Lam.

Pāribhadra

BOTANICAL SOURCE(S)

Erythrina indica Lam.
(Fam. Fabaceae)

Syn. *E. variegata* L. var. *orientalis* (L.) Merrill.

PHARMACOPOEIAL AYURVEDIC DRUG

Pāribhadra (Stem bark).

API, Part I, Vol. II.

The bark is used as a substitute for Rohitaka bark.³⁰

AYURVEDIC SYNONYMS

Pāribhadraka, Kaṇṭakimśuka.

Mandāra, Rakta pushpa, Kantaki, Pārijāta, Kaṇṭ-kiṁshuka.⁴

Pāribhadraka was a synonym of Nimba, and Kuṣṭha (Pāribhadraka, Pārihārya and Pāribhavya).⁴ (The Nimba synonym indicates that, in practice, Nimba was substituted for Pāribhadra.)³⁰

HABITAT

Distributed widely in deciduous forests throughout India, also grown in gardens as an ornamental plant and as a support for black pepper vine.

REGIONAL LANGUAGE NAMES

Eng: Coral tree;
Beng: Pattermadar;

Guj: Panderavo;
Hindi: Pharahada, Pangara;
Kan: Hongar, Halivanadamar;
Mal: Murrikku;
Mar: Pangara;
Tam: Kalyanamurongai, Mulmurungai;
Tel: Badisa, Varifamu.

CONSTITUENTS

Alkaloids and Resins.

Alkaloids in the bark 0.05%; resins with fixed oil and fatty acids 0.60%.^{20(j)}

The bark was shown to contain wax alcohols and wax acids, alkyl ferulates, alkyl phenolates, stigmasterol, sitosterol, campesterol, and possibly citrostadienol.

Alkaloids include erysotine, erythratidine, epi-erythratidine and 11-hydroxy-epi-erythratidine.

From outer layer of bark, two new isoflavones, erythrinins A and B, along with osajin and alpinumisoflavone, were isolated.^{20(j)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmimiroga, Śoṭha, Karṇaroga

Used for worm infestations, edema and ear diseases (therapeutic uses based on texts from 1000 BC to sixteenth century. Except for the flowers, no other plant part is mentioned in the quoted text.)

Bark alkaloids: neuromuscular blocking, smooth muscle relaxant, CNS depressant, hydrocholeretic, and anti-convulsant.^{33(b)}

Erythrina alkaloids have shown promising results in the treatment of muscular rigidity.^{2(a)} Bark alkaloids showed a curarimimetic action on skeletal muscles *in vitro* and *in vivo*.

IMPORTANT FORMULATION/ APPLICATIONS

Nyagrodhādi Churna (Yogaratanākara, sixteenth century), contains 28 plant drugs in equal proportion, Pāribhadra stem bark is one of them. Used for dysuria and other urinary disorders.

Abhaya Lavana (Bhaishajya Ratnāvali, seventeenth century) contains alkaline ashes of

17 barks, plants and roots. Used for diseases of the spleen and liver.

Nārāyana Taila (Bhaishajya Ratnāvali); Pāribhadra is among the 13 main herbs, all in equal proportions. Used for neurological disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

6–12 g of the drug in powder form.

12–24 g of the drug for decoction.

LD₅₀ values of the ethanol extracts of stem bark and leaves were found to be 250 and 1000 mg/kg i.p., respectively, in mice.

LD₅₀ of the alkaloids was found to be 87.5 mg/kg i.p. in albino rats.^{20(j)}

Eucalyptus globulus Labill.

Tailaparnah

BOTANICAL SOURCE(S)

Eucalyptus globulus Labill.
(Fam. Myrtaceae)

23 species of *Eucalyptus* are found in India.^{20(g)}
For chemical studies of ten species, see Reference 20(g).

PHARMACOPOEIAL AYURVEDIC DRUG

Tailaparnah (Leaf).

API, Part I, Vol. V.

A non-classical Sanskritized synonym.

International Pharmaceutical name: Aetheroleum Eucalypti (essential oil).

AYURVEDIC SYNONYMS

Nīlaniryāsa,* Ekaliptah, Sugandha patrah.

Indian physicians recognize the oil as Nilgiri oil and the tree as eucalyptus.

HABITAT

Native to Australia, but planted worldwide and introduced in Nilgiris, Anamalai and Palni hills, Simla and Shillong at altitude of 1,500–2,500 m.

Cultivated in Ranikhet in Uttarakhand and Kangra, Kullu, and Chamba in Himachal Pradesh.^{20(j)}

E. globulus was discovered on the island of Taasmania in 1792 (after the period of all Ayurvedic classical texts) by French explorers. It was introduced into India in 1843 as a fuel tree.

REGIONAL LANGUAGE NAMES

Eng: Blue gum,* *Eucalyptus*;

Hindi: Yukeliptas;

Mal: Yukkaalimaram;

Mar: Nilgiri;

Tam: Yukkaalimaram.

CONSTITUENTS

Essential oil containing terpenes such as 1,8 – cineole, camphene, sabinene, myrcene, p-menthone, α - and γ -terpinene, fenchone, α - β -thujone, citral, verbenone.

Oxygenated monoterpenes include 1, 8-eucalyptol 72.71%, α -terpineol 2.54%, terpinen-4-ol 0.34% and linalool 0.24%; main monoterpenes include α -pinene 9.22% and β -pinene 0.4%. Sesquiterpenes include α -eudesmol 0.39%, (–)-globulol 2.77%, and epiglobulol 0.44%.¹⁷⁷

Other compounds: α -terpineol acetate 3.1%, geranyl acetate 0.71%, L-pinocarveol 0.36%, β -sabinene 0.25%, and terpinolene 0.19%.¹¹⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmi, Jīrnakāsa, Pratisyāya, Svarabheda, Viṣamajvara, Jvara, Śūla, Pūyameha, Kṣaya, Śvāsa, Bastiroga, Pravāhikā, Pliharoga, Hr̥droga, Agnimāndya

Used in worms, chronic fever, sinusitis, hoarseness, malaria, fever, colic, polyuria, emaciation, asthma, diseases of the urinary system, sprue, diseases of the spleen, heart disease, and digestive impairments (contemporary attributes).

Eucalyptus oil, diluted with olive oil, is used externally as a rubefacient for rheumatism. Tincture of leaves is used as a stimulating expectorant in chronic bronchitis and asthma.

The oil is preferred for inhalation or as a part of medicinal steam. A number of pharmaceutical products, creams, gels, rubs, and inhalers are available. Ayurvedic preparations are few.

IMPORTANT FORMULATION/ APPLICATIONS

Panchagūṇa Taila (Siddhayoga-samgraha, by a contemporary physician), contains 15 ingredients including Pine oil, Eucalyptus oil and Kejoputi oil. Externally for arthritis, wounds, and as ear drops in earache.

All other quoted compounds are obscure drugs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g.

For asthma, eucalyptol (a constituent of oil) has been given 200 mg three times daily.¹³

Essential oil or equivalent preparations:

0.3–0.6 mL.

Lozenges: one of 0.2–15.0 mg every 30–60 min.

For inhalation: 15 drops/150 mL in boiling water.¹⁰⁽²⁾

Ingestion of 3.5 mL oil can be fatal in adults. Oil contains cineol, which when consumed in high doses can cause seizures. Hydrocyanic acid is also very toxic.¹³

Preparations should not be applied to the face, especially the nose of infants and young children.^{10(2),8}

Euphorbia dracunculoides Lam.

Saptalā

BOTANICAL SOURCE(S)

Euphorbia dracunculoides Lam.
(Fam. Euphorbiaceae)

Syn. *E. angustifolia* Buch.-Ham. ex D. Don.^{20(j)}
E. tirucalli Linn.¹⁵

In Kerala and Bengal, *Acacia concinna* (Willd.)

DC. (Soapnut *Acacia*) is used as Saptalā.³

Samples received from drug dealers, excepting those from Chennai, Mysore, and Kerala,

contained *E. dracunculoides* as the Unani drug Sudāb (*Ruta graveolens*).

(In dried conditions, both herbs resemble each other to a great extent.)^{20(j)}

PHARMACOPOEIAL AYURVEDIC DRUG

Saptalā (Whole plant).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Sātalā, Carmasāhvā, Caramakaṣā.

Vimalā, Sāri, Vayu-phenikā, Phenā, Diptā,
Nālikā,⁴ Saptalikā.³⁰

HABITAT

Throughout India in plains and low hills.

REGIONAL LANGUAGE NAMES

Beng: Chagalpupti;

Guj: Satale;

Hindi: Titali, Joyachi, Chagulputputi;

Kan: Satala, Bilikalli, Kalli;

Mal: Chasma lantha, Pathiri;

Mar: Nivadung;

Ori: Naagapheni, Siju, Saptala;

Punj: Kangi;

Tam: Tillakada, Thusimullai;

Tel: Tillakada;

Urdu: Thuhar.

CONSTITUENTS

Glyco-alkaloid (Euphorbine).

Stalk and leaves contained euphorbine
0.35%–0.38%.^{20(j)}

Aerial parts contain flavonoids, quercetin and its
3-O-beta-D-glucopyranosyl (1 → 4) O-alpha-
L-rhamnopyranoside, kaempferol and its
3-O-beta-methylglucuronide and 3-O-beta-
glucosyl (1 → 4) beta-methylglucuromide.

Presence of coumarins, beta-sitosterol, and
oleanolic acid is also reported.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Udavartta, Ānāha, Udararoga, Vibandha,
Visarpa

Used for abdominal lumps, obstructive enter-
opathies, flatulence, diseases of the abdomen,
constipation, and erysipelas (therapeutic uses
based on texts from 1000 BC to sixteenth
century).

Aerial parts are used as a vegetable for maintain-
ing smooth and regular movements of the
bowels.⁷

Alcoholic and aqueous extracts of aerial parts
showed significant action on gastrointestinal
motility in rats and may have potential as a
laxative drug. Air-dried plant also exhibits
cholinergic action and direct stimulation on
different muscle preparations.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Nārāyana Churna (Ashtāngahridaya, seventh cen-
tury), contains 33 plant drugs, Saptala plant's
proportion is more than other main drugs. For
diseases of digestive and nervous system.

In the other quoted compounds, Brahmi Ghrita
and Mishraka Sneha (Ashtāngahridaya),
Saptalā is among the supporting herbs.

E. tirucalli: the plant's juice is purgative and
carminative; it is used in dyspepsia, colic,
enlargement of the spleen, jaundice, leprosy,
leucorrhea, and gonorrhea.^{2(c)} Stem gave
hentriacontane, hentriacontanol, beta-
sitosterol, taraxerol, ellagic acid, and
kaempferol glucoside.³²

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50 g of the drug for decoction.

LD₅₀ of the ethanolic extract of the plant was
found to be 1000 mg/kg i.p. in mice.

E. tirucalli: MTD of the ethanolic extract of
the plant (excluding root) was found to be
500 mg/kg i.p. in mice.^{20(j)}

Euphorbia hirta L.

Bṛhat Dugdhikā

BOTANICAL SOURCE(S)

Euphorbia hirta L.

Syn. *E. pilulifera* auct. non L.

(Fam. Euphorbiaceae)

Chamaesyce hirta (L.) Mill.^{20(j)}

PHARMACOPOEIAL AYURVEDIC DRUG

Bṛhat Dugdhikā (Whole plant).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Dugdhikā.

Nagārjuni, Kṣīrini.^{20(j)}

HABITAT

Throughout the hotter parts of India as a common weed.

Smaller var. is equated with *E. thymifolia*.

REGIONAL LANGUAGE NAMES

Eng: Asthma weed;

Ben: Barakherui;

Guj: Dudhelo, Dudeli, Dudhi;

Hindi: Dudhi, Badi dudhdi;

Mal: Nelapalai;

Mar: Mothi dudhi, Naayato, Dudhi, Dudali, Mothi naayati;

Ori: Dudili, Dudoli;

Pun: Dudhi;

Tam: Ammanpatchaiarisi;

Tel: Reddivarinanubalu, Nanubalu.

Eng: Australian asthma weed, Pill-bearing spurge;

Urdu: Dudhi khurd.

CONSTITUENTS

Flavonoids, ellagotannins and tri terpenoids.

The herb yields diterpenoids along with quercetin and its 3-rhamnoside, rutin, cycloartenol,

camphol, jambulol, euphosterol, beta-sitosterol and triacontane; an alkaloid xanthorhamine; dimeric tannins and euphorbins A–E, having dehydrohexahydroxy diphenyl group in the molecule; monomeric hydrolyzable tannins; geraniin and terchebin together with quinic acid esters.^{2(c,d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dadru (taeniasis), Kṛmi (worm infestation), Kāsa (cough), Kustha (Leprosy/ diseases of skin), Mūtrakṛcchra (dysuria), Pūyameha (urinary infection), Śūla (pain/colic), Tamakaśvāsa (bronchial asthma). Used as single drug. (Based on a sixteenth century text.)

Plant juice is given in dysentery, diarrhea, vomiting, colic pain, urinogenital diseases, to induce lactation and as an anthelmintic.

Leaves are prescribed in asthma, bronchitis, cough, leucorrhea, menorrhagia, spermatorrhea, and urinary disorders.

IMPORTANT FORMULATION/ APPLICATIONS

Antiasthmatic activity is attributed to choline and shikimic acid.

Quercetin is reported to be responsible for anti-diarrheal activity. Aqueous extract of the herb exhibits sedative, anxiolytic, analgesic, antipyretic, and anti-inflammatory activities.^{2(c)}

Alcoholic extract of the plant is bronchodilatory; ethanol extract of aerial parts is anti-histaminic, anti-inflammatory and immunosuppressive (experimentally).^{20(j)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 1 to 3 g. Svarasa (juice): 10 to 20 drops.

Maximum tolerated dose of the ethanolic extract of plant was found to be 1000 mg/kg orally in mice.^{20(j)}

E

Euphorbia neriifolia Linn.

Snuhī

BOTANICAL SOURCE(S)

Euphorbia neriifolia Linn.
(Fam. Euphorbiaceae)
Syn. *E. ligularia* Roxb.^{20(j)}
E. neriifolia sensu Hook. f.
E. neriifolia auct.³² non-Linn. syn. *E. ligularia* Roxb.

PHARMAKOPOEIAL AYURVEDIC DRUG

Snudhī (Stem).
API, Part I, Vol. I.
(Snuhi wrongly spelt as Snudhi.)
Latex of *E. neriifolia* and alkaline powder of *Achyranthes aspera* and *Curcuma longa* are used for preparing Kshārasūtra, a medicated thread for ambulatory treatment of fistula-in-ano.

AYURVEDIC SYNONYMS

Sudhā, Vajradrumā, Snuk.
Sehunda, Vajri,³ Vajratunda, Gaṇḍra, Sāmanta, Dugdhā, Asipatrā.⁴

HABITAT

Wild on rocky ground throughout central India, extensively grown as a hedge plant

REGIONAL LANGUAGE NAMES

Eng: Milkhedge;
Beng: Manasa sij;
Guj: Thor, Kantalo;
Hindi: Thuhar, Sehunda;
Kan: Muru kanina kallii;
Mal: Kalli, Kaikalli;
Mar: Nivadung;
Ori: Thor, Kantalothon;
Punj: Thohar;
Tam: Elaikalli, Perumbu kallii;
Tel: Kadajemudu.
Eng: Holy milk hedge, Dog’s tongue.³²

CONSTITUENTS

Resin, gum and triterpenes.
Leaves and stem yielded friedelan-3- α - and 3- β -ols, taraxerol and glut-5 (10)-en-1-one. From latex, nerifoliol, euphol, neriifolione, and nerifoliene were isolated.^{20(j)}
Whole plant, latex, bark, and root gave euphol.¹⁵
Anthocyanins, pyruvate dikinase, and terpenes are also encountered in the plant.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Udararoga, Meha, Kuṣṭha, Śoṭha
Used for abdominal lumps, diseases of the abdomen, diabetes, obstinate skin diseases including leprosy and edema (therapeutic uses based on texts from 1000 BC to sixteenth century).
Snuhi was among the important drugs of Sushruta (1000 BC). His preparation of Snuhi latex, Arka (*Calotropis procera*) and *Berberis aristata* has been adopted as Kshārsūtra.
Sushruta used Snuhi alkaline ash for cautery; latex as an ingredient of medicated *ghrita* for the cleaning and sterilizing of the interior of ulcers, as well as for dressing wounds; and internally in acute constipation, abdominal lumps, dropsy, jaundice, intestinal immobility, piles, and urinary calculi. Snuhi was also incorporated in a medicated oil for imparting natural color to the cicatrix formed after surgery.²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Chitrakādi Taila (Sushruta Samhitā, 1000 BC), contains Sudhā (Snuhi) root with 10 other roots.
For external application in fistula-in-ano.
Abhaya Lavana (Bhaishajya Ratnāvali, seventeenth century) contains Snuhi plant with 26 other plant drugs. Used for diseases of the liver and spleen.

Vajraka Kshāra (Bhaishajya Ratnāvali) contains Snuhi latex with 18 other ingredients for preparing alkaline ash. Used for edema, abdominal lumps, and other enteric diseases.

Avittolādi Bhasma, not in AFI, Parts I and II.

Turmeric powder mixed with Snuhi latex was applied on piles (Sushruta Samhita, Charaka Samhita, 1000 BC; Raja Martanda, eleventh century).^{16(a)}

(For pharmacological and biological studies, see Reference 20(f).)

DOSAGE/USAGE/CAUTIONS/COMMENTS

125–250 mg of the drug in powder form.

The latex given with distilled water produced a persistent rise in the blood pressure of dogs at a dose of 0.1 mL/kg i.p. Higher doses produced asphyxia.^{20(j)}

The MTD of the ethanolic extract of the stem was found to be 500 mg/kg i.p. in mice.^{20(j)}

E

Euphorbia nivulia Buch.-Ham.

Latex

Patrasnuhī

BOTANICAL SOURCE(S)

Euphorbia nivulia Buch.-Ham.
(Fam. Euphorbiaceae)

Tam: Ilaikkalli;
Tel: Akujemudu;
Urdu: Zakum.

Urdu: Zakkum-e-Hindi.

PHARMACOPOEIAL AYURVEDIC DRUG

Patrasnuhī (Latex).

API, Part I, Vol. VI.

(Latex from freshly cut leaves and stems.)

Classical name: Nistriṃsha-patra (Charaka Samhitā)

AYURVEDIC SYNONYMS

Bahukaṇṭka, Vajrī, Patta karie, Sehūṇḍa.

Synonyms of Sehūṇḍa: Vajratuṇḍa, Vajra-tuṇḍaka, Samanta-dugdhā, Asi-patrā, Vajri, Mahātaru.⁴

HABITAT

Dry and rocky regions, practically throughout India.

REGIONAL LANGUAGE NAMES

Ben: Dandaa thohara, Sij;
Guj: Thorkantalo, Thor;
Hindi: Katthohar, Sij;
Kan: Yela kalli;
Mal: Ilakalli;
Mar: Sabar, Tepari;
Ori: Kath sigu;

CONSTITUENTS

Cyclonivulialol; cycloartenol; cycloeucalenol; cycloart-25-en-3-β-24-diol.

Latex gave cycloart-25-en-3 beta-ol, and cyclolaudenol; stem contained cyclolaudenol and sitosterol; leaves gave sitosterol. None of these triterpenes have been reported from *E. neriifolia*. This difference in constituents can be used to differentiate between the two plants known as Snuhi.³²

(For chemical constituents see Reference 20(j).)

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa (piles), Bhagandara (Fistula-in-ano), Kuṣṭha (Leprosy/diseases of skin), Śvāsa (Asthma), Udararoga (diseases of abdomen).

Used as a single drug.

(A Sanskrit *śloka*, composed by a contemporary scholar, has been quoted.)

Latex of *E. nivulia* is used in traditional medicine for treating enlargement of the liver and spleen, jaundice, dropsy, colic, syphilis, leprosy, and hemorrhoids. Coagulated latex is used in bronchitis and rheumatism.^{2(c)}

IMPORTANT FORMULATION/
APPLICATIONS

7-angeloyl-12-acetyl-8-methoxylingol isolated from the latex showed significant prostaglandin inhibitory activity.
Three compounds from latex, 3, 12-diacetyl-7-angeloyl-8-methoxylingol, 7-angeloyl-12-acetyl-8-methoxylingol, and 3, 12-diacetyl-7-hydroxy-8-methoxylingol, showed significant cytotoxic activity against Colo 205, MT 2, and CEM cell lines, while other compounds showed moderate or no activity.

Ether and methanol extract of the leaves showed anti-fungal activity against the dermatophyte *Trichophyton simii*; latex showed anti-bacterial activity against *Staphylococcus aureus* and *E. coli*.^{20(j)}

DOSAGE/USAGE/CAUTIONS/
COMMENTS

Ksira (latex): 125 to 250 mg.
LD₅₀ of the ethanolic extract of plant was found to be 1000 mg/kg i.p. in mice.^{20(j)}

Euphorbia prostrata W. Ait. Dugdhikā

BOTANICAL SOURCE(S)

Euphorbia prostrata W. Ait.
(Substitute for *E. thymifolia*, the official drug.)
(Fam. Euphorbiaceae)
E. thymifolia Linn.
Syn. *E. maculata* Aubl.^{2(c)}
E. prostrata Ait. is also recorded as a synonym of *E. thymifolia* Linn.^{33(b)}
A bigger variety of Dugdhikā is equated with *E. hirta* Linn.

REGIONAL LANGUAGE NAMES

Beng: Bara, Kharui, Kerai, Dudiya, Shwet keruee;
Guj: Raati dudhelee, Naagalaa dudhelee;
Hindi: Dudhi, Duddhi, Dudhdee, Chhotidudhi;
Kan: Kempu nene hakki;
Mal: Nilappal;
Mar: Lahaan naaytee, Naayeti, lahaandudhi;
Punj: Dodhak, Hajardana, Baradodk, Hazardana;
Tam: Sittirappaladi, Sittirappaladi;
Tel: Peddivari manubaala;
Urdu: Dudhi.

PHARMACOPOEIAL AYURVEDIC DRUG

Dugdhikā (Whole plant).
API, Part I, Vol. V.
E. prostrata is Dugdhikā; *E. thymifolia* is Laghu dugdhikā (AFI, Part I, page 334).

CONSTITUENTS

Glucoside, Galactoside, β-sitosterol, Compesterol, Stigmasterol, Cholesterol.
E. thymifolia: plant contains myricyl alcohol, taraxerol, hentriacontane, 1-hexacosanol, epitaraxerol, *n*-hexacosanol, euphorbol, 24-methylene cycloartenol, 12-deoxy-4-beta-hydroxyphorbol-13-phenylacetate-20-acetate, 12-deoxyphorbol-13, 20-diacetate, 12-deoxy-4-beta-hydroxyphorbol-13-dodecanoate-20 acetate and quercetin-3-beta-galactoside.^{20(j)}
Tannins 15.7%–17.1% of pyrogallol and pyrocatechol group.^{2(d)}

AYURVEDIC SYNONYMS

Svāduparṇī, Kṣīrinī, Laghudugdhikā, Nāgārjunī, Gorakṣadugdhī.

HABITAT

Throughout India as a naturalized weed.
E. thymifolia: throughout warmer parts of India in plains and low hills, ascending to 1500 m in Kashmir.^{20(j)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Kṛmi, Śvāsa, Pravāhika, Raktapitta, Prameha, Raktārśa, Palita, Danta-ghuṇa, Dadru, Sphoṭa

Used for obstinate skin diseases including leprosy, worm infestations, dyspnea, dysentery, bleeding disorders, urinary disorders, diarrhea with blood, graying of the hair, dental caries, teniasis, and blisters (therapeutic uses based on texts from 1000 BC to sixteenth century).

E. thymifolia plant is used to treat skin diseases, worms, and intestinal parasites. Its decoction is given with honey to treat hematuria.^{2(c)}

Plant juice is applied to treat dandruff. Root is given in amenorrhea.^{2(d)}

Essential oil is used in medicinal soaps for erysipelas.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Gaganasundara Rasa (Bhaishajya Ratnāvali, seventeenth century), a mineral drug containing

purified borax (ore), cinnabar, sulphur, calcined mica, processed in Dugdhikā juice. For diarrhea with fever and ulcerative colitis.

Dugdhikā, steamed with cooked rice and mixed with oil, was given to check dysentery with blood (Vaidyamanoramā).

Ghee cooked with Dugdhikā and Kaṇṭakāri (*Solanum* spp.) was prescribed for bleeding piles with pain (Charaka Samhitā, 1000 BC; Ashtāngahridaya, seventh century).

Dugdhikā latex, as well as plant juice, was applied externally on ringworm and boils (Gadanigraha, twelfth century).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

E. thymifolia: LD₅₀ of the alcoholic extract of the plant was found to be >1000 mg/kg i.p. in rats.^{20(j)}

BOTANICAL SOURCE(S)

Fagonia cretica Linn.
Syn. *F. arabica* Linn.
F. bruguieri DC.
(Fam. Zygophyllaceae)

Fagonia indica Burm. f.; *F. cretica* Auct. non-Linn.; *F. arabica* Auct. non-Linn.^{20(k)}

In Kerala, *Tragia involucrata* Linn. is used for both Dhanvayāśa and Yavāśa.⁵

PHARMAKOPEIAL AYURVEDIC DRUG

Dhanvayāśah (Whole plant).

API, Part I, Vol. V.

Although Dhamāsā (Dhanvayāśa) and Yavāśa are equated with *F. cretica* and *Alhagi pseudalhagi* (Bieb.) Desv., respectively, both have been used as substitutes.³⁰

AYURVEDIC SYNONYMS

Duhsparśā, Durālabhā, Dhanvayavāsakah, Virupā, Durālabhā, Uṣṭrabhakṣyā.

Anantā.³⁰

Duhsparshā is also a synonym of Kantakāri (*Solanum surattense*) and Kapikacchu (*Mucuna pruriens*).³⁰

Anantā is an accepted name of Sārivā.³⁰

HABITAT

North-west India and Deccan.

REGIONAL LANGUAGE NAMES

Eng: Khorasan thorn;
Beng: Duralabha;
Guj: Dhamaaso;
Hindi: Damahan, Dhamaasa, Hinguaa, Dhanhare;
Mal: Kodittuva;

Mar: Dhamaasaa;
Punj: Dama, Dhamah, Dhamaha;
Tam: Tulganari;
Tel: Chittigava, Gilaregati.

Trade name: Dhamāsā.

CONSTITUENTS

Alkaloids (Harmine), amino acids (alanine, glycine, leucine, arginine, isoleucine, lysine, phenylalanine, proline, tyrosine and valline); terpenoids of oleanane group.

Aerial parts contain several triterpenoid saponins.

Saponins A and B gave a sapogenin, naha-genin; saponin C gave 21-alpha, 22-beta-dihydroxynahagenin. Saponins A and B on acid hydrolysis gave hederagenin; saponin C gave oleanolic acid as the sapogenin.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra, Grahaṇī, Dāha, Jvara, Visamajvara, Trṣṇā, Prameha, Meha, Murcchā, Madaroga, Raktapitta, Raktavikāra, Kuṣṭha, Visarpa, Vātarakta, Bhrama, Gulma, Chardi, Kāsa, Mūtraghāta

Used for diarrhea, sprue, burning sensation, fever, malaria, excessive thirst, urinary disorders, polyuria, syncope, obesity, hemorrhagic diseases, vitiated blood, obstinate skin diseases including leprosy, erysipelas, gout, vertigo, abdominal lumps, vomiting, cough, and retention of urine (therapeutic uses based on texts from 1000 BC to sixteenth century).

Durālabhā: as an āśava for sprue; with honey in emesis; with sandalwood in intrinsic hemorrhage; infusion in acute alcoholism (Charaka, 1000 BC); juice in retention of urine (Sushruta, 1000 BC; Ashtāngahridaya, seventh century; Bangasena, eighteenth century).^{16(a),27}

IMPORTANT FORMULATION/ APPLICATIONS

Durālabhā is a supporting herb, in all compounds quoted in API, except in Tikta Ghrita (Ashtāngahridaya, seventh century).

Sahasrayoga (a non-Samhitā, Kerala Materia Medica) included five preparations among Kashāya (CCRAS text):

1. Decoction of Durālabhā with *ghee*. Used for vertigo (also, Vrindamādhava, eighth century; Chakradata, eleventh century; Bhāvaprakāsha, sixteenth century).^{16(a)}
2. Durālabhādi kashāya, with Parpata (*Fumaria*) and four other plant drugs. Used for bleeding disorders and fevers.

3. Durālabhādi Kashāya, with Balā (*Sida cordifolia*) and six other plant drugs. Used for rheumatic fever.
4. Durālabhādi Kashāya, with Bhūnimbā (*Andrographis paniculata*), *Fumaria* and *Picrorhiza*. Used for chickenpox.
5. Duhsparsahādi Kashāya, with Pāthā (*Cissampelos pareira*). Used for piles.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g powder. 40–80 mL *phanta*.

MTD of the alcoholic extract of the plant was found to be 2000 mg/kg i.p. in mice.^{20(k)}

Feronia limonia (Linn.) Swingle

Kapittha

BOTANICAL SOURCE(S)

Feronia limonia (Linn.) Swingle

Syn. *F. elephantum* Correa
(Fam. Rutaceae)

Syn. *Limonia elephantum* (Correa) Panigrahi
Schinus limonia Linn.¹⁵

Limonia acidissima Linn. is the current valid name.^{20(k)}

PHARMACOPEIAL AYURVEDIC DRUG

Kapittha (Fruit pulp).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Dantaśaṭha, Kapipriya.

Kapitthaka, Dadhiphala, Surabhi-chhadah.⁴
Phala sugandhika, Chirapāki, Gandhapatra.^{20(k)}

HABITAT

Throughout the plains of India, Siwalik range and forests, at base of Himalayas up to an elevation of 450 m, often cultivated in many parts of India.

REGIONAL LANGUAGE NAMES

Eng: Wood apple;
Beng: Kayet bael, Kavataleal, Kavita;
Guj: Kotha, Kondhu;
Hindi: Kaitha;
Kan: Bekalu, Belada hannu, Bilvara, Belalu, Balada, Haminamara;
Mal: Villanga kaaya, Vilar maram;
Mar: Kavatha;
Punj: Kainth;
Tam: Vilamaram, Vilangai;
Tel: Velaga;
Urdu: Kaith.

Eng: Elephant apple.³

CONSTITUENTS

Citric acid and Mucilage.

Edible pulp of fruit contains mineral matter 1.9%; calcium 0.13%; phosphorus 0.11%; vitamin C 2.0 mg/100 g. Acid content varies from 7.6% in unripe fruits to 2.3% in fully ripe ones. Pectin 3.5%.^{2(a)}

From menthol extract of defatted fruits, the tyramine derivatives, dihydroxy-acidissiminol,

acidissiminol epoxide, and N-benzoyl tyramine have been isolated (acidissiminol epoxide is a known synthetic compound, reported as a natural product in the fruit).^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Ripe: Trṣā, Hikkā, Svāsa, Vāmi.

Unripe: Grahani roga, Agnimāndya.

Ripe: excessive thirst and dry throat, hiccup, dyspnea and vomiting. Unripe: initial stage of malabsorption syndrome and digestive impairment (therapeutic uses based on classical texts from 1000 BC to sixteenth century).

Kapitth fruit pulp juice, mixed with *Piper longum*, black pepper and honey, was given for excessive thirst (Sahasrayoga).

Fruit: in toxicosis (Charaka); deranged digestive functions (Sushruta, 1000 BC); pulp mixed with *Trikatu* (dry ginger, long pepper and black pepper) for diarrhea (Charaka Samhitā, Ashtangahridaya, seventh century).^{16(a),27,28}

Ripe fruit: appetizer, stimulant, stomachic, refresher and cardiacal.

Unripe fruit: astringent, used in whooping cough and externally applied to poisonous bites.^{2(a),15}

IMPORTANT FORMULATION/ APPLICATIONS

Kapitthāshataka Churna (not in AFI; Sahasrayoga, a Kerala Materia Medica, CCRAS text), contains Kapittha fruit pulp as main drug (6 parts), with 1 part of 10 and 3 parts of 6 powdered herbs. For acute diarrhea, malabsorption syndrome, digestive disorders, cough, dyspnea, chronic rhinitis.

Yavānyādi Churna (Ashtangahridaya, seventh century, AFI; Sahasrayoga, CCRAS text) does not contain any part of Kapittha.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Fruit used as a substitute for *Aegle marmelos* (Bael) in the treatment of diarrhea and dysentery.^{2(a)}

Pulp of unripe fruit is included in a paste to tone the breast.⁷

F

Ferula foetida Regel.

Hiṅgu

BOTANICAL SOURCE(S)

Ferula foetida Regel.

Ferula narthex Boiss and other species of *Ferula* (Fam. Umbelliferae)

F. narthex is an inappropriate equation since the volatile oil is reported to be sulfur free.^{24(a)}

Charaka used dried fruits of Hiṅgu (Hinguka) in a gruel as a blood purifier and purgative (Charaka Samhitā)²⁷ and Hiṅgu and Hiṅguparni in a medicinal *ghee* for insanity.^{16(a)}

Hiṅguparni, Hingupatrikā, Hiṅguvātikā of Charaka Samhita³⁰ need proper identification.

PHARMACOPOEIAL AYURVEDIC DRUG

Hiṅgu (Oleo-gum-resin).

API, Part I, Vol. I.

International Pharmacopoeial name: Ferulae resina.

AYURVEDIC SYNONYMS

Rāmaṭha, Sahasravedhi.

Vāhlika, Atyugra, Bhūta-nāśana, Ārutgandha Jarāṇa, Jantuka, Sūpadhūpana.⁴

HABITAT

Occuring in Persia and Afghanistan.

F. foetida: East Iran; *F. assafoetida*: West Iran;

F. narthex: Afghanistan.¹

F. narthex is found in Kashmir.

F. jaeschkeana Vatke, known as Hingupatri, occurs in Jammu and Kashmir, and Himachal Pradesh.

REGIONAL LANGUAGE NAMES

Eng: Asfoetida;

Assam: Hin;

Beng: Hing;

Guj: Hing, Vagharni;

Hindi: Hing, Hingda,

Kann: Hingu, Ingu;

Kash: Eng;

Mal: Kayam;

Mar: Hing, Hira;

Ori: Hengu, Hingu;

Punj: Hing;

Tam: Perungayam;

Tel: Inguva;

Urdu: Hitleet, Hing.

Eng: "Food of the gods".¹

CONSTITUENTS

Essential oil, gum and resin

Essential oil (about 6%–17%) consists of polysulfides.

Gum about 25% and resin 40%–60%.

Resin consists chiefly of asaresinotannol, free or combined with ferulic acid.^{2(a),24(a)}

The gum-resin contains the coumarins,

5-hydroxy-, 8-hydroxy-, 8-acetoxy-5-hydroxy umbelliprenin, assafoetidin, ferocolicin, asacoumarin A and B (galbanic acid), farne-siferol A, B, and C and disulfides, asadisulfide, and *sec*-butylpropenyl disulfide.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Ādhmāna, Anāha, Gulma, Śūlaroga, Udararoga, Hṛdroga

Used for digestive impairment, flatulence, distension of the abdomen, abdominal lumps, colic pain, abdominal diseases, heart diseases, and worm infestations (therapeutic uses based on texts from 1000 BC and sixteenth century).

Classical compounds not quoted in the API: Hingvādi Ghritam (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), used for insanity. Hingutrigunā Taila (Ashtāngahridaya, seventh century), used as an anthelmintic and anti-inflammatory. Rajahpravartini Vati (Bhaishajya Ratnāvali, seventeenth century), used for amenorrhea and dysmenorrhea.

IMPORTANT FORMULATION/ APPLICATIONS

Hingvāshtaka Churna (Bhaishajya Ratnāvali, seventeenth century), contains purified Hingu with six carminative herbs and rock salt. For digestive impairment.

Hingvādi Churna (Yogarātnākara, sixteenth century) contains Hingu and 25 plant drugs, all in equal proportions. Used for flatulence, upset stomach, and internal spasms.

Hinguvachādi Churna (Chakradata, eleventh century) contains Hingu and Vachā (*Acorus calamus*) with 22 other plant drugs, all in equal proportions. Used for tympanites.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

125–500 mg of the drug.

Dietary asafoetida decreases levels of phosphatases and sucrase. It is also reported to damage the human gastric mucosa by causing exfoliation of gastric mucosa epithelial cells.^{2(d)}

A market sample of asafoetida was found to be adulterated by up to 76.3% with ash, starch, galbanum, colophony, ammonia and other foreign resins.^{2(d)}

The flavor of asafoetida is largely due to sulfur compounds.^{2(d)}

Ferula jaeschkeana Vatke

Hingupatrī

BOTANICAL SOURCE(S)

Ferula jaeschkeana Vatke
(Fam. Apiaceae)

Peucedanum jaeschkeanum, *Ferula jaeschkeana*
var. *parkeriana*.

Two more botanical sources have been suggested:
Ferula narthex Boiss or *Gardenia gummifera*
Linn. f.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Hingupatrī (Leaf).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Hinguparṇī, Hingupatrikā, Bāṣṭpikā.

Prathus-tanvi, Prathivikā, Chārupatrikā,
Vāṣṭhikā, Kāravi, Bilvikā, Dirghikā.⁴

HABITAT

Distributed in north-western Himalayas, on dry
sunny slopes between 2000 and 3900 m; abund-
ant in Kashmir, Ladakh and Lahaul and Spiti in
Himachal Pradesh.

REGIONAL LANGUAGE NAMES

Beng: Hing, Desaj hing;
Guj: Hing, Hingro, Hinglavadharni, Hingupatri;
Hindi: Hingupatri;
Kan: Doddahingina balli;
Mal: Kayam, Penungayam, Perungkayam;
Mar: Hing patree;
Ori: Hengu;
Punj: Hinge, Hing;
Tam: Inguva, Perungayam;
Tel: Hingo patramu.

Eng: Wild asafoetida.

CONSTITUENTS

Not quoted in API.

Prithivikā was a fruit drug of Ayurveda. It is
possible that the fruits or fruiting plants of
F. jaeschkeana were used in medicine (Charaka
also used the fruit, Hinguka).²⁷

Essential oil from fruits (3.8%) contain camphene
25%, d-alpha-pinene 60%–90%, cumaldehyde
1–3%, azulene 5%, sulfur compounds 0.3%,
and an aldehyde.^{2(a)}

The oil from leaves is mycotoxic against
dermatophytes.

Aerial parts and a coumarin ferujol and sesquiter-
penoids (from rhizomes) showed abortifacient
and anti-implantation activities.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Hṛdroga, Bastiśūla, Vibhandha, Garbhani,
Arśa, Gulmaroga, Kṛmi, Plihāroga, Apasmāra,
Unmāda

Used for heart disease, renal colic, constipation,
(problematic) pregnancy (?), piles, obstructive
jaundice, splenic diseases, epilepsy, and insan-
ity (therapeutic uses based on texts from the
thirteenth to fourteenth centuries).

The plant's use in epilepsy and insanity is not
mentioned in quoted *ślokas*.

IMPORTANT FORMULATION/ APPLICATIONS

Kumāryāsava (Shārangadhara Samhitā, thir-
teenth century), contains Aloe juice as the
main drug with 44 herbo-mineral supporting
drugs in equal proportion; Hingupatri leaf is
one of them.

For dysuria and dysmenorrhea, enlargement of
liver and spleen, anemia.

Hexane extract of the plant exhibits anti-
fertility activity by decreasing the activ-
ity of the beta-glucuronidase enzyme in
the uterus of pregnant rats and preventing
implantation.^{2(d)}

An ethanolic extract of the aerial parts also exhib-
ited significant anti-fertility, potent estrogenic
and anti-implantation activities in rats.^{2(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Plant is abortifacient with anti-implantation activity.³²

The ethanolic extract of the aerial parts produced dilation, congestion and hypertrophy of the liver in rats.^{2(c)}

F

Ficus arnottiana Miq.

Nandī

BOTANICAL SOURCE(S)

Ficus arnottiana Miq.
(Fam. Moraceae)

F. retusa Linn. or *F. rumphii* Blume has been suggested for Nandivṛksha.³⁰

Charaka Samhitā's Nanditaka is equated with *F. retusa*.²⁷ *Cedrela toona* Roxb. is considered for Nandivṛksha of Bhavaprakāsha.³⁰

Nandi-ervatam of Kerala is considered a synonym of Nandivṛksha. Some scholars equated it with *F. retusa* or *F. arnottiana*. But in Kerala, *Tabernaemontana divaricata* (L.) Roem. & Schutt. is used as the drug source.⁵

also found in Chhota Nagpur, Bihar, Central India, Sunderbans, Andamans, Malaya islands, and Australia.)

REGIONAL LANGUAGE NAMES

Beng: Kamru;
Guj: Naandrukheevad;
Hindi: Beliya peepal;
Kan: Kadarasu, Kallarase;
Mal: Kallarayal;
Mar: Nandee vruksh, Naandruk;
Ori: Plokhyo;
Tam: Kagoli, Kodiarasu, Kallarasu;
Tel: Kallaravi, Kondaravi.

PHARMACOPOEIAL AYURVEDIC DRUG

Nandī (Root).

API, Part I, Vol. V.

In the API, classical texts have been quoted for *Kānda tvaka* (bark), not for the root.

Nandī has been identified as *Cedrus toona* Roxb. (AFI, Part I, page 321), *F. arnottiana* is also equated with Nandī (AFI, Part I, page 334).

AYURVEDIC SYNONYMS

Pāśvāpippala, Prarohī, Gardhabhāṇḍa, Gajapādapa, Sthālidruma, Nandivṛkṣa.

HABITAT

Throughout India in rocky hills up to 1350 m altitude.

(*Ficus retusa* is known as Chinese banyan; it is distributed throughout Western Peninsula, and

CONSTITUENTS

Not quoted in API.

The acetone extract of the bark yielded a triterpenoid ficanone.^{20(k)}

In the literature, use of the root could not be traced.

Acetone extract of the bark gave a hypoglycemic and anti-oxidant principle ficanone,^{20(k)} in addition to the astringent, demulcent, depurative and emollient constituents common to *Ficus* spp.

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Raktavikāra, Viṣavikāra, Dāha, Kaphavikāra, Vraṇa, Bhagna, Yonidoṣa

Used for bleeding disorders, diseases due to vitiated blood, toxemia, burning sensation,

catarrhal afflictions, ulcers, dislocation of the joints, and diseases of the female genital tract (therapeutic uses of the bark based on texts from 1000 BC to sixteenth century).

Nandi bark is used in diabetes,¹²¹ burning sensation, inflammation, leprosy, scabies, diarrhea, and dysentery, as well as diseases of the female genital tract.

Leaf extract showed significant anti-ulcer,¹²² mucoprotective and gastric anti-secretory activities.

Young sprouts (Nandi shāka) and fruits were used as pot herbs. Nanditaka fruits were used as a tranquilizer (Charaka Samhita, 1000 BC).²⁷

IMPORTANT FORMULATION/
APPLICATIONS

Nyagrodhādi Kwātha Churna (Ashtāngahridaya, seventh century), contains stem barks of 19 plants in equal proportion including Nandi stem bark. Prescribed for bleeding disorders, sprue, and mal-absorption syndrome.

DOSAGE/USAGE/CAUTIONS/
COMMENTS

10–20 g powder. 30-50 g decoction.

Literature review revealed that most of the scholars preferred *Ficus retusa* as the drug source of Nandi, which belonged to the Nyagrodhadi group of Sushruta (Su. 38, 44).

F

Ficus bengalensis Linn. Stem bark Nyagrodha

BOTANICAL SOURCE(S)

Ficus bengalensis Linn.
(Fam. Moraceae)

F. bengalensis Linn, var. *bengalensis*.
Syn. *F. indica* Linn. *F. bengalensis* Linn. var.
kishnae (C. DC. Corner).^{20(k)}
One of the recorded hosts of the lac insect.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Nyagrodha (Stem bark).
API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Vaṭa.
Bahupāda, Yakṣavāsah, Rakta- phala, Kshiri,
Padarohi, Dhruvah,⁴ Vaisravaṇa.^{20(k)}

HABITAT

All over India.
Throughout the forest tracts of India, both in the sub-Himalayan region and in deciduous

forests of South India. Grown in gardens and roadsides.^{2(a)}
Also found in Pakistan.¹

REGIONAL LANGUAGE NAMES

Eng: Banyan tree;
Assam: Vat, Ahat, Vatgach;
Beng: Bot;
Guj: Vad, Vadalo;
Hindi: Badra, Bargad, Bada;
Kan: Aala, Aladamara, Vata;
Kash: Bad;
Mal: Peraal;
Mar: Vad;
Ori: Bata, Bara;
Punj: Bhaur;
Tam: Aalamaram, Aalam;
Tel: Marri;
Urdu: Bargad, Bad.

CONSTITUENTS

Tannins, glycosides and flavonoids.
Tannins 11%.^{2(a)}

Flavonoid compounds A, B, and C were identified as different forms of leucoanthocyanin. Stem bark yields a glucoside, bengaleno-side, and the flavonoid glycosides leucocyanidin 3-O-beta-D-galactosyl cellobioside 5, 3'-dimethyl ether and leucopelargonidin-3-O-alpha-L-rhamnoside 5, 7-dimethyl ether;^{2(c)} ketones, 20-tetratriacontene-2-one, 6-heptatriacontene-10-one and pentatriacontene-5-one; esters; alpha-D-glucose, and meso-inositol.^{118,119}

F

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Trṣṇā, Raktapitta, Vraa, Visarpa, Yonidoṣa, Prameha

Used for burning sensation, excessive thirst, bleeding disorders, ulcers, erysipelas, gynecological diseases, and polyuria/diabetes (therapeutic uses based on texts from the fourteenth to sixteenth centuries).

Leucopelargonidin-3-O-alpha-L-rhamnoside dimethyl ether showed about 12% hypoglycemic action in normal rats (ED₅₀: 100 mg/kg). A low dose of insulin in combination with the ED₅₀ dose of the compound for 30 days compared well with a double dose of insulin.

Aqueous extract of the bark produced a hypocholesterolemic effect.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Nyagrodhādi Kwātha Churna (Ashtāngahridaya, seventh century), contains stem barks of 19 plants in equal proportion. Prescribed for gynecologic and hemorrhagic diseases, malabsorption syndrome.

Nyagrodhādi Churna (Yogarātnākara, sixteenth century) contains 28 plant drugs in equal proportions. Prescribed for dysuria, anuria, polyuria, and diabetic carbuncle.

The Panch-vaikāla (the "Five Barks") group of Ayurveda (barks of *Ficus bengalensis*, *F. racemosa*, *F. religiosa*, *F. lacor*, and *Grewia asiatica*) is specific for ailments of the female genital tract, ulcers, edema, erysipelas, and obstinate skin diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Infusion of the bark is used in diabetes, dysentery and in leucorrhea, menorrhagia and nervous disorders.^{7,2(a),15}

LD₅₀ of the aqueous extract was found to be 9.47 g/kg i.p. in mice.²⁰⁽¹⁾

Ficus bengalensis Linn.

Nyagrodha Jatā

BOTANICAL SOURCE(S)

Ficus bengalensis Linn.
(Fam. Moraceae)

F. bengalensis Linn. var. *bengalensis*.
Syn. *F. indica* Linn. *F. bengalensis* Linn. var. *kishnae* (C. DC. Corner).^{20(k)}

PHARMACOPOEIAL AYURVEDIC DRUG

Nyagrodha Jatā (Aerial root).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Vata jata, Bahu pada.

Bahupāda, Yakṣavāsah, Rakta-phala, Kshiri, Padarohi, Dhruvah,⁴ Vaiśravaṇa.^{20(k)}

HABITAT

Throughout India.

Throughout the forest tracts of India, both in the sub-Himalayan region and in deciduous forests of South India. Grown in gardens and roadsides.^{2(a)}

Also found in Pakistan.¹

REGIONAL LANGUAGE NAMES

Eng: Banyan tree;
 Beng: Bar, Bot;
 Guj: Vad vadavai;
 Hindi: Baragada jata, Valajatta;
 Kan: Alada chirugu;
 Mal: Peralveru;
 Mar: Vada paranika;
 Ori: Bara gachha;
 Punj: Barda jattu;
 Tam: Alamvizhuthu;
 Tel: Peddamatti, Marri udalu;
 Urdu: Bargad.

CONSTITUENTS

Tannins.

Aerial roots yielded bengalensinone (22 beta-hydroxylup-12, 20-dien-3-one); a new lupane triterpene and benzanoic acid; a new apocarotenoid together with lupanyl acetate, 3-acetoxy-9(11), 12-ursandiene, stigmasterol, alpinumisoflavone, 4-hydroxycetophenone, 4-hydroxybenzoic acid, 4-hydroxymellein and *p*-coumeric acid.¹²⁰

Aerial roots were found to be a rich source of sugars—D-lactose, D-raffinose, L-sorbose, D-arabinose, L-rhamnose, D-glucose, D-galactose, maltose and D-fructose.^{20(k)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Trsna, Daha, Yoniroga, Medoroga, Bhagandara, Visarpa

Used for bleeding disorders, excessive thirst, burning sensation, gynecological diseases, obesity, fistula-in-ano, and erysipelas (therapeutic uses based on texts from 1000 BC to sixteenth century).

Therapeutic uses, based on quoted texts, are for Vatānkur (leaf bud), not for Jatā (aerial roots). (Vatānkur has been interpreted as leaf bud in the AFI.)

The aqueous, ethanol and acetone extracts of aerial roots showed 10%, 29% and 20% ACE inhibition, respectively.^{20(k)}

Various extracts of aerial roots exhibited significant hepatoprotective, anti-diarrheal and immunomodulatory activities.

IMPORTANT FORMULATION/ APPLICATIONS

Kumkumādi Taila (Yoga-Ratnākara, sixteenth century), contains 27 constituents in equal proportion; Nyagrodha leaf bud (not aerial root) is one of them.

Aerial root of Nyagrodha is not a component of the mineral drugs quoted in the API monograph.

Milk processed with aerial roots or leaf buds used in hemorrhages and bleeding piles (Charaka Samhitā, 1000 BC); decoction of aerial roots and leaf buds, mixed with honey or *ghee*, used for checking vomiting, as well as during fevers with burning sensation (Ashtāngahridaya, seventh century; Vrindamādhava, eighth century; Vaidyamanorama, thirteenth century); aerial roots pounded with butter milk used to check diarrhea (Chakradatta, Rajamarttanda, eleventh century).^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–5 g of the drug in powder form.

LD₅₀ of the aqueous extract was found to be 9.47 g/kg i.p. in mice (ICMR, in previous medicinal plant series).

Ficus glomerata* Roxb.*Fruit****Udumbara****BOTANICAL SOURCE(S)**

Ficus glomerata Roxb.
Syn. *F. racemosa* Linn.
(Fam. Moraceae)

PHARMACOPEIAL AYURVEDIC DRUG

Udumbara (Fruit).

API, Part I, Vol. III.

Not to be confused with Udumbarparni, equated with Danti (*Baliospermum montanum* Muell.-Arg.).

Kashtodumbara is equated with *Ficus hispida* Linn. f.

AYURVEDIC SYNONYMS

Jantuphala, Hemadugdhā.

Sadāphala.

Audumbara, Yangyānga.³

HABITAT

Throughout ever green forests in India, up to an elevation of 1,800 m, in moist localities and banks of streams.

Indigenous to Indo–Malesian region.¹

REGIONAL LANGUAGE NAMES

Eng: Cluster fig;

Assam: Jambhaij, Jamij;

Beng: Jogmadumur;

Guj: Umardo;

Hindi: Gullar, Gular, Umra;

Kan: Athimaro;

Mal: Atti;

Mar: Umbar;

Ori: Dumburi, Dumuri;

Tam: Atti;

Tel: Atti, Medi;

Urdu: Goolar, Gular.

CONSTITUENTS

β-Sitosterol, Lupeol Acetate and Carbohydrates.

Fruits contain gluacol, beta-sitosterol, lupeol acetate, friedelin, higher hydrocarbons, and other phytosterols.¹⁵

Fruits gave moisture 72%, protein 8%, fat 2%, crude fibre 8%, ash 10%, Ca 784 mg/100 g, P 195 mg/100 g, Zn 18 mg/100 g, Fe 19 mg/100 g, and Mn 2 mg/100 g.

Fresh whole fruit: a source of dietary fiber; lignin, the main fiber constituent, is considered better than pure cellulose.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Mūrccha, Dāha, Tr̥ṣṇā, Pradara, Granthi roga

Used for bleeding disorders, syncope, burning sensation, excessive thirst, excessive vaginal discharge, and cysts (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Juice of ripe fruit mixed with honey was prescribed in internal hemorrhages (Sushruta Samhitā, 1000 BC; Vṛndamādhava, eighth century; Rājamārttanda, eleventh century); for vaginal discharges and meno-metrorrhagia (Sushruta Samhitā; Bhāvaprakāsha, sixteenth century); and for excessive thirst (Sushruta Samhitā; Ashtāngahridaya, seventh century). Steamed tender fruits mixed with curd were recommended for sprue and dysentery (Siddha-bheshaja-manimālā, eighteenth century).

A decoction of fruits with honey and powdered *Sāli* rice was used for checking miscarriage (Sushruta Samhitā, Rājamārttanda).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Marma Gutikā (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), a thrice impregnated drug with 45 plant drugs, contains flower and stem bark of Udumbara as supporting herbs. For trauma (AFI).

Another Sahasrayoga compound of Marma Gutika with only eight ingredients is available in South India for topical application on chronic ulcers, wounds, and inflammatory swellings.⁵ Sushruta recommended fruits in obesity. Fruits, as a source of dietary fiber, exhibited hypocholesterolemic activity.

DOSAGE/USAGE/CAUTIONS/COMMENTS

10–15 g of the drag in powder form.

Ficus glomerata Roxb.

Bark

Udumbara

F

BOTANICAL SOURCE(S)

Ficus glomerata Roxb.
Syn. *F. racemosa* Linn.
(Fam. Moraceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Udumbara (Bark).

API, Part I, Vol. I.

Not to be confused with Udumbarparni, equated with Danti (*Baliospermum montanum* Muell.-Arg.).

Kashtodumbara is equated with *Ficus hispida* Linn. f.

AYURVEDIC SYNONYMS

Sadaphala.

Jantuphala, Hemadugdha.
Audumbara, Yangyanga.³

HABITAT

Throughout ever green forests in India, up to an elevation of 1,800 m, in moist localities and banks of streams.

Indigenous to the Indo–Malesian region.¹

REGIONAL LANGUAGE NAMES

Eng: Cluster fig, Country fig;
Assam: Jangedumuru, yagyadimru;
Beng: Jagnadumur, Yagnadumur;

Guj: Umbro, Umerdo, Umardo, Umarado;
Hindi: Gulara, Gular;
Kan: Attihanninamara, Oudumbara, Athimara, Attigida;
Kash: Rumbal;
Mal: Athi;
Mar: Atti, Gular, Umber;
Ori: Jajnadimbri, DImbiri;
Punj: Kath gular, Gular;
Tam: Atti;
Tel: Atti, Medi;
Urdu: Gular.

CONSTITUENTS

Tannins.

Tannins 14%.^{2(a)}

Stem bark gave gluanol acetate, beta-sitosterol, leucocyanidin-3-O-beta-D-glucopyranoside, leucocyanidin-3-O-alpha-L-rhamnopyranoside, lupeol, ceryl behenate, lupeol acetate, and alpha-amyrin acetate.³²

Alcoholic extract of stem bark possessed anti-protozoal activity against *Entamoeba histolyca*.²⁰⁽¹⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Dāha, Medoroga, Yonidosa

Used for bleeding disorders, burning sensation, obesity, and gynecological disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

An alcoholic extract of the bark helps with improving the damaged beta-cells of islets of

langerhans, thus exerting a permanent blood sugar-lowering effect. Petroleum ether extract of stem bark completely inhibited the enzymes glucose-6-phosphatase and arginase and activated the enzyme glucose-6-phosphatase dehydrogenase from the rat liver.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

F

Nyagrodhādi Kwātha Churna (Ashtāngahridaya, seventh century), contains stem bark of 19 plants in equal proportion, including Sadāphala (Udumbara) stem bark. Prescribed for bleeding disorders, sprue, malabsorption syndrome. Mutra-sangrahaniya Kashāya Churna (Charaka Samhitā, 1000 BC) contains ten plant drugs,

including Udumbara stem bark, in equal proportions. Used for polyuria and turbidity of the urine.

Bark powder is given to treat menorrhagia; a decoction is used in diarrhea.

Dried aqueous extract of bark exhibited anti-ulcer activity. It also inhibited acid secretion and stimulated mucopolysaccharide secretion of gastric juice.^{2(d)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form. 20–30 g of the drug for decoction.

Ficus hispida Linn. f.

Fruit

Phalgu

BOTANICAL SOURCE(S)

Ficus hispida Linn. f.
(Fam. Moraceae)

Syn. *F. oppositifolia* Willd.^{28,33(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Phalgu (Dried fruit).

API, Part I, Vol. III.

(Kakodumbara would have been more appropriate.)

Phalgu is madhura (sweet) while Kakodumbara is tikta (bitter).¹³⁰

Malayu or Malpu is the synonym of Kakodumbara, while Phalgu is the synonym of Bhadrodumbari.^{16(a)} Kakodumbara, as well as Phalgu roots, were prescribed for leucoderma.

AYURVEDIC SYNONYMS

Kakodumbur, Malayu, Malpu.

Manjula.^{4,27}

Kakahvanodumbari.³⁰⁴

Kākodumbarika is also equated with *F. hispida*.

Phalgu and Malpu are said to be two varieties.

F. cunia Ham. ex Roxb. may be one of the two.³⁰ According to the AFI, Malpu and Phalgu are synonyms (AFI, Part I, page 319).

HABITAT

Distributed throughout the outer Himalayan range from Chenab eastwards to Bengal, Central and South India and Andaman Islands.

Also found in Sri Lanka, Myanmar, Southern regions of China, New Guinea, and Australia.

REGIONAL LANGUAGE NAMES

Eng: Wild fig, Devil fig;

Assam: Khoskadumar, Tanvardi, Teenbarree;

Beng: Kakdumur, Kathdumur, Kakdumbar;

Guj: Tedumbaro, Dhedadambaro, Dhedhumbro, Dhedhumbro;

Hindi: Konea- dumbar, Kathumar;

Kan: Kadaatti, Arjeeru Hamu, Anjeeru, Onagida, Hanna, Adane;

Mal: Peyatti, Kattatti, Erumanakku, Parakasimi;

Mar: Rambal, Kalodumbar, Bhuimbar;

Ori: Dimiri, Ani dambura;

Punj: Rumbal;
 Tam: Peyatti;
 Tel: Brahma medi, Kakimedi;
 Urdu: Kath gular.

Eng: Redwood fig tree.²⁸

CONSTITUENTS

Tannins and Saponins.

Fruits, seeds, and bark gave beta-sitosterol, beta-amyrin, *n*-triacontanyl acetate, gluacol acetate, hispidin, a phenanthraindolizidine alkaloid, bergapten, and psoralen.¹⁵

Steam-distilled oil of receptive figs contained linalool as the major constituent, while the oil of post-parasitized and post-pollinated figs contained dibutyl phthalate as the major compound.¹²⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Vraṇa, Śveta kuṣṭha, Pandu, Arśa, Kāmalā, Atisāra, Dāha, Kṣata, Viṣaroga, Tvakaroga, Raktavikāra, Kandu, Kuṣṭha, Sopha, Raktapitta, Vatapittajaroga

Used for ulcers, leucoderma/vitiligo, anemia, piles, jaundice, diarrhea, burning sensation, wounds, toxemia, skin diseases, vitiated blood, pruritus, leprosy, edema, hemorrhagic diseases, and metabolic disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

Methanolic extract of fruits showed significant nephroprotective activity.¹²⁶

Ethanollic extract of fruits (Southeast Bangladesh) also showed significant anti-nociceptive and neuropharmacological activities, validating their use as a remedy for pain and depression.¹²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Chitrakādi Taila (Sushruta Samhitā, 1000 BC), contains 12 plant drugs including Malapu (Phalgu) root bark, not dried fruit. Externally for fistula-in-ano (AFI).

Kākodumbara was specific for leucoderma/vitiligo during the classical period.

Charaka (1000 BC) used a paste of the fruit in prescriptions for external application in leucoderma.²⁷

Powdered, unripe fruits are used in compounds for vitiligo.^{2(d)}

Vaginal discharges were treated with the juice of Kakodumbara fruit, mixed with honey (Vrṇdamadhava, eighth century).^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g.

The root is used in compounds for piles and constipation in China.

A patent, US 20120128808 AI, is based on active principles of *F. hispida* for the amelioration of metabolic syndrome and related diseases.

Ficus hispida Linn. f.

Root

Phalgu

BOTANICAL SOURCE(S)

Ficus hispida Linn. f.
 (Fam. Moraceae)

Syn. *F. oppositifolia* Willd.^{28,33(b)}

PHARMACOPOEIAL AYURVEDIC DRUG

Phalgu (Root).

API, Part I, Vol. III.

(Kākodumbara would have been more appropriate.)

Phalgu is *madhura* (sweet) while Kakodumbara is *tikta* (bitter).¹³⁰

Malayu or Malpu is the synonym of Kākodumbara, while Phalgu is the synonym of Bhadrosumbari.^{16(a)}

Kakodumbara, as well as Phalgu roots, were prescribed for leucoderma.

AYURVEDIC SYNONYMS

Kākodumbur, Malayu, Malpu.

Mañjula.^{27,4}

Kākahvānodumbari.^{30,4}

Kākodumbarika is also equated with *F. hispida*.

Phalgu and Malpu are said to be two varieties.

F. cunia Ham. ex Roxb. may be one of the two.³⁰ According to the AFI, Malpu and Phalgu are synonyms (AFI, Part I, page 319).

HABITAT

Throughout the outer Himalayan range from Chenab eastwards to Bengal, Central and South India and Andaman Islands.

Also found in Sri Lanka, Myanmar, Southern region of China, New Guinea, and Australia.

REGIONAL LANGUAGE NAMES

Eng: Wild fig, Devil fig;

Assam: Khoskadumar, Tanvardi, Teenbarree;

Beng: Kakdumur, Kathdumur, Kakdumbar;

Guj: Tedumbaro, Dhedadambaro, Dhedhumbro, Dhedhumbro;

Hindi: Konea-dumbar, Kathumar;

Kan: Kadaatti, Arjeeru Hamu, Anjeeru, Onagida, Hanna, Adane;

Mal: Peyatti, Kattatti, Erumanakku, Parakasimi;

Mar: Rambal, Kalodumbar, Bhuimbar;

Ori: Dimiri, Ani dambura;

Punj: Rumbal;

Tam: Peyatti;

Tel: Brahma medi, Kakimedi;

Urdu: Kath gular.

Eng: Redwood fig tree.²⁸

CONSTITUENTS

Alkaloids.

A leucocyanin, isolated from the root, has been characterized as leucocyanidin-3-O- α -D-glucosyl (1 \rightarrow 4)-O- β -D-arabinopyranoside.^{20(k),123}

THERAPEUTIC AND OTHER ATTRIBUTES

Śvitra, Kaṇḍu, Kuṣṭha, Vrana, Raktapitta, Śopha, Paṇḍu, Raktavikāra, Kāmala, Arsa

Used for leucoderma/vitiligo, pruritus, leprosy, ulcers, hemorrhagic diseases, edema, anemia, vitiated blood, jaundice, and piles (therapeutic use based on texts from the twelfth to sixteenth centuries).

In an experimental study, it was found that the root extract (methanolic) decreased the incidence of ulcers and also enhanced the healing of ulcers in Swiss albino rats.¹²⁴ The ethanolic extract of the root showed significant wound-healing activity.¹²⁵

The root and leaves exhibited anti-diarrheal, anti-diabetic, hepatoprotective, anti-bacterial, and cardioprotective properties in animal studies.¹²⁴

IMPORTANT FORMULATION/ APPLICATIONS

Mahā-panchagavya Ghrita (Ashtāngahridaya, seventh century), contains cow's milk, curd, *ghee*, urine, and dung's extract as main constituents with 24 main supporting plant drugs including Phalgu root and 18 additional plant drugs. For fevers, edema, jaundice, psychoneurosis, epilepsy.

It is an obsolete drug.

Kākodumbara was specific for leucoderma/vitiligo during the classical period.

Sushruta (1000 BC) prescribed a decoction of the root internally and as an ingredient of a medicinal plaster in leucoderma externally.²⁸

A warm decoction of the root bark (of Kākodumbara), mixed with an equal quantity of Udumbara (*F. glomerata*), was given to the patient, who was then exposed to sun, as a treatment for vitiligo (Sushruta Samhitā).^{16(a)}

The root of Kākodumbara, pounded with rice water, was given in intrinsic hemorrhage (Rajamārttāṇḍa, eleventh century).^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Ficus lacor Buch.-Ham.

Plakṣa

BOTANICAL SOURCE(S)

Ficus lacor Buch.-Ham. = *F. lucescens* Blume. Syn. *F. infectoria* Roxb. (Fam. Moraceae)

Three varieties are recognized: var. *infectoria*, var. *lambertiana* and var. *wightiana*.^{2(a)}

The botanical source of Plakṣa in Kerala is *F. microcarpa* Linn.⁵ *F. retusa* sensu Hook. f. is also used. In Tamil Nadu, *F. lacor* is used.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Plakṣa (Stem bark).

API, Part I, Vol. II.

Plakṣa (fruit).

API, Part I, Vol. IV.

Bark of Plakṣa was an important drug of Ayurvedic medicine as it was one of the ingredients of *pancha-vaalkas* (the “Five Barks”), which was extensively used for ulcers, skin diseases, and inflammations. The fruit of the white fig (*F. lacor*) is not to be confused with common figs. It is constipative,³ while common figs are laxative.^{2(a)} It is rarely used in medicine.

AYURVEDIC SYNONYMS

Parkarī, Parkatī, Jaṭī.

Chāru vr̥kṣha, Svapārshva, Garddhabhāndaka, Priya, Vaṭi, Kamandalu.⁴

HABITAT

Throughout India, as an avenue and ornamental tree.

Also found in in Bangladesh, Nepal, Pakistan, Sri Lanka, Southwest China, and Indo–China.

REGIONAL LANGUAGE NAMES

Beng: Pakur;

Guj: Paras pipalo, Pepli;

Hindi: Pakad;

Kan: Karibasari, Kadubasari, Jeevibasari, Basari, Juvvebasari;

Mal: Itti, Ittiyadi, Itthy;

Ori: Pakali, Pakal;

Tam: Icchi, Itthi, Kallalnaram;

Urdu: Pakhad.

Eng: White fig, Java fig, Yellow-barked fig tree.

CONSTITUENTS

Stem bark: Sterols, Sugars, Tannin, Alkaloid and Saponin.

Stem bark yields acetates of long-chain alcohols, *N*-tetracosyl acetate, *N*-hexacosyl acetate, *N*-octacosyl acetate, *N*-tricontyl acetate; methyl ricinolate, beta-sitosterol, lanosterol, caffeic acid, bergenin and sugars,^{2(c),15,20(k)} furanocoumarins, bergapten, and bergaptol.^{2(d)}

Fruit: amino acids.

Free amino acids along with leucin and lysine are components of fruit protein.^{20(k)}

THERAPEUTIC AND OTHER ATTRIBUTES

Stem bark: Raktapitta, Murchā, Vraṇa, Yoniroga, Śoṭha, Visarpa, Atisāra Haemorrhagic diseases, syncope, ulcer, diseases of the female genital tract, oedema, erysipelas, diarrhoea (therapeutic uses based on texts, twelfth to sixteenth century).

Fruit: Dāha, Raktapitta, Murchā, Srama, Pralapa, Bhrama, Śoṭha. Burning sensation, hemorrhagic diseases, syncope, fatigue, delirium, vertigo, and edema (therapeutic uses based on texts from the twelfth to sixteenth centuries).

Decoction of bark is used in leucorrhea, for washing ulcers and as a gargle in salivation. Pulverized bark with honey is applied externally in diseases of the female genitals.¹⁵

Benzene extract of stem bark exhibited antibacterial activity against *Staphylococcus aureus* and *Escherichia coli* and anti-fungal activity against *Penicillium glaucum* (attributed to furanocoumarins).^{2(d)} Methanolic extract of

bark and leaf exhibited hepatoprotective activity in rats.¹²⁹

**IMPORTANT FORMULATION/
APPLICATIONS**

Nyagrodhādi Kwātha Churna (Ashtāngahridaya, seventh century), contains stem barks of 19 plants, including Plaksha. For sprue, bleeding disorders, diseases of the female genital tract. Marma Gutika (Sahasrayoga, a non-Samhita, Kerala Materia Medica) contains 45 drugs, including Plaksha flowers and stem bark (four components still unidentified). Used for trauma. Nālpāmraḍi Taila (Sahasrayoga) contains Plaksha stem bark as a minor supporting drug.

Fresh ripe fruit or powder of dried fruits is used to treat diabetes.^{2(c)}

Sushruta (1000 BC) prescribed fruits internally in obesity, hemoptysis, and vaginal discharges.²⁸ Plaksha fruits have been described in Charaka Samhitā and Sushruta Samhitā, along with other *Ficus* fruits. They were used for preparing a *phalāsava* (fruit wine).¹³⁰

Phalāsava of five *Ficus* spp. were prescribed as a tonic for the mind and body, in sleeplessness and anxiety and as an exhilarating drink.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

Stem bark: 50 g of the drug in powder for decoction.

Fruit: 5–10 g.

F

Ficus religiosa Linn.

Aśvattha

BOTANICAL SOURCE(S)

Ficus religiosa Linn.
(Fam. Moraceae)

The tree is one of the recorded hosts of the Indian lac insect in Madhya Pradesh, Bengal, and Assam.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Aśvattha (Bark).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Pippala.

Bodhidru,³ Vodhipādapa, Māngalya, Chaldala, Harivāsa.⁴

HABITAT

Throughout the plains of India up to 170 m altitude in the Himalayas.

From India to Southeast Asia.¹

REGIONAL LANGUAGE NAMES

Eng: Pipal tree;
Assam: Ahant;
Beng: Asvattha, Ashud, Ashvattha;
Guj: Piplo, Jari, Piparo, Pipalo;
Hindi: Pipala, Pipal;
Kan: Arlo, Ranji, Basri, Ashvatthanara, Ashwatha, Aralimara, Araleghida, Ashvathamara, Basari, Ashvattha;
Kash: Bad;
Mal: Arayal;
Mar: Pipal, Pimpal, Pippal;
Ori: Aswatha;
Punj: Pipal, Pippal;
Tam: Ashwarthan, Arasamaram, Arasan, Arasu, Arara;
Tel: Ravichettu.

Eng: Bot tree.

CONSTITUENTS

Tannins.

Tannins 4%,^{2(a)}

Bergenin, lupen-3-one, methyl oleanolate, lanosterol, *N*-octacosanol, beta-sitosterol-*D*-glucoside, stigmasterol, caffeic acid, and vitamin K.^{2(c),15,32}

The benzene extract of stem bark afforded furanocoumarins bergapten and bergaptol.^{20(k)}

Aqueous extract of the bark was anti-bacterial against *Staphylococcus aureus* and *Escherichia coli* and anti-protozoal against *Ascaridia galli*.¹⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Vatarakta, Raktapitta, Vrana, Yonidoṣa, Prameha

Used in gout, hemorrhagic diseases, ulcers, diseases of the female genital tract, and urinary disorders/polyuria (therapeutic uses based on texts from 1000 BC to sixteenth century).

Paste of bark or tender roots was prescribed internally and externally for skin infections and wounds, and also as a purgative;²⁷ decoction of bark was used in gout (Charaka Samhitā, 1000 BC). Powder of dried bark was dusted over burns (Vṛndamādhava, eighth century). Paste of bark and leaves were applied in the mouth for stomatitis (Chakradatta, eleventh century). Dried bark was burnt and dipped in water; the water was given to check vomiting (Bhavaprakasha, sixteenth century).^{16(a)}

A decoction of stem bark with molasses is given in hematuria; infusion of bark is given internally for scabies; powdered bark, with coconut oil, is applied over burns.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Nyagrodhādi Kvātha Churna (Ashtāngahridaya, seventh century), contains stem barks of 19 plants, including Ashvattha. For sprue, bleeding disorders, diseases of the female genital tract.

Nālpāmṛādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Ashvattha stem bark as a part of the four *Ficus* group of Ayurveda (Nalpalmaran). Used for eczema, boils, and chronic ulcers.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–30 g of the drug for decoction.

Oral LD₅₀ of alcoholic extract in albino rats was 2.24 g/kg, while intravenous LD₅₀ was 0.80 g/kg.²⁰⁽²⁾

A hypoglycemic response is reported for beta-sitosterol-*D*-glucoside obtained from the bark.^{2(c)}

Phytosterolin, isolated from the bark, is a powerful CNS stimulant.

Flacourtia indica Merr.

Leaf

Sruvavr̥kṣa

BOTANICAL SOURCE(S)

Flacourtia indica Merr.

Syn. *F. ramontchii* L'Herit.

(Fam. Flacourtiaceae)

Previously, *F. sepiaria* and *F. indica* were considered synonyms, now they are treated as different species.^{2(a)}

In Kerala, one plant drug, Aghori (not mentioned in any of the Ayurvedic texts), is equated with

Flacourtia indica. Aghori is used in bilious affections, rheumatism, poisonous bites, skin diseases, urinary disorders and mental diseases.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Sruvavr̥kṣa (Leaf).

API, Part I, Vol. IV.

(Vikaṅkata is a better option. It was a popular nomenclature during the classical period.)

AYURVEDIC SYNONYMS

Vikaṅkata, Gopakanta.

Vaikaṅkata, Swādukantaka.³⁰

Kantaki^{3,30} (also a synonym of Khadira, *Acacia catechu* Willd.)

Not to be confused with Vikaṅgata of Charaka Samhitā, equated with *Gymnosporia montana* Benth.²⁷

Flacourtia jangomas (Lour.) Raeusch. is equated with Prāchināmalaka of Charaka and Sushruta.³⁰

HABITAT

The sub-Himalayan tracts and outer Himalayas up to 1220 m, also common throughout Chota Nagpur, Deccan and South India.

Native to tropical Africa and Asia.

REGIONAL LANGUAGE NAMES

Eng: Governor plum, Madaraskara plum;

Beng: Bincha, Bainchi, Bewich;

Guj: Kankata;

Hindi: Bilangra;

Kan: Ilumanika, Dodda gejjalakai;

Mal: Vavankataku, Vikamkath, Valiya nzeriniga, Loloikka;

Mar: Kaker;

Ori: Kantheikoli, Vaincha, Uincha;

Punj: Kakoa, Kukoya;

Tam: Sottaikala, Kat ukala;

Tel: Putregu, Kanavegu chettu, Vikankata.

Eng: Madagascar plum.^{2(a)}

CONSTITUENTS

Tannin and sugar.

Phenolic glycosides,¹³² condensed tannins, sugar, flacourtin, beta-sitosterol, beta-sitosterol-beta-D-glucopyranoside, ramontoside, and

butyrolactone lignan disaccharide; coumarins include scoparone and acsculetin.¹³¹

Leaves (dry basis) contain copper 14.03 ppm, iron 184.25 ppm, manganese 108.23 ppm, and zinc 45.03 ppm.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktavikara, Sopha, Kamala

Used for diseases due to vitiated blood, edema, and jaundice (therapeutic uses based on texts from 1000 BC to sixteenth century).

Leaf extracts in experimental studies exhibited: free radical scavenging and anti-oxidant activities; hepatoprotective activity against CCl₄-induced hepatotoxicity; anti-inflammatory activity; and broad-spectrum anti-microbial activity.¹³¹

Three compounds, pyrocatechol, homaloside D, and poliothysoside, isolated from aerial parts,¹³¹ and mururin A, isolated from leaves and twigs, showed anti-plasmodial activity.^{132*}

Ethanollic extract of leaves showed significant anti-histaminic (H receptor 1 antagonist) (suggesting anti-asthmatic) activity.¹³³

F. jangomas showed anti-bacterial activity.¹³¹

IMPORTANT FORMULATION/ APPLICATIONS

Aragvadhādi Kvātha Churna (Ashtāngahridaya, seventh century), contains stem bark (not leaf) of *Sruvavrksha*. (AFI)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50–100 g for decoction.

* Ref. 132: the study was undertaken by scientists of the Central Drug Research Institute, Lucknow.

Flacourtia indica Merr.

Stem bark

Sruvavṛkṣa

BOTANICAL SOURCE(S)

Flacourtia indica Merr.
Syn. *F. ramontchii* L’Herit.
(Fam. Flacourtiaceae)

Previously, *F. sepiaria* and *F. indica* were considered as synonyms, now they are treated as different species.^{2(a)}

In Kerala, one plant drug, Aghori (not mentioned in any of the Ayurvedic texts), is equated with *Flacourtia indica*. Aghori is used in bilious affections, rheumatism, poisonous bites, skin diseases, urinary disorders, and mental diseases.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Sruvavṛkṣa (Stem bark).

API, Part I, Vol. IV.

(Vikaṅkata is a better option. It was a popular nomenclature during the classical period.)

AYURVEDIC SYNONYMS

Vikaṅkata, Gopakanta.

Vaikaṅkata, Swādukantaka.³⁰

Kantaki^{3,30} (also a synonym of Khadira, *Acacia catechu* Willd.)

Not to be confused with Vikangata of Charaka Samhitā, equated with *Gymnosporia montana* Benth.²⁷

Flacourtia jangomas (Lour.) Raeusch. is equated with Prāchināmalaka of Charaka and Sushruta.³⁰

HABITAT

The sub-Himalayan tracts and outer Himalayas up to 1220 m, also common throughout Chota Nagpur, Deccan and South India.

Native to tropical Africa and Asia.

REGIONAL LANGUAGE NAMES

Eng: Governor plum, Madaraskara plum;
Beng: Bincha, Bainchi, Bewich;
Guj: Kankata;
Hindi: Bilangra;
Kan: Ilumanika, Dodda gejjalakai;
Mal: Vavankataku, Vikamkath, Valiya nzerinigal, Loloikka;
Mar: Kaker;
Ori: Kantheikoli, Vaincha, Uincha;
Punj: Kakoa, Kukoya;
Tam: Sottaikala, Kat ukala;
Tel: Putregu, Kanavegu chettu, Vikankata.
Eng: Madagascar plum.^{2(d)}

CONSTITUENTS

Tannin and flacourtin, a phenolic glucoside ester.

Six new phenolic glycosides, flacourtoside A–F; phenolic glycoside itoside H, xylosmin, scolochinenoside D, and poliothryoside; and betulinic acid 3 beta-caffeate were obtained from the stem bark of *F. ramontchi* for identifying novel inhibitors of chikungunya and dengue virus replication.

In dengue RNA polymerase assay, significant inhibition was observed with betulinic acid 3 beta-caffeate and, to a lesser extent, with the flacourtosides A and E and scolochinenoside D.¹³⁴

THERAPEUTIC AND OTHER ATTRIBUTES

Raktavikara, Sopha (Sotha), Dusta vrana

Used for diseases due to vitiated blood, edema (inflammation) and non-healing ulcers (therapeutic uses based on texts from 1000 BC to sixteenth century).

Stem barks, fruits and leaves were used in epilepsy, sleep disorders, headache, and fever.¹³⁵

F

**IMPORTANT FORMULATION/
APPLICATIONS**

Āragvadhādi Kvātha Churna (Ashtāngahridaya, seventh century), contains 20 herbal drugs in equal proportion, Sruavṛkṣa is one of them. For toxemia, non-healing ulcers, obstinate skin diseases, pruritus, urinary disorders. Bark was used in self-fermented asavas and lehas (confections) for urinary disorders (Sushruta Samhitā, 1000 BC); paste of the bark was

applied topically on cysts (Sushruta Samhitā), in spider poisoning and in compounds for cough (Ashtangahridaya).^{16(a)}

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

50–100 g of the drug for decoction.

Leaves and stem are used against malaria in Madagascar and the Comoro Islands.¹³²

F

<i>Flacourtia indica</i> Merr.	Fruit	Sruvavṛkṣa
BOTANICAL SOURCE(S) <i>Flacourtia indica</i> (Burm. f.) Merr. syn. <i>F. ramontchi</i> Herit. (Fam. Flacourtiaceae) Previously, <i>F. sepiaria</i> and <i>F. indica</i> were considered as synonyms, now they are treated as different species. ^{2(a)} In Kerala, one plant drug, Aghori (not mentioned in any of the Ayurvedic texts), is equated with <i>Flacourtia indica</i> : Aghori is used in bilious affections, rheumatism, poisonous bites, skin diseases, urinary disorders, and mental diseases. ⁵	<i>Flacourtia jangomas</i> (Lour.) Raeusch. is equated with Prachināmālaka of Charaka and Sushruta. ³⁰ HABITAT Sub-mountain areas of Punjab and Himachal Pradesh, Bihar, Maharashtra, and southern peninsula. Native to tropical Africa and Asia.	REGIONAL LANGUAGE NAMES Eng: Governor plum, Madagascara plum, Mauritius plum; Ben: Bincha, Bainchi-kul, Bainchaa; Guj: Kankata, Kaankod; Hindi: Bilangra, Kakaiyaa, Kataai; Kan: Lumanika, Dodda gejjalakai, Hunmunaki, Panumbus; Mal: Vavankataku, Vikamkath, Yaliya nzerinigal; Mar: Kaker, Bhekal; Ori: Kantheikoli, Vaincha, Unicha; Pun: Kanghu; Tam: Sottaikala, Kat-ukala, Panampuvatti; Tel: Putikatada, Putregu, Kanaveguchettu, Vikankata, Kandregu.
PHARMACOPOEIAL AYURVEDIC DRUG Sruvavṛkṣa (Fruit). API, Part I, Vol. VI. (Vikaṅkata is a better option. It was a popular nomenclature during classical period.) AYURVEDIC SYNONYMS Vikaṅkata Gopakaṇṭa., Vaikaṅkata, Swādukantaka. ³⁰ Kantaki ^{3,30} (also a synonym of Khadira, <i>Acacia catechu</i> Willd.) Not to be confused with Vikaṅgata of Charaka Samhitā, equated with <i>Gymnosporia montana</i> Benth. ²⁷	CONSTITUENTS Flacourside, and on methyl 6-O-(E)- <i>p</i> -coumaroyl glucopyranoside and 6-O-(E)- <i>p</i> -coumaroyl glucopyranose.	

Quoted constituents are of the fruit juice. The structure of flacourside has been determined—4-oxo-2-cyclopentenyl methyl 6-0-(E)-*p*-coumaroyl-beta-D-glucopyranoside.²⁵⁴

Mineral composition of the edible fruit (100 g of edible portion): minerals 1.3 g; calcium 100 mg, phosphorus 100 mg, iron nil; protein (N X 6.25) 1.7 g; fat 1.8 g; carbohydrates 22.7 g; energy (kcal) 114.^{20(k)}

Fruits contains total sugar 17.35%, protein 3.8% and vitamin C 217.99 mg/100 g.^{20(k)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya (digestive impairment), Kāmālā (Jaundice), Plihāvṛaddhi (splenomegaly), Prameha (metabolic disorder), Raktavikāra (disorders of blood), Śōtha (inflammation), Yakṛdroga (diseases of liver). Used as single drug.

Therapeutic uses based on texts from 1000 BC to sixteenth century.

IMPORTANT FORMULATION/ APPLICATIONS

Fruits are appetizing and digestive. In traditional medicine, they are given in jaundice and enlarged spleen.^{2(a)}

In ethnomedicine, seeds are used as a contraceptive.^{20(k)}

Vikāṅkata fruits have been described as *dosaghna* and *visaghna* by Charaka. (The fruit alleviates all *dosas* and destroys toxic substances from the system.)¹³⁰

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 5 to 10 g.

F

Foeniculum vulgare Mill.

Miśreyā

BOTANICAL SOURCE(S)

Foeniculum vulgare Mill.
(Fam. Umbelliferae)

The European Pharmacopoeia recognizes *Foeniculum vulgare* Mill, subsp. *vulgare* var. *vulgare* (*Foeniculi amari fractus*, bitter fennel) and *F. vulgare* Mill. subsp. *vulgare* var. *dulce* (*Foeniculum dulcis fractus*, sweet fennel) as distinct entities. Separate monographs are provided in the Pharmacopoeia.

In a WHO monograph, no distinction is made between “bitter” and “sweet” varieties.

PHARMACOPOEIAL AYURVEDIC DRUG

Miśreyā (Dried ripe fruits),

API, Part I, Vol. I.

International Pharmacopoeial name: *Foeniculi fructus*.⁸

AYURVEDIC SYNONYMS

Miśi, Miṣi, Madhurikā.

Shatapushpā.³
Shatāhvā is equated with *Peucedanum graveolens* Linn.³

HABITAT

Cultivated extensively throughout India up to 1830 m, also sometimes found wild.

Naturalized in Australia and West U.S. Four to five species are found in Asia.¹ Widely cultivated in temperate and tropical regions of the world.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Fannel fruit;

Assam: Guvamuri;

Beng: Marui, Panmauri;

Guj: Variyali;
 Hindi: Saunf;
 Kan: Badisompu, Doddasompu;
 Kash: Sanuf, Badnai;
 Mal: Kattusatakuppa, Parinjaeragum;
 Mar: Badishop;
 Ori: Panamadhuri;
 Punj: Saunf;
 Tam: Shombu;
 Tel: Soppu;
 Urdu: Saunf.

F

CONSTITUENTS

Essential oil and fixed oil.

Essential oil (2%–6%) contains *trans*-anethole (50%–82%), (+)-fenchone (6%–27%), estragole (methylchavicol) (3%–20%), limonene (2%–13%), *p*-anisaldehyde (6%–27%), alpha-pinene (1%–5%) and alpha-phellandrene (0.1%–19.8%).¹⁰⁽³⁾

Fixed oil (17%–20%) contains petroselinic acid (60%–75%).^{9,11}

Fenchone is higher in bitter fennel.³¹ Some varieties are anethole free, with up to 80% estragole. These are not suitable for normal use.³¹

Flavonoids include kaempferol, quercetin, isoquercetin, and rutin.⁹

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Śūla, Kāsa, Raktadoṣa, Pravāhikā, Arśa

Used for digestive impairment, colic, cough, vitiated blood, dysentery, and piles (therapeutic uses based on texts from the twelfth to thirteenth centuries).

Fennel seeds promote gastrointestinal motility, and in higher concentrations act as an anti-spasmodic.

Experimentally, anethole and fenchone have been shown to have a secretolytic action in the respiratory tract. Aqueous fennel extracts raise the mucociliary activity of ciliary epithelium.⁸

Petroselinic acid present in fennel is a cholesterol level reducer. Pheophytin, chlorophyll A and B, present in fennel, are free radical binders.^{2(d)}

Seeds are a rich sources of Fe, Zn, and K.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Mishreyārka (Arkaprakāsha, Rāvana, period not known), contains distilled essences and volatile constituents of Mishreyā. For colic, flatulence and nausea.

Panchasakāra Churna (Siddha-bheshajamanimāla, a non-classical text) contains *F. vulgare* fruits, *Terminalia chebula* fruits, *Zingiber officinale* rhizomes, and *Cassia angustifolia* leaf and rock salt. This compound is an adaptation of Panchasama Churna (Sharangadhara Samhitā, thirteenth century). Used for indigestion, flatulence, constipation, and as a mild laxative.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

5–7 g crushed or ground seeds per day for teas. 10–20 g for fennel syrup or honey.⁸

The extract of fennel seeds inhibits the growth of microorganisms, especially *Streptococcus mutans*, responsible for dental caries and periodontal diseases. It can be used in oral compositions and toothpastes.^{2(c)}

Standardization basis marker compound: Anethole-NLT 0.6% w/w (IP).

Fritillaria roylei Hook.

Kṣīrakākoli

BOTANICAL SOURCE(S)

Fritillaria roylei Hook.
(Fam. Liliaceae)

In addition to *F. roylei*, orchids being sold in the market include *Roscoeia procera* Wall., *Nomocharis oxypetala* Royle and *Lilium polyphyllum* D. Don., as well as *Mimusops kauki* Linn.³

PHARMACOPOEIAL AYURVEDIC DRUG

Kṣīrakākoli (Bulb).
API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Śuklā, Kṣīrvallikā.

Upper part is called Kshirakākoli; lower part is known as Kākoli.⁴

Bhāvamishra (sixteenth century) had suggested the use of Ashvagandhā (*Withania somnifera* Dunal) root as a substitute of Kākoli and Kshirakākoli.³ This is being followed in practice.

The AFI equated Kākoli with *Lilium polyphyllum* D. Don., and Kshirakākoli with *Fritillaria roylei*, while *Withania somnifera* is an official substitute for both.

HABITAT

Western temperate Himalayas from Kumaon to Kashmir at an altitude of 2500-4000 m.

REGIONAL LANGUAGE NAMES

Eng: Fritillary;
Hindi: Kshira, Kakoli;
Mar: Kshira, Kakoli;
Tam: Kshira, Kakoli;
Tel: Kshira, Kakoli.

Chinese: Pei Mu.

CONSTITUENTS

Alkaloids Kashmirine (imperialine), Peimine, Peimisine, Propeimine, Peimiphine and Peimitidine.

Following are the sources of constituents quoted in the API text: *J Am Pharm Ass, Sc Ed*, 36, 1947; 215; *Chem Abstr*, 41, 1947; 7677h; *Tetrahedron Lett*, 1976; 2903; *Chem Abstr*, 44,1950; 11030c.

The basic fractions of the alcoholic extract of bulbs yielded a C-nor-D-homo steroidal alkaloid Kashmirine.^{20(k)} T.Q. Chao (*Chinese J Physiol*, 4, 1932; 265) isolated peimine and peimimine from the root of *F. roylei* (Chinese drug Pei-Mu), and Chen studied their pharmacology. Characterization was done by Chi, Kao and Chang (*Chinese J Physiol*, 7, 1933, 41); an entirely different active principle, fritimine was isolated.

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Dāha, Śoṣa, Jvara, Kṣaya, Raktadoṣa, Raktaroga, Hṛdroga, Śvāsa, Kāsa, Vaatarakta, Yoni vyāpad, Vātavyādhi, Vātapittarujā, Kṣaya, Hṛdroga

Used for bleeding disorders, burning sensation, cachexia, fever, phthisis, disorders of the blood, diseases of the blood, heart disease, dyspnea, cough, gout, diseases of the female genital tract, diseases of the nervous system, and wasting diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

All the eight plant drugs of “Ashta Varga” were used as one component for their synergistic action: cooling, nourishing, spermatopoetic, aphrodisiac, and recuperating.

IMPORTANT FORMULATION/ APPLICATIONS

In practice, all the quoted compounds contain substitutes approved by AFI. For all the eight herbs of “Ashta Varga” (“the Eight Tonic Herbs” of Ayurveda) substitutes were used since sixteenth century (the Bhāvaprakāsha period).

F

Dioscorea bulbifera Linn. (in South India, *Curculigo orchioides* Geartn.) for Riddhi and Vṛdhi; *Withania somnifera* Dunal for Kākoli and Kshirakākoli; *Asparagus racemosus* Willd. for Meda and Mahāmeda; and *Pueraria tuberosa* DC. for Jivaka and Rshbhaka are used in practice.

DOSAGE/USAGE/CAUTIONS/COMMENTS

3-5 g in the powder form.

LD₅₀ of the alcoholic extract of the bulbs was found to be 250 mg/kg i.p. in rats.^{20(k)}

F

Fumaria parviflora Lam.

Parpata

BOTANICAL SOURCE(S)

Fumaria parviflora Lam.
(Fam. Fumaraceae)

According to the AFI, *F. parviflora* is the accepted source of Parpata.

In Kerala, *Hedyotis brachypoda* DC., *H. corymbosa* (L.) Lam. and *H. diffusa* Willd. are generally accepted as Parpata.⁵

IMPCOPS, Chennai, is using *Mollugo cerviana* Ser. as Parpataka.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Parpata (Whole plant).

API, Part I, Vol. IV.

International Pharmacopoeial name: *Fumariae herba*.

AYURVEDIC SYNONYMS

Varatikta, Suksmapatra.

Kavacha, Reṇu, Pitrahā, Yava-kantaka, Parpataka, Spr̥штika, Charmmakantaka.⁴

HABITAT

As a weed of cultivated fields over the greater parts of India, and also commonly growing on road sides during cold season.

REGIONAL LANGUAGE NAMES

Assam: Shahtaraj;

Beng: Vanshulpha, Bansulpha;

Guj: Pittapapada, Pitpapado, Pittapapado;

Hindi: Pittapapada, Dhamgajra, Pittapapara;

Kan: Kallu sabbasige, Parpatu, Chaturasigide;

Mar: Pittapapada, Shatara, Parpat;

Punj: Shahtara, Pittapapara;

Tam: Tura, Tusa;

Tel: Parpatakamu;

Urdu: Parpata.

CONSTITUENTS

Alkaloids, Tannins, Sugars and salt of Potassium.

Major alkaloids protopine, parfumine and adlumidiceine; minor alkaloids fumariline, dihydrofumariline, cryptopine, (–)-stylophine, 8-oxocoptisine, sanguinarine, 6-oxosanguinarine, coptisine, (–)-canadine, berberine, chelidonine, bulbocarpine and papaverine.

Plant also contains alkaloids nor-oxyhydrastinine and izmirine.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Chardi, Raktapitta, Mada, Bhrama, Jvara, Tr̥сна, Daha, Raktavikara, Glani

Used for vomiting, bleeding disorder, intoxication, vertigo, fever, excessive thirst, burning sensation, disorders of the blood, and self-aversion (therapeutic uses based on texts from 1000 BC to sixteenth century).

Decoction of leaves, in prescriptions, used for fever, hemothemia, and diarrhea (Charaka Samhita, 1000 BC).²⁷ Cooked as a pot herb in fevers, chronic skin diseases, urinary diseases,

cough, hiccup, and hemoptysis (Sushruta Samhita, 1000 BC).²⁸

For all types of fevers, Parpata alone or with supporting herbs was prescribed (Ashtāngasangrha, sixth century; Vrndamadhava, eighth century; Rājamārṭanda, seventeenth century.)^{16(a)}

proportions. Used for skin diseases, leprosy, pruritus, and erysipelas.

Pāchanāmṛta Kvāth Churna (Sahasrayoga) contains ten plant drugs, including Parpata plant, in equal proportions. Used for fevers.

All other quoted compounds contain Parpata as a supporting herb.

IMPORTANT FORMULATION/ APPLICATIONS

Parpataka Kashāya (Sahasrayoga, a non- Samhitā, Kerala Materia Medica). A single drug preparation with honey. For headache and burning sensation in eyes.

Nālapāmarāda Taila (Sahasrayoga) contains *Curcuma longa* rhizomes and Parpata plant juice as main components with the “Four Ficus Barks” and nine supporting herbs in equal

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-3 g.

The major alkaloid constituent, protopine, has anti-histaminic, hypotensive, bradycardiac, and sedative activities in small doses and causes excitation and convulsions in large doses.¹³

Clinical trials in biliary disorders gave encouraging results.^{11(b)}

BOTANICAL SOURCE(S)

Garcinia pedunculata Roxb.
(Fam. Guttiferae)

G. pedunculata is equated with Amlavetas (AFI, Part I, page 335). *Rheum emodi* Wall. is its substitute (AFI, Part I, 337). *Garcinia indica* Choisy is equated with Vrksamla (AFI, Part I, page 330).

The fruits of *G. pedunculata* are used in Bengal and Assam as Amlavetas; almost everywhere else, dried leaf stalks of *Rheum emodi* are in use.³⁰

In Kerala, the plants used as Amlavetas are *Cissus repens* Lamk., *C. vitiginia* Linn., *Ampelocissus latifolia* (Roxb.) Planch and *Cayratia trifolia* (L.) Domin (all *Vitaceae*).⁵

Fruits of *Garcinia indica* Choisy are used as Amlavetas (Malabar tamarind) in Tamil Nadu.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Vṛntāmlaphala (Fruit Rind).

API, Part I, Vol. VI.
Amlavetas.

AYURVEDIC SYNONYMS

Vṛntāmlaphala.

Amla, Amla vidula (vidul = vetasa).³⁰

HABITAT

Found sporadically in upper Assam up to an altitude of 1000 m and in Manipur; occasionally cultivated.

Distributed in Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, and West Bengal.

Rheum emodi (Himalayan rhubarb) is collected from wild plants found in the hills of Kangra, Kulu, Kumaun, Nepal, and Sikkim. Cultivated in Assam for its leaves.^{2(a)}

REGIONAL LANGUAGE NAMES

Assam: Borthekera;
Ben: Tikul, Tikur, Thaikal;
Hindi: Amalbeda;
Kan: Chaarighuli;
Tam: Pulivanchi;
Tel: Pullaprabballi;
Urdu: Amalbeda.

CONSTITUENTS

Pedunculol; garcinol; cambogin.

Malic acid (13%–20%) is the principal acid of the fruit pulp.^{2(a)} Garcinol is also present in *G. indica* fruit pulp, and combogin in the root of *G. gummi-gutta*.

Organic acids, (–)-hydroxycitric along with its lactone, oxalic acid, and citric acid were reported from the aqueous, acetone, and methanol extracts of the leaves, pulp, fruits, and dried rinds of *G. pedunculata*.^{20(k)}

THERAPEUTIC AND OTHER ATTRIBUTES

Ānāha (distension of abdomen due to intestinal obstruction), Ajīrṇa (indigestion), Aśmarī (calculus), Arśa (piles), Aruci (tastelessness), Gulma (abdominal lump), Hṛdroga (heart disease), Hikkā (hiccup), Kṛmi (worm infestation), Kāsa (cough), Pilhāroga (splenic disease), Śūla (pain/colic), Śvāsa (Asthma), Udāvarta (upward movement of gases), Vibandha (constipation).

Used as a single drug.

For therapeutic uses, classical sources are not quoted.

IMPORTANT FORMULATION/ APPLICATIONS

Fruits are used in hepatitis, asthma, hemorrhoids, oliguria, diabetes, stomach problems, dysentery, diarrhea, and gastroenteritis.

Fruit pericarp is used in constipation, griping pain of the stomach and indigestion, diarrhea, dysentery, dyspepsia, and flatulence (based on ethnobotanical reports).^{20(k)}

Crude hexane and chloroform extracts of the fruit rind exhibited *in vitro* anti-bacterial activity against food-borne pathogens and spoilage

bacteria. The activity was more pronounced for Gram-positive bacteria.^{20(k)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Svarasa (juice): 5 to 10 mL.

Gardenia gummifera L. f.

Nāḍihingu

G

BOTANICAL SOURCE(S)

Gardenia gummifera L. f.

Syn. *G. arborea* Roxb.

(Fam. Rubiaceae)

Leaf buds and young shoots of *G. gummifera*, as well as of *G. lucida* Roxb. = *G. resinifera* Roth.,²⁵ yield a resinous exudation, known as Dikāmāli or Cumbi Gum.^{2(a)}

The gum is not related to *Ferula* spp., nor is a substitute of any *Ferula* product. A flavonoid (gardenin A, its methyl ether and acetate) has been isolated from the plant gum (3.76%); six cycloartane triterpenes, dikamaliartanes A–F, along with the flavonoid gardenin E, were also isolated.^{20(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Nāḍihingu (Exudate).

API, Part I, Vol. VI.

Hingu, Hingupatri, and Nāḍihingu were mentioned for the first time in a sequence in Dhanvantari Nighantu (prior to the thirteenth century). The *shloka* describing the attributes of Nāḍihingu (quoted in the API) was the basic text that was adapted and quoted during the later period.

AYURVEDIC SYNONYMS

Hingunāḍikā.

Jantukā, Hingupatri, Vaṇsha-patri (CCRAS).²⁵ (Hingupatri is equated with *Ferula jaeschkeana* Boiss.)

HABITAT

Moist deciduous forests of India.

Throughout the Deccan Peninsula, extending northwards to Bundelkhand and parts of Bihar.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Gummy gardenia;

Ben: Dikamali;

Guj: Dikaamaari, Maaladi;

Hindi: Naadihingu, Dikaamaali;

Kan: Dikkaamalli;

Mal: Somanaadikaayam, Gandharaajan;

Mar: Dikemaali;

Pun: Dikaamaali;

Tam: Tikka malli;

Tel: Tellamanga, Karinguva;

Urdu: Dikkamali.

CONSTITUENTS

Gardenin, 3', 4', 5' apigenin, demethoxysudachitin and 3', 5'- dihydroxy-4'-methoxywogonin.

Resin yielded flavones gardenin, gardenin A, acerosin, desmethyltangeretin, nevadensin, 5,3',5', tryhydroxy-6,7,8,4'-tetra-methoxyflavone (gardenin E), 3'-4'-dihydroxywogonin, 3',4',5'-trihydroxywogonin, *iso*-scutellarein, 4'-hydroxywogonin, apigenin, demethoxysudachitin, and 5,7,3',4'-tetrahydroxy-6,8-dimethoxyflavone.^{32,25}

Deep yellow resin gives higher yields of gardenin.^{2(a)}
(See also PMID 1969736 for triterpenes.)

THERAPEUTIC AND OTHER ATTRIBUTES

Ādhmana (flatulence with gurgling sound), Agnimāndya (digestive impairment), Ajirna (indigestion), āmadoṣa (products of impaired digestion and metabolism), Aruci (tastelessness), Gulma (abdominal lump), Hikkā (hiccup), Kṛmi (helminthiasis), Medoroga (obesity), Udaraśūla (pain in the abdomen). Used as single drug.

According to the quoted text of Dhanvantari Nighantu, Nāḍihingu, the drug is pungent, a stimulant, harmonizes the body fluids and central and autonomus nervous systems and cures distention of the abdomen, indigestion and acute constipation.

IMPORTANT FORMULATION/ APPLICATIONS

The resin is extensively employed in veterinary medicine to keep away flies from sores, for destroying maggots in wounds, and as a sheep wash.

The resin is anti-spasmodic, carminative, anthelmintic, diaphoretic, and expectorant. In dyspepsia attended with flatulence, the resin has been frequently used. It is given to children with nervous disorders and diarrhea due to dentition. A decoction is used in fevers. It is also used for cleaning ulcers.^{2(a)}

The rein of *G. resinifera* is used in cutaneous diseases (CCRAS).²⁵

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 1 to 3 g.

Gentiana kurroo Royle

Trāyamāṇā

BOTANICAL SOURCE(S)

Gentiana kurroo Royle
(Fam. Gentianaceae)

The roots of *G. kurroo* as well as those of *Picrorhiza kurroa* are known in commerce as Kutaki. Both are used as substitutes for the official drug Gentian of the British Pharmacopoeia.^{20(k)}

PHARMACOPOEIAL AYURVEDIC DRUG

Trāyamāṇā (Rhizome);

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Trāyantī, Giriḡa, Adrisānuḡa, Balabhadra, Pālanikā, Trāyantikā.

Shuṛṭ ṭṛṇa, Giri shānuḡā, Kṛṭa ṭṛṇa, Vārshikā, Trāyamānaka.⁴

HABITAT

Distributed sporadically in sub-alpine to alpine meadows between altitudes of 1500 to 3000 m.

Commonly found in Kashmir and the Northwestern Himalayas.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Indian gentian;

Guj: Traymana;

Hindi: Trayman, Kadu;

Kan: Karadihanni;

Mal: Trayamana;

Pun: Kadu;

Tam: Kampanitirai;

Tel: Trayama.

CONSTITUENTS

Bitter crystalline glycoside - Picrorhizin (3 to 4%) cathartic acid. Secoiridoids like picroside A and kutuoside.

Rhizomes and roots contain iridoid glycosides; the major component was identified as 6'-cinnamoyl-catapol.^{2(c)} *Gentiana lutea* (Yellow Gentian), imported into India, contains secoiridoid compounds, amarogentin and gentiopicroside, together with traces of swertiamarin and sweroside. The roots also contain the alkaloids gentianine and gentioflavone; xanthonenes and bitter oligosaccharides, gentiobiose and gentianose. Amarogentin, gentiopicrocin, swertamarin and sioeroside (iridoid monoterpenes) are toxic constituents.⁷

G

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra (diarrhoea), Bhrama (vertigo), Gulma (abdominal lump), Hṛdroga (heart disease), Jvara (fever), Raktapitta (bleeding disorder), Raktavikāra (disorders of blood), Śūla (pain/colic), Sūtikāśūla (postpartum abdominal pain), Trṣṇā (thirst), Visarpa (Erysipelas)

Therapeutic uses are based on texts from the twelfth to sixteenth centuries.
Roots and rhizomes are bitter tonics, anti-peri-
odic, febrifuge, astringent, stomachic, and

anthelmintic. Rhizomes improve appetite and stimulate gastric secretion, as well as alleviate urinary disorders.^{2(a),20(k)}

IMPORTANT FORMULATION/ APPLICATIONS

Mahā paishāchika Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica; not in AFI), contains 22 plant drugs including Trāyamāṇa. For epilepsy, insanity, mental diseases.
Trāyantyādi Kashāya (Ashtāngahridaya, seventh century; Sahasrayoga) and Trāyamāṇādi Kashāya (Sahasrayoga) contain Trāyamāṇa.
Trāyantyādi Kvāth Churna of the AFI contains Trāyanti plant (not the rhizome). Used for fevers, eruptions, and bleeding disorders.
Trāyamāṇa Ghrita (Bhaishajya Ratnāvali, seventeenth century; not in the AFI) contains Trāyamāṇa among nine supplementary herbs. Used for fevers, jaundice, and erysipelas.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 1 to 3 g.

Gisekia pharnaceoides L.

Vālukā-śāka

BOTANICAL SOURCE(S)

Gisekia pharnaceoides L.,
Syn. *G. molluginoides* Wt.
(Fam. Aizoaceae)

PHARMACOPEIAL AYURVEDIC DRUG

Vālukā-śāka (Leaf).

API, Part I, Vol. VI.
Not to be confused with Valuka and Elavaluka.³⁰

AYURVEDIC SYNONYMS

Vālukā.

Vālu, Kānduka, Shirna-vṛnta, Chitraphala,
Vichitra, Pitavarṇka.⁴

HABITAT

Distributed in coastal areas and arid zones of India.
Distributed in the drier parts of Northern and Western India and the Deccan peninsula.
Gisekia: distributed in Africa and Western and Southern Asia.^{2(a)} The herb is sold in Nigeria as a purgative.²⁶⁰

REGIONAL LANGUAGE NAMES

Ben: Valuka;
Hindi: Balukaasaaga;

Mal: Panckirai;
Mar: Vaaluchi-bhaaji;
Tam: Manalkirai;
Tel: Eskadantikura.

CONSTITUENTS

Oxalic, tartaric, citric and succinic acids besides triacontane, myristone, tetracosanol and dotriacontane.

Quoted constituents were mentioned in Reference 259 (2004). (API, Vol. VI was published in 2008–2009.)

Leaves and unripe seeds gave anthocyanidins. Whole plant yielded common sugars, acids and hydrocarbon, myristone, tetracosanyl acetate and dotriacontane.²⁶⁰ The fruit is said to be poisonous.²⁶⁰

THERAPEUTIC AND OTHER ATTRIBUTES

Kañḍū (itching), Kṛmi (helminthiasis), Kuṣṭha (Leprosy/diseases of skin), Raktapitta (bleeding disorder)

For therapeutic uses, classical sources are not quoted.

Plant is anthelmintic and vulnerary. Used for scabies, leprosy, leucoderma, rhinitis, bronchitis, and chest diseases. It is a powerful anthelmintic in cases of tenia.²⁵⁹ Fresh herb, including leaves, stalks and capsules, is ground with water and administered in cases of tenia. In Africa, it is rubbed on swellings and used in poultices for sores in cattle.^{2(a)} The 50% ethanolic extract of the plant showed CNS-depressant activity. The chloroform extract exhibited strong anthelmintic and antimicrobial activities.²⁵⁹

IMPORTANT FORMULATION/ APPLICATIONS

Lavangāḍya Churna (Bhaishajya Ratnāvali, seventeenth century), contains Bālaka (Hrīvera) root (not Vālukā sāga). A herbo-mineral compound of 25 drugs used for diarrhea and dysentery (AFI, Part II). Lavangāḍya Churna of Sahasrayoga also does not contain Vālukā (CCRAS text).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 3 to 6 g.

Glinus lotoides L. Ūṣandī

BOTANICAL SOURCE(S)

Glinus lotoides L.,
Syn. Mollugo hirta Thub.
M. lotoides Kuntz.
(Fam. Aizoaceae).

PHARMACOPOEIAL AYURVEDIC DRUG

Ūṣandī (Whole Plant).
API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Bhissata, Okharadi.

HABITAT

A spreading annual herb with white hairy aerial parts, distributed in wanner parts of India in plains, on the hills up to 800 m. Found in river beds throughout the plains and lower ghats of India.³²

REGIONAL LANGUAGE NAMES

Ben: Duserasag;
Guj: Aakaraadya;
Hindi: Gandibudi;
Kan: Chandra kaasi soppu;
Mar: Kothuk, Bhisata;
Ori: Gandhibuti;
Pun: Gandibuti;
Tam: Ciruceruppatai;
Tel: Chandrasi koora.

Hindi: Gandhbūti.^{20(k)}

CONSTITUENTS

Mollugogenol A, B, C, D, E, F and G (sapogenins); mollugocin A, and B (triterpene glycosides); β - and γ -sitosterol glucosides (sterol glucosides); oleanolic acid; Flavonoids like apigenin-8-C- glucoside; apigenin-7-O- rhamnoglucoside; pelargonidin-3-sophorsido-7 -gluco side (anthocyanins); esculin; sulfuretin; vicianin 2 (6, 8-di-C-beta-D- glucopyranosyl apigenin); vitexin.^{20(k)}

In addition, seven hopane-type saponins were isolated; six of them were designated as lotoides A–F, with seventh compound as succulentoside B.^{20(k)}

Aerial parts showed the presence of Ca, Mg, Na, K (concentration was maximum at 30.0 mg/g), Fe, Cu, Zn, and Mn.^{20(k)}

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra (diarrhoea), Raktapitta (bleeding disorder), Udararoga (diseases of abdomen), Vidradhi (abscess), Vraṇa (ulcer).

Used as a single drug.

The quoted text of Shodhala Nighantu gives only the plant's synonyms and botanical features.

For therapeutic uses, classical sources are not quoted.

IMPORTANT FORMULATION/ APPLICATIONS

The ethanolic extract of the plant, in a pharmacological study showed antioxidant, anticholesterolemic, and hepatoprotective effects.^{20(k),258}

The methanolic extract of the plant prevented tumor cell growth and enhanced mean survival by 130.4%.^{20(k)} The ethanolic extract of the plant showed gross behavioral effects, hypothermia, and diuretic activity in rats.^{20(k)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 3 to 6 g.

LD₅₀ of the ethanolic extract of the plant was found to be 250 mg/kg i.p. in mice.^{20(k)}

Gloriosa superba Linn.

Lāṅgalī

BOTANICAL SOURCE(S)

Gloriosa superba Linn.
(Fam. Liliaceae)

Sliced rhizomes of *Costus speciosus* (Koem.) Sims. (Kebuka) are often adulterated with the drug Lāṅgalī.³⁶ Their action on the uterus has been found to be similar to that of Lāṅgalī.³⁰

Both Lāṅgalī and Kebuka were used as pot herbs.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Lāṅgalī (Tuberous root).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Kalihārī, Garbhanut, Halinī, Agnisikhā.

Lāṅgalakī, Lāṅgalikī, Lāṅgalahva, Indrapushpī.²⁸ Agnimukhī.³⁰

HABITAT

Wild throughout the tropical regions of India up to 2,000 m.

The drug is collected in Bengal and a few other parts of India.

REGIONAL LANGUAGE NAMES

Eng: Glory lily;
Beng: Bisalanguli;
Guj: Khadiyanag;
Hindi: Kalihari;
Kan: Kolikutumana gade;
Mal: Mathonni;
Mar: Karianag;
Punj: Kariyari;
Tam: Kalappoi, Kizhangu;
Tel: Potthidumpa.

Eng: Tiger's claw, Superb lily.³²

CONSTITUENTS

Alkaloids and Resins.

Alkaloid colchicine is present in all parts; demethyl colchicine, N-formyldeacetyl colchicine, and lumicolchicine (in flower, leaves, and tubers); tubers yield an enzyme hydrolyzing amygdalin, beta- and gamma-lumicolchicines, gloriosine, superoine, benzoic acid, 2-hydroxy-6-methoxy benzoic acid, furfuraldehyde, palmitic, salicylic acids, choline, dextrose, beta-sitosterol and its glucoside, stigmasterol.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Śopha, Arśa, Vrana, Śūla, Kṛmi, Baṣṭisūla, Garbha, Śalya, Vātavyadhi

Used for obstinate skin diseases, edema, piles, ulcers, colic, worm infestations, pain in the urinary bladder, induced abortion, and diseases of the nervous system (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

A suspension in cow's urine was used internally for expelling the placenta; internally and externally in skin diseases; as an ingredient of a medicinal oil, externally, for malignant ulcers; the decoction is an antiseptic for cleansing wounds (Sushruta Samhitā, 1000 BC).

Tuberous root: anti-leprotic, anthelmintic, oxytotic, and abortifacient;³² and as a cataplasm in neuralgic pain.^{2(a)} Used for treating chronic ulcers.^{2(a)}

Starch from root: anti-gonorrheic.³²

IMPORTANT FORMULATION/ APPLICATIONS

Nirgundi Taila (Bhaishajya Ratnāvali, seventeenth century, not in AFI), contains *Vitex negundo* plant juice processed with Lāṅgalī root. Nasal drops for treating scrofula.

Kāsisādi Taila (Bhaishajya Ratnāvali), a herbo-mineral oil, contains green vitreol and 14 plant drugs, including the Lāṅgalī rhizome, in equal proportions. Used externally for piles.

Mahāvishagarbha Taila (Bhaishajya Ratnāvali), a herbo-mineral oil, contains 44 plant drugs, including Kalihari, in equal proportions. It has a total of 71 constituents. Used for nervous diseases, sciatica, rheumatic afflictions, and quadriplegia.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

125–250 mg of purified drug.

For purification, Lāṅgalī root is soaked in cow's urine for 24 hours, then washed and dried (AFI, Part I). It is a source of colchicine, used in the treatment of gout and rheumatism.

Reported colchicine content in the tuber: from Sri Lanka 0.3%, and from the Amritsar market 0.03%. Total alkaloidal content from Mumbai market 0.1%.

Alkaloid content is likely to be much higher if the tuber is collected at a proper time and stored properly.^{2(a)}

Glycyrrhiza glabra Linn.

Yaṣṭī

BOTANICAL SOURCE(S)

Glycyrrhiza glabra Linn.

(Fam. Leguminosae)

A number of plant drugs were used as a substitute for Madhuyashti during the classical period.^{16(b)}

Possible substitutes for *G. glabra* root during classical period:

The root of *Abrus precatorius*, known as Indian licorice (contains glycyrrhizin).

Taverniera cuneifolia Arn.

Syn. *T. nummularia* Baker (plains of Punjab, Gujarat, and the Deccan peninsula) was known as Jetimad in Mumbai (common names of Yashtimadhu are Jethi Madh in Gujarat, Jeshta Madha in Maharashtra, and jashtimadhu in Bengal).^{2(a),16(b)}

PHARMAPOEIAL AYURVEDIC DRUG

Yaṣṭī (Root).

API, Part I, Vol. I.

International Pharmacopoeial name: Liquiritiae radix,⁸

Glycyrrhizae radix.

AYURVEDIC SYNONYMS

Yaṣṭimadhūka, Yaṣṭikā, Madhūka*, Madhuyasṭī, Yaṣṭyāhvā

Madhuka³ is the correct synonym. Madhūka* is equated with *Madhuca indica*.³

Klitaka is a confusing and unidentified synonym of aquatic species of *G. glabra*. Seeds of Klitaka were used during 1000 BC. The root was included among poisonous roots.^{16(b)}

HABITAT

Cultivated in Europe, Persia, Afghanistan and to a little extent in some parts of India.

Glycyrrhiza: 18 species occur in the Eurasian region.¹ None of the species occur in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Liquorice root;

Assam: Jesthimadhu, Yeshtmadhu;

Beng: Yashtimadhu;

Guj: Jethimadha, Jethimard, Jethimadh;

Hindi: Mulethi, Mulathi, Muleti, Jethimadhu, Jethimadh;

Kan: Jestamadu, Madhuka, Jyeshthamadhu, Atimadhura;

Kash: Multhi;

Mal: Irattimadhuram;

Mar: Jesthamadh;

Ori: Jatimadhu, Jastimadhu;

Punj: Jethimadh, Mulathi;

Tam: Athimadhuram;

Tel: Atimadhuramu;

Urdu: Mulethi, Asl-us-sus.

CONSTITUENTS

Glycyrrhizin, glycyrrhizic acid, glycyrrhetinic acid, asparagine, sugars, resin and starch.

Triterpenoid saponins (4%–24%), mostly glycyrrhizin, and a mixture of potassium and calcium salts of glycyrrhizic acid; flavonoids (1%), mainly the flavonones liquiritin and liquiritigenin, chalcones, isoliquiritin, isoliquiritigenin, and isoflavonoids (formononetin); amines (1%–2%) asparagine, betaine, and choline; amino acids; 3%–15% glucose and sucrose; starch (2%–30%), polysaccharides, sterols, coumarins, resin, and volatile oils (0.047%).⁹

THERAPEUTIC AND OTHER ATTRIBUTES

Kāsa, Svarabheda, Kṣaya, Vraṇa, Vatarakta

Used for cough, hoarseness of voice, phthisis/chest diseases, ulcers, and gout (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) prescribed Madhuka as an aphrodisiac and intellect-promoting tonic; the

paste of Madhuyashti with Katukā (*Picrorhiza kurroa*) was used as a cardiac tonic. Sushruta (1000 BC) prescribed a decoction of Madhuka or its powder in anemia, and a paste of yashti-madhu in intrinsic hemorrhage.

In Bhāvaprakāsha (sixteenth century), Yashi was an ingredient in 23 compounds, Yashtimadhu in 7 compounds and Yashtyāhva in 16 compounds.³

IMPORTANT FORMULATION/ APPLICATIONS

Elādi Gutikā (Bhaishajya Ratnāvali, seventeenth century). Madhuka root is among 8 plant drugs. For cough, asthma, hoarseness of voice, vomiting. Yashtimadhuka Taila (Shārangadhara Samhitā, thirteenth century) contains only two plant drugs, yashtimadhu root and Āmalika fruit juice. Used for loss of hair and gray hair. Madhuyashtyādi Taila (Ashtāngahridaya, seventh century) contains Madhyashti root

as the main drug, with 29 supporting herbs. Prescribed with milk or warm water in fever, burning sensation and gout.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–4 g of the drug in powder form.

About 5–15 g of root, equivalent to 200–600 mg of glycyrrhizin per day.⁸

Deglycyrrhizinated licorice (DGL) tablets (380 mg DGL, 4:1). Used for acute cases of duodenal or gastric ulcers: chew two to four tablets before each meal. In chronic cases, chew one to two tablets before meals.⁹

Prolonged use (>6 weeks) of excessive doses (>50 g/day) can lead to pseudo-aldosteronism, which includes potassium depletion, sodium retention, edema, hypertension, and weight gain (WHO).¹⁰⁽¹⁾

G

Gmelina arborea Linn. Stem, stem bark Gambhārī

BOTANICAL SOURCE(S)

Gmelina arborea Linn.
(Fam. Verbenaceae)

G. asiatica Linn. is used as a substitute in Kerala.^{3,36}

PHARMACOPOEIAL AYURVEDIC DRUG

Gambhārī (Stem bark).

API, Part I, Vol. IV.

Gambhārī (stem).

API, Part I, Vol. III.

Lignan gmelinol should be used as a marker of bark to achieve the quality standard of the raw drug and to distinguish it from adulterants.

AYURVEDIC SYNONYMS

Kasmari, Kasmarya, Sriparni.

Sarvatobhadra, Kṛṣṇa vṛntikā, Kambhārī, Hīrā Kāshmarī, Bhadra Parṇikā.⁴

Sriparni is also equated with *Trewia nudiflora* Linn.³

HABITAT

Mostly found in Southern Peninsula and up to Kashmir.

Planted in gardens and avenues.

Occurs naturally in Myanmar, Thailand, Laos, Cambodia, Vietnam, and Southern provinces of China.

REGIONAL LANGUAGE NAMES

Eng: Candhar tree;

Assam: Gamari;

Beng: Gamar;

Guj: Shivani hannu, Shewan;

Hindi: Gambhar khambhari;

Kan: Shivani, Shivanigida;

Mal: Kumizhu, Kumbil, Kumpil, Kumizhin;

Mar: Shivan;

Ori: Gambhari,
Punj: Gumhar, Kumhar;
Tam: Nilakumizh;
Tel: Peggumudu, Peggumaddi.

Trade: Gumhar.^{2(a)}

CONSTITUENTS

Alkaloids, in traces.

G Bark: the diethyl ether-soluble fraction yielded tryosol [2-(4-hydroxyphenyl) ethanol]; (+)-bal-anophonin, 8, 5'-neolignan and gmelinol, a known lignan.

The ethyl acetate-soluble fraction afforded a new phenylethanoid glycoside. From the methanol extract, two known compounds, 2, 6-dimethoxy-*p*-benzoquinone and 3, 4, 5-trimethoxyphenol were isolated and identified.¹³⁷

Gmelinol was not reported previously in stem bark.

Stem: lignans.

Lignans reported from the heart wood, stem, and root include paulownin, gmelanone, arboreol, and gmelinol.^{20(k)}

THERAPEUTIC AND OTHER ATTRIBUTES

Stem bark: Sula, Arsa, Jvara, Raktapitta, Trsna, Bhrama, Sotha

Used for colic, piles, fever, bleeding disorders, thirst, vertigo, and inflammation (therapeutic uses based on texts from 1000 BC to sixteenth century).

Stem: Sopha, Jwara, Dāha, Tr̥ṣṇā, Raktadosa, Viṣavikara, Arśa, Raktapitta, Brahma, Soṣa, Ama śūla.

Used for edema, fever, burning syndrome, thirst, disorders of the blood, piles, hemorrhagic disorders, vertigo, emaciation, and colic (therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Chandanāsava (Bhaishajya Ratnāvali, seventeenth century), contains 22 plant drugs in equal proportion; Gambhari stem bark is one of them. Used for dysuria and cystitis.

Dantyaṛishta (Ashtāngahridaya, seventh century) contains 15 plant drugs, including Gambhāri root/stem bark, all in equal proportions. Used for malabsorption syndrome.

Ushirāsava (Bhaishajya Ratnāvali) contains Kāśhmarya stem bark with 25 other plant drugs. Used for bleeding disorders.

Karpurādi Kuzambu: not in the AFI.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–5 g.

Alcoholic extract of the stem bark showed anti-inflammatory activity comparable to phenylbutazone.^{2(c)} 3, 4, 5-trimethoxyphenol exhibited moderate free radical-scavenging activity.¹³⁷

Gmelina arborea Roxb.

Root

Gambhārī

BOTANICAL SOURCE(S)

Gmelina arborea Roxb.
(Fam. Verbenaceae)

G. asiatica Linn. is used as a substitute in Kerala.^{3,36}

PHARMACOPOEIAL AYURVEDIC DRUG

Gambhārī (Root, Root bark).

API, Part I, Vol. I.

Root is used as a constituent of *Mahat Panchamula*, and was used in all “*Dashamula*” preparations of Ayurveda. AFI, Part I, Second

edn. approved the stem bark as a substitute for the root. Today, the impact of this variation is not known.

AYURVEDIC SYNONYMS

Kāśmarī, Kāśmarya.

Sarvatobhadra, Kṛṣṇa vṛntikā, Kambhārī, Hirā Kúshmarī, Bhadra Parṇikā.⁴

Sriparni is also equated with *Trewia nudiflora* Linn.³

HABITAT

The lower Himalayas, the Nilgiris and the East and West Coasts of India.

Planted in gardens and avenues.

Occurs naturally in Myanmar, Thailand, Laos, Cambodia, Vietnam, and Southern provinces of China.

REGIONAL LANGUAGE NAMES

Eng: Candhar tree;

Assam: Gumari;

Beng: Gambhar, Gamar;

Guj: Shivan;

Hindi: Ganbhar, Khambhari;

Kan: Shivanigida, Shivani;

Kash: Kashmiri;

Mal: Kumizhu, Kumpil;

Mar: Shivan;

Ori: Ganbhari;

Punj: Gumhar, Kumhar;

Tam: Kumishan, Kumizhan;

Tel: Peggummudu, Peggummadi

Trade: Gumhar.^{2(a)}

CONSTITUENTS

Alkaloids and lignans (arboreol, isoarboreol and related lignans)

Root yielded gmelofuran-a, furanosesquiterpenoid, sesquiterpene, cerylalcohol,

hentriacontanol-1, beta-sitosterol, *n*-octacosanol and gmelinol.²⁵

An apiose containing coumarin glycoside, umbelliferone-7-apiosylglucoside was reported from the methanolic extract of root.^{20(k)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Trṣṇā, Dāha, Arśa, Śoṭha

Used for fever, thirst, burning sensation, piles, and inflammation (therapeutic uses based on Rāja Nighantu, fourteenth century).

Root is a bitter tonic, stomachic, laxative, and galactagogue.

Prescribed in indigestion, fevers and anasarca in the form of an infusion or decoction. Applied locally for gout.^{2(a),15}

IMPORTANT FORMULATION/ APPLICATIONS

Dashamūlārishta (Sharangadhara Samhitā, thirteenth century), Dashmūla Haritaki (Ashtāngahridaya, seventh century), Dashmūla Ghrita (Ashtāngahridaya), and Dashmūla Shatapalaka Ghrita (Chakradatta, eleventh century). All these compounds contained the ten specific roots (Dashmūla), a specific group of Ayurveda for a synergistic action. But in AFI, Part I, Second Rev. edn. in 2003, stem barks have been allowed as substitutes for the five larger roots and plants for the five lesser roots. Thus the specific Dashmūla group of Ayurveda and their compounds, also their classical attributes, stand almost expired. A fresh validation is required.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–30 g of the drug for decoction

G

Gmelina arborea

Robx

Fruit

Gambhārī

BOTANICAL SOURCE(S)

Gmelina arborea Robx
(Fam. Verbenaceae)

G. asiatica Linn is used as a substitute in Kerala.^{3,36}

PHARMACOPEIAL AYURVEDIC DRUG

Gambhārī (Fruit).

API, Part I, Vol. II

AYURVEDIC SYNONYMS

Kāśmari, Kāśmarya, Pītakarohiṇī, Sripaṇī, Bhadrapaṇī.

Sarvatobhadrā, Kṛṣṇa vṛntika, Kambhārī, Hirā Kūshmari, Bhadra Paṇikā.⁴

Sripaṇi is also equated with *Trewia nudiflora* Linn.³

HABITAT

Deciduous forests up to an altitude of 500 m, also as an avenue tree.

Planted in gardens and avenues.

Occurs naturally in Myanmar, Thailand, Laos, Cambodia, Vietnam, and Southern provinces of China.

REGIONAL LANGUAGE NAMES

Assam: Gomari;
Beng: Gamargachha, Gambar;
Guj: Seevan;
Hindi: Gambhari;
Kan: Seevani, Shivani, Hannu;
Mal: Kumbil, Kumizhu;
Mar: Sivan;
Ori: Gambhari, Bhodroparṇi;
Punj: Khambhari;
Tam: Perunkurmizh, Komizhpazham;
Tel: Gumaditeku;
Urdu: Gambhari.

Trade: Gumhar.^{2(a)}

CONSTITUENTS

Butyric acid, Tartaric acid, Alkaloid, Resin and Saccharine.

In a Nigerian study, matured fruits gave the following amino acids and minerals: arginine 4.29, histidine 2.96, isoleucine 3.08, leucine 4.13, lysine 3.66, cysteine 2.64, methonine 3.81, tyrosine 4.23, tryptophan 4.13, phenylalanine 3.4, and theronine 3.91 g/100 g; zinc 1.54, copper 0.47, iron 5.71, magnesium 32.9 and calcium 22.77 mg/100 g.¹³⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Rakta pitta, Dāha, Tṛṣṇā, Kṣata, Kṣaya, Mūtrakṛcchra, Hṛdroga

Used for bleeding disorders, burning sensation, thirst, wound, phthisis, dysuria, and heart disease (therapeutic uses based on texts from 1000 BC to sixteenth century). For stem, see stem bark.

In Charaka Samhitā, the fruits were included in the laxative and heat-pacifying group, and were used in *phatāsava* (fermented wine). Sushruta included fruits in rejuvenating tonics and diuretics. Ripe fruits were used as a substitute for Drākshā (*Vitis vinifera* fruits).¹³⁰

Diarrhea, bleeding piles, and intrinsic hemorrhages were treated with prescriptions containing fruits (Charaka Samhitā, 1000 BC; Ashtāngahridaya, seventh century; Chakradatta, eleventh century). For urticaria, dried ripe fruits, cooked with cow’s milk, were given (Rāja Mārttanda, Chakradatta, eleventh century).

A decoction was used in fevers and biliary affections.¹⁵ The extract is anthelmintic.¹³⁹

IMPORTANT FORMULATION/ APPLICATIONS

Arvindāsava (Bhaishajya Ratnāvali, seventeenth century), contains 24 plant drugs in equal proportion, Gambhari fruits are one of them. A general tonic for children.

Drākshādi Kvātha Churna (Ashtāngahridaya, seventh century) contains 17 plant drugs in equal proportions. Used for overintoxication, vomiting, syncope, and vertigo.

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–3 g of the drug in powder form.

The fruit powder at 0.5 g/animal/d p.o. dose to normal rabbits exhibited anabolic activity.^{20(k)}

Gossypium herbaceum Linn.

Kārpāsa

G

BOTANICAL SOURCE(S)

Gossypium herbaceum Linn.
(Fam. Malvaceae)

Syn. *G. wightianum* Tod.^{20(k)}
Gossypium arboreum Linn. (CCRAS).²⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Kārpāsa (Seed).

API, Part I, Vol. I.

Karpasi has been accepted as a synonym of Karpasa. Karpasini of classical texts have been equated with *Thespesia lampas* Dalz & Gibs or *Hibiscus cancellatus* Roxb., popularly known as Vana (wild) Kapasa.³⁰

AYURVEDIC SYNONYMS

Tuṇḍakeśī.

Samudrāntaka, Kārpāsi.^{20(k)}

HABITAT

Extensively cultivated in India.

The species occur in Western India, Africa, Middle Eastern countries and Central Asia.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Bona, Kapasia;
Assam: Karpasa, Tula;
Beng: Cotton plant seed;
Hindi: Kapasa, Binaula;
Kan: Hati, Arale;

Mal: Karpasi, Panji Karpasam;
Mar: Sarki;
Tam: Parutti kkoottam;
Tel: Patti ginga;
Urdu: Pambadana, Habb-ul-Qutn.

Eng: Asiatic cotton, Levant cotton,³² Uppam cotton.^{2(c)}

CONSTITUENTS

Fixed oil, resin and sterols

Fixed oil 13.1%–24.5%.^{2(a)} Seeds contain cyclopropenoid fatty acids (malvalic acid), ascorbic acid, gibberellic acid, and flavonoids gossypetin-7-O-glucoside, gossypetin-8-O-glucoside, quercetin-3-O-glucoside, quercetin-3-O-rhamnoglucoside, quercetin-7-O-glucoside, kaempferol-3-O-glucoside, kaempferol-3-O-rhamnoglucoside, and herbacetin-7-glucoside. Seed hulls gave leucodelphihidin.²⁵

The principal pigment is gossypol (0.4%–2.0%); other pigments include gossypurpurin and gossyacerulin.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Śrama, Bhrānti, Mūrcchā, Stanyakṣya

Used for burning sensation, lethargy, confused mental state, syncope, and laxity of breasts (therapeutic uses based on fourteenth to sixteenth century texts).

A paste of tender fruits of Kārpāsa was given with milk for 1 week during the menstrual period to women desiring sterility (Vaidya Manorama, thirteenth century). Oil cooked with Kārpāsa and Kullatha (Horsegram) seeds

was prescribed as a massage oil in rheumatic affections (Charaka Samhita, 1000 BC). Kārpāsā seeds and Ashvagandha were smoked for treating cough (Charaka Samhitā).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Kārpāsādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains Kārpāsa seed endosperm among 4 main and 11 supporting plant drugs.

Used for rheumatic afflictions, paralysis, and hemiplegia.

Gossypol is a male contraceptive. It also assists menstrual flow and effectively inhibits egg implantation.^{2(c)} Experimentally, it is abortifacient and teratogenic.³¹

Gossypol and its derivatives exhibit anti-microbial and wound-healing activities. It is reported to kill herpes virus.^{2(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Studies on gossypol's contraceptive effect on men were started in the early 1970s in China. By 1980, more than 8000 men in mainland China had been treated with gossypol and two other forms of the compound.⁹

For male contraception, 15–20 mg (gossypol) is typically used for 12–16 weeks, followed by a maintenance dose of 7.5–10 mg per day.¹³

The serum concentration of gossypol needed to reduce sperm count is about 132 mg/mL.¹³

In women who consume gossypol, the uterus may decrease in size and amenorrhea may occur. Gossypol is used in uterine myoma, endometriosis, and dysfunctional uterine bleeding.¹³

Grewia tenax (Forsk.) Aschers & Schwf.

Gāṅgeru

BOTANICAL SOURCE(S)

Grewia tenax (Forsk.) Aschers & Schwf.
Syn. *Grewia populifolia* Vahl
(Fam. Tiliaceae)

G. tenax (Forsk.) Fiori.^{20(k)}

PHARMACOPOEIAL AYURVEDIC DRUG

Gāṅgeru (Stem bark).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Gāṅgeruki.

Nāgabalā.³

Sida veronicaefolia Lam. is equated with Nāgabalā (AFI).

Gāṅgeruki was included in the group of medicinal fruits of Charaka and Sushruta, which were

used for their sweet, astringent, cooling, and styptic properties.¹³⁰

HABITAT

North Western and central part of India and in Deccan Peninsula.

Nearly 40 species of *Grewia* are found in India.¹⁴⁰

REGIONAL LANGUAGE NAMES

Beng: Garakshachakule;

Guj: Gangeti;

Hindi: Gangeran;

Kan: Turuve;

Mal: Oorakam;

Mar: Gangeti;

Ori: Ghodaguli;

Punj: Ganger;

Tam: Achchu;

Tel: Gangeruki;

Urdu: Gangeran.

CONSTITUENTS

Sugar, Tannin and Sterols (Triacontan-1-ol, alpha-amyirin, beta-amyirin etc.).

Stem contained beta-sitosterol, alpha- and beta-amyirin and faradiol. The presence of proline, serine, glutamic acid, phenylalanine, isoleucine, and lysine has been reported.^{20(k)}

Stem bark is reported to contain taraxasterol, erythrodiol, lupenone, betulin, alpha-amyirin, and beta-amyirin.^{2(d)}

Leaves yielded triacontanol, tetratriacont-21-ol-12-one, and beta-sitosterol.¹⁴⁰

THERAPEUTIC AND OTHER ATTRIBUTES

Vraṇa, Pittavikāra

Used for ulcers and dysentery (therapeutic uses based on texts from 1000 BC to sixteenth century).

The mucilage of the bark is reported to possess bactericidal activity and is used in the treatment of tuberculosis in hilly areas.

The crude alcoholic extract did not show anti-tubercular activity.^{20(k)}

IMPORTANT FORMULATION/ APPLICATIONS

Jirakādi Modaka (Bhaishajya Ratnāvali, seventeenth century), contains cumin and Indian hemp seeds as main drugs, with 44 supporting components, including Gangeru stem bark, in equal proportion. For diarrhea, dysentery, ulcerative colitis.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–3 g of the drug in powder form.

Decoction of wood is given in cough and as an analgesic.

In Sudan, the roots are used for curing skin diseases.

A light porridge prepared with fruits is given to lactating mothers. Fruits are made into a fermented drink in Sudan and South Africa. The fruit is rich in iron content and is used in anemia.

The ethanolic extract of aerial parts was found to exhibit CNS-depressant activity.¹⁴⁰

G

Gymnema sylvestre R. Br.

Leaf

Meṣaśṛngī

BOTANICAL SOURCE(S)

Gymnema sylvestre R. Br.
(Fam. Asclepiadaceae)

Meṣaśṛngī is equated with *G. sylvestre*. Kerala physicians use different plants as the source of Viśhāṇikā: *Vallaris solanacea* (Roth) Kunize, *Cryptolepis buchanani* Roem. & Schult., *Aristolochia bracteolata* Ham. and *Dolichandrone falcata* (DC.) Seemann.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Meṣaśṛngī (Leaf).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Madhunāśinī, Ajāśṛngī.

Madhunāśini is a Malayalam common name.

Meshavalli, Sarpadaṁśhtrā, Ajashrgikā.

Synonyms of another variety: Dakshiṇāvartī, Vṛshikālī and Viśhāṇikā.⁴

HABITAT

Throughout India in dry forests up to 600 m.

Mainly present in the tropical forests of Central and Southern India. Also found in Western Ghats.

Distributed in Sri Lanka, Malaysia, Australia, Indonesia, Japan, Vietnam, tropical Africa and the Southwestern regions of China.¹⁴¹

REGIONAL LANGUAGE NAMES

Eng: Periploca of the wood;
 Beng: Medhasingi;
 Guj: Kaavalee, Medhasinge;
 Hindi: Gudmaar, Medhaa singee;
 Kan: Kadhasige;
 Mal: Cakkarakkolli, Madhunaashini;
 Mar: Kaavalee, Medhaashingi;
 Tam: Shirukurum kaay, Shakkarakkolli;
 Tel: Podapatro.

Eng: Periploca of the woods, *Periploca sylvestris*.

CONSTITUENTS

Triterpenoid saponins of gymnemic acid A, B, C and D with sugar-residues such as glucuronic acid, galacturonic acid, ferulic and angelic acids attached as carboxylic acids. Several isopropylene derivatives of gymnemagenin, a hexahydroterpene, gymnemagenin, gymnemic acid. The leaves also contain betaine, choline, gymnamine alkaloids, inositol, d-quercitol. Hydrocarbons such as nonacosane, hentriacontane, tritriacontane, pentatriacontane, phytin, resin, tartaric acid, formic acid, butyric acid, amino acids such as leucine, iso-leucine, valine, alanine, γ -butyric acid.

Oleanane saponins are gymnemic acid and gymnemasaponins; dammarene saponins are gymnemasides.¹⁴¹

Gymnemic acid: shoot tips 54.29 mg/g dw, nodes 28.82 mg/g dw, leaves 27.67 mg/g dw, and internodes 25.39 mg/g dw.¹⁴²

THERAPEUTIC AND OTHER ATTRIBUTES

Śvāsa, Kāsa, Śula, Kuṣṭha, Prameha, Krmi, Vrana, Śopha, Arś, Hṛdroga, Dantakṛmi, Netraroga

Used for asthma, cough, colic, obstinate skin diseases, urinary disorders/polyuria, worm infestations, ulcers, edema, cardiopathy, dental caries, and eye diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

Attributes and compounds, quoted in the API, represent the classical usage. As the profile of the drug has changed, the validated findings and

their applications in Ayurvedic medicine should be endorsed by CCRAS.

First scientific confirmation of the use of *G. sylvestre* in diabetes: KG Charpurey, Indian Medical Gazette, New Delhi, 1926; 155.¹⁴¹
 (See also Reference 143.)

IMPORTANT FORMULATION/ APPLICATIONS

Ayaskṛti (Ashtangahridaya, seventh century), contains 23 plant drugs of Asanādi group, including Meshashringi leaf, with 25 supplementary drugs and iron. For diabetes, anemia, chronic dysentery.

Nyagrodhādi Chūrna (Yogarātnākara, sixteenth century) contains 28 plant drugs in equal proportions; the Meshashringi plant is one of them. Used for dysuria, polyuria, and diabetic carbuncle.

Mahāvishagarbha Taila (Bhaishajya Ratnāvali, seventeenth century) contains 72 herbo-mineral drugs. Used as a massage oil for diseases of the nervous system.

Mṛtasanjivani Surā (Bhaishajya Ratnāvali) contains 44 constituents. Meshii plant is a minor secondary herb.

(An anti-diabetic and hypolipidemic profile of the herb is not represented in the quoted compounds.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

In the anti-diabetic and anti-obesity category, a number of patents have been filed.¹⁴³

It is widely used in Indian proprietary, polyherbal compounds.

In the U.S., 250-mg capsule, containing whole phytocomplex concentrate, standardized to 4.5% gymnemasaponins, yielding 11.25 mg per capsule, and, the extract standardized to 25% gymnemic acid are available.¹³

LD₅₀ of ethanolic and water extract of *G. sylvestre* i.p. in mice was found to be 375 mg/kg.¹⁴¹
 Pediatric use is not recommended.¹⁴¹

Gymnema sylvestre R. Br.**Root****Meṣaśrngī****BOTANICAL SOURCE(S)**

Gymnema sylvestre R. Br.
(Fam. Asclepiadaceae)

Meṣaśrngī is equated with *G. sylvestre*. Kerala physicians use different plants as the source of Vishāṇikā: *Vallis solanacea* (Roth) Kunze, *Cryptolepis buehneri* Roem. & Schult., *Aristolochia bracteolata* Ham. and *Dolichandrone falcata* (DC.) Seemann.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Meṣaśrngī (Root).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Madhunāśinī, Ajāśrngī.

Madhunāśini is a Malayalam common name. Meshavalli, Sarpadaṁshtrā, Ajashrgikā.

Synonyms of another variety: Dakshināvarti, Vṛshikāli and Vishāṇikā.⁴

HABITAT

Throughout India in dry forests up to 600 m.

Mainly present in the tropical forests of Central and Southern India. Also found in Western Ghats.

Distributed in Sri Lanka, Malaysia, Australia, Indonesia, Japan, Vietnam, tropical Africa and Southwestern regions of China.¹⁴¹

REGIONAL LANGUAGE NAMES

Eng: Periploca of the wood;

Beng: Medhasingi;

Guj: Kaavalee, Medhasinge;

Hindi: Gudmaar, Medhaa singee;

Kan: Kadhasige;

Mal: Cakkarakkolli, Madhunaashini;

Mar: Kaavalee, Medhaashingi;

Tam: Shirukurum kaay, Shakkaraiikkolli;

Tel: Podapatro.

Eng: Periploca of the woods, *Periploca sylvestris*.

CONSTITUENTS

Not quoted in API.

The chloroform extract of the root has shown to have eicosane, oleic acid, stigmaterol, and vitamin E.¹⁴⁴

Gymnemic acid content in the root:

20.56 mg/g dw (in the leaves, 27.67 mg/g dw).¹⁴²

The root extract showed promising radical-scavenging activity with a minimum inhibition of 81.3%. The ethanolic root extract showed antifungal activity against *Aspergillus niger* and *Aspergillus fumigata*. The extract also showed anthelmintic activity.¹⁴⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Prameha, Kāsa, Kṛmiroga, Vraṣa, Viṣavikāra, Mūtrakṛcchra, Śvāsa, Hṛdroga, Raktavikāra, Dāha, Akṣiśūla, Vidradhi, Vātahara

Used for obstinate skin diseases, urinary disorders/polyuria, cough, worm infestations, ulcers, toxemia, dysuria, asthma, cardiopathy, blood disorders, burning sensation, eye pain, abscesses, and neurological diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

The juice of the root is given to treat vomiting and in dysentery.¹⁴¹ In Tanzania, pounded and cooked roots are given to treat epilepsy. In Botswana, pounded and cooked roots or root powder are applied to treat boils.

IMPORTANT FORMULATION/ APPLICATIONS

Mahāvishagarbha Taila (Bhaishajya Ratnavali, seventeenth century), contains Meshashringi leaf (not the root or plant).

Nyagrodhādi Chūrna (Yogarātnākara, sixteenth century) contains 28 plant drugs in equal proportions; the Meshashringi plant is one of them. Used for dysuria, polyuria, and diabetic carbuncle.

Mrtasanjivani Surā (Bhaishajya Ratnāvali) contains 44 constituents. Meshī plant is a minor secondary herb.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

50–100 mL decoction. 1–2 powder.

As the root and other plant parts also contain gymnemic acid contents (shoot tips 54.29 mg/g dw, flowers 31.66 mg/g dw, nodes 28.82 mg/g dw, internodes 25.39 mg/g dw and seeds 1.31 mg/g dw), the entire plant is a better option for further research into a potential anti-diabetic and hypolipidemic drug.

BOTANICAL SOURCE(S)

Habenaria intermedia D. Don
(Fam. Orchidaceae)

Habenaria spp. (*H. intermedia*, *H. acuminata* Thw. and *H. goodyeroides* D. Don.) are collected in the Dehradun region and used as Riddhi-Vriddhi.

Habenaria edgeworthii Hook. f. ex Collett. and *H. intermedia* are used in Kerala as Riddhi-Vriddhi.^{29,30}

PHARMACOPOEIAL AYURVEDIC DRUG

Riddhi (Dried tuber).

API, Part I, Vol. V.

The Riddhi-Vriddhi pair is a constituent of *Ashta varga*.

Substitute drug: *Dioscorea bulbifera* Linn. (AFI).

AYURVEDIC SYNONYMS

Aśvāsini.

HABITAT

Temperate Himalayas up to 2000 m.

It is an orchid.

Found throughout temperate Himalayan regions, including Meghalaya.²⁰⁽¹⁾

REGIONAL LANGUAGE NAMES

Riddhi-dwaya: Riddhi-Vriddhi.

Eng: Divine herbs.

Belongs to the *Ashta varga*, the “Eight Tonic Herbs”.

CONSTITUENTS

Not quoted in API.

Scopoletin and gallic acid are marker compounds of the tuber.¹⁴⁶

Scopoletin, a coumarin component, exhibits anti-convulsant, anti-oxidant, anti-microbial, and hypotensive activities. Gallic acid possesses a wide range of biological activities, such as being an anti-oxidant and being cytotoxic.

THERAPEUTIC AND OTHER ATTRIBUTES

Kṣaya, Raktavikāra, Jvara, Mūrcchā

Used for phthisis, diseases due to vitiated blood, fever, and syncope (therapeutic uses based on texts from the twelfth to fourteenth centuries).

The *Ashta varga* was used in classical compounds for its cooling, spermatopoetic, and nourishing properties. It alleviates vitiated blood and consumption; promotes lactation and conception.⁴

H. intermedia tuber extracts exhibited protective effects against acute and chronic physical and psychological stress paradigms in rats.¹⁴⁶

IMPORTANT FORMULATION/ APPLICATIONS

Amritaprāsha Ghrita (Ashtāṅgahridaya, seventh century), Dashmūlārishta (Sharangadhara Samhitā, thirteenth century), Ashoka Ghrita (Bhaishajya Ratnāvali, seventeenth century), Chāgalādyā Ghrita (Bhaishajya Ratnāvali). All the compounds contain the *Ashta varga* for its revitalizing properties.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Hedychium spicatum Ham. ex Smith

Śaṭī

BOTANICAL SOURCE(S)

Hedychium spicatum Ham. ex Smith
(Fam. Zingiberaceae)

Syn. *H. album* Buch.-Ham. ex Wall.

Rhizome of *Hedychium coronarium* Koenig is the most common adulterant.³⁶

H. spicatum (a Himalayan plant) is not available in South India. *Curcuma zedoaria* Roscoe is used as Śaṭī.^{5,6} *Kaempferia galanga* Linn. is used as a substitute.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Śaṭī (Rhizome).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Śaṭhī, Gandhamūlikā.

Nishāchhada, Palashā, Haridrāchhadana.³⁰

Palāshi, Shadgranthā, Suvratā, Gandhamūkubū.⁴

HABITAT

In parts of western and central regions of sub-tropical Himalayas at an altitude of 1500–2000 m, grows abundantly in Kumaon and Punjab.

Himalayan species *H. gardnerianum* is known as Kahiliginger.¹ *H. coronarium* Koenig is the common Ginger Lily and *H. flavum* Roxb. is the Yellow Ginger Lily.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Spiked ginger lily;

Assam: Katuri, Sati;

Beng: Shati, Kachri;

Guj: Kapurkachri, Kapurkachali;

Hindi: Kapurkachri;

Kan: Goul Kachora, Seenakachora, Kachora;

Kash: Kapoorkachara;

Mal: Katcholam, Katchooram;

Mar: Kapurakachari, Gablakachari;

Ori: Gandhasunthi;

Punj: Kachur, Kachoor;

Tam: Poolankizangu, Kichili Kizongu;

Tel: Gandha Kachuralu.

Eng: Camphor zedoary (in South India).

CONSTITUENTS

Essential oil.

Essential oil 0.2%–4%;^{2(a,d)} contains ethyl ester of *P*-methoxy cinnamic acid 67.8%; ethyl cinnamate 10.2%; *D*-sabinene 4.0%–4.2%; 1, 4-cineole 6%; sesquiterpene alcohols 4.7%, and traces of cinnamaldehyde.^{2(a)}

Rhizome contains several anti-inflammatory principles including the diterpenes hedychenon, 7-hydroxy hedychenon, and 6-oxo-labda-7, 11, 13-triene, 16-oic lactone.^{2(d),15}

THERAPEUTIC AND OTHER ATTRIBUTES

Kāsa, Śvāsa, Mukharoga, Śūla, Chardi, Kaṇḍu

Used for cough, asthma, orolingual diseases, colic, emesis, and pruritus (therapeutic uses based on a text of the sixteenth century).

Powder of Śaṭī and dried ginger, *Inula racemosa* (Pushkarmula) and Āmalaka fruit, with honey, used for bronchial asthma (Charaka Samhitā, 1000 BC; Ashtangahridaya, seventh century).

Paste of Śaṭī and dried ginger with a decoction of *Boerhaavia diffusa* (Punarnavā) used for rheumatism (Vrindamadhava, eighth century; Bhāvaprakāsha, sixteenth century).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Agastya Haritaki Rasāyana (Ashtangahridaya, seventh century), contains 20 plant drugs in equal proportion, Śaṭī rhizome is one of them. For chronic bronchitis, asthma, cold.

Śatyādi Churna (Charaka Samhita, 1000 BC, not in the AFI) contains Śaṭī, *trikatu* (the Three Pungents) and long pepper roots as the main drugs. Used for asthma.

In a clinical trial, the rhizome gave encouraging results in pulmonary eosinophilia.^{33(b)} The essential oil inhibited the growth of several fungi. The dried roots showed anti-bacterial and anti-malarial activity.^{2(c)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–3 g of the drug in powder form.

LD₅₀ of the 50% ethanolic extract of the rhizome was found to be >1000 mg/kg i.p. in mice.²⁰⁽¹⁾

Heliotropium indicum L.

Hastiśuṇḍī

BOTANICAL SOURCE(S)

Heliotropium indicum L.
(Fam. Boraginaceae)

Used as Vṛśchikālī in South India.⁵ Vṛśchikālī is equated with *Tragia involucrata* Linn. in the AFI. *Tragia* is used as Durālabhā in South India. (Durālabha is equated with *Fagonia cretica* Linn. in the AFI.)

PHARMACOPOEIAL AYURVEDIC DRUG

Hastiśuṇḍī (Aerial part).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Bhūraṇḍī, Śrīhastini, Aśmariripu, Mahāśuṇḍī.

Chanchu-phala (Ashtāngahridaya, seventh century).³⁰

Vishṇūnika (see API quoted text, second *śloka* of Madanpāl Nighantu, fourteenth century) is a different drug that is as-yet unidentified. In practice, *Dolichandrone falcata*, *Vallisneria spiralis*, *Cryptolepis buchanani*, and *Aristolochia bracteolata* are used in different places.

HABITAT

Throughout the hotter parts of India along roadside and on waste lands.

REGIONAL LANGUAGE NAMES

Eng: Indian turnsole;
Ben: Haathishundaa;

Guj: Haathisudhaan;
Hindi: Haathisuondha, Haathisundha;
Kan: Chelubaalad a gida;
Mal: Telkkat, Terkkat, Tekkit;
Mar: Bhurundi;
Tam: Telkodukkai;
Tel: Kodikki, Naagdanti.

Eng: Heliotrope.¹⁵

CONSTITUENTS

Pyrrolizidine alkaloids (heliotrine, indicine N-oxide), tannins.

Indicine, indicine-N-oxide, indicinine, 3'-acetylindicine, and lycopsamine (maximum at the onset of flowering).

Alkaloid content (dry basis): inflorescences 1.50%; roots 0.49%; fruits 0.30%; leaves 0.20% and stems 0.14%.

In flowers, indicine, and in the roots, 3'-acetylindicine are dominant alkaloids.^{2(c)}

From *n*-butanol crude extract, two alkaloids, pestalamide B and glycineamide, N-(1-oxo octadecyl) glycyl-L-alanylglycyl-L-histidyl, were isolated for the first time.¹⁴⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Sannipātajvara (high fever due to vitiation of all *doṣas*), śūla (pain/colic). Used as single drug.

Therapeutic uses based on texts from the fourteenth to fifteenth centuries.

Indicine-N-oxide along with cytotoxic drugs has been found more effective against P-388 leukemia and S-180 (ascites) tumors than drugs alone.^{2(c)}

The aqueous and alcohol extracts of the roots are oxytotic. The roots contain significant amounts of a sex hormone, estradiol.^{2(c),33(a)} Alkaloids pestalamide B and glycinamide exhibited wound-healing effects.¹⁴⁷ Heliotrine exhibited a ganglion-blocking activity in dogs.^{2(c)}

**IMPORTANT FORMULATION/
APPLICATIONS**

The plant extract exhibited stong fungitoxic activity against *Rhizoctonia solani*.

Leaf extract showed anti-bacterial activity against several Gram-positive bacteria. Flowers are emmenagogues (in small doses); leaves and flowers are abortifacient (in large doses). Roots are given as an infertility agent. Leaf juice is applied to boils, gingivitis, pimples, sores, ulcers, and wounds; a decoction is used in fevers and urticaria. A root decoction is used in cough and fever.^{2(d),15}

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

Curna (powder): 3 to 6 g.

H

Hemidesmus indicus (L.) R. Br.

Śveta Sārivā

BOTANICAL SOURCE(S)

Hemidesmus indicus (L.) R. Br.
(Fam. Asclepiadeceae)

Syn. *Perilopa indica* L.³²
In South India, aromatic roots of *Decalepis hamiltonii* Wight & Arn. are sold as Sārivā.⁵
Cryptolepis buchanani Roem & Schult. is equated with Kṛshna Sārivā (AFI), while in South India, *Ichnocarpus frutescens* R. Br. is used as Kṛshna Sārivā.^{5,6}

PHARMACOPOEIAL AYURVEDIC DRUG

Śveta Sārivā (Root).

API, Part I, Vol. I.

Two varieties of Sārivā are mentioned in the texts: white and black.

H. indicus (white variety); *Cryptolepis buchanani* (black variety, Anantamūla); *Ichnocarpus frutescens* (black variety in Bengal and Kerala); *Tylophora fasciculata* Ham. ex Wight and *Decalepis hamiltonii* W. & A. (suggested by Ayurvedic scholars as the black and second variety).³

AYURVEDIC SYNONYMS

Anantā, Gopasutā, Sārivā.

Chandana gandhā.²⁰⁽¹⁾

HABITAT

Throughout India from upper Gangetic plains east-wards to Assam, throughout Central, Western and Southern India up to an elevation of 600 m.

Also found in Southeast Asia and Malesia.¹

REGIONAL LANGUAGE NAMES

Eng: Indian sarasaparilla;
Assam: Vaga sariva;
Beng: Anantamul, Shvetashariva;
Guj: Upalsari, Kabri;
Hindi: Anantamul;
Kan: Namada veru, Bili namadaberu, Anantamool, Sogadeberu, Namadaberu;
Kash: Anant mool;
Mal: Nannari, Nannar, Naruneendi;
Mar: Upalsari, Anantamula;
Ori: Dralashvan lai, Anantamool;
Punj: Anantmool, Ushbah;
Tam: Ven nannari;
Tel: Sugandhi pala, Telia sugandhi;
Urdu: Ushba Hindi.

Urdu: Atkum, Latjeeraa.

CONSTITUENTS

Essential oil, saponin, resin, tannins, sterols and glucosides.

Air-dried roots yield 0.225% essential oil containing *p*-methoxy salicylic aldehyde as a major constituent (about 80%).^{2(a)}

Hexatriacontane, 2-hydroxy-4-methoxybenzaldehyde, alpha- and beta-amyrin, beta-amyrin acetate, lupeol and its acetate, lupeol octacosanoate and beta-sitosterol; three coumarinolignoids (hemidesminine and hemidesmin-1 and -2) have been isolated from the root.¹⁵

The active component, 2-hydroxy-4-methoxybenzaldehyde is absent in *Jchnocarpus frutescens*.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aruci, Agnimāndya, Atisāra, Kāsa, Śvāsa, Kaṇḍu, Kuṣṭha, Jvara, Raktavikāra

Used for tastelessness, digestive impairments, diarrhea, cough, asthma, pruritus, obstinate skin diseases, fever, and diseases due to vitiated blood (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Aqueous extract of the root is bacteriostatic against *Mycobacterium leprae*.⁷

2-hydroxy-4-methoxy benzaldehyde, isolated from the root, showed anti-bacterial activity

against Gram-positive and Gram-negative bacteria.

Fresh decoction of the root was found to possess blood-purifying properties.²⁶

Methanolic extract of the root showed remarkable anti-cancer potential against MCF7 breast cancer cell lines.¹⁴⁸

IMPORTANT FORMULATION/ APPLICATIONS

Sārivādyaśava (Bhaishajya Ratnāvali, seventeenth century), contains 23 plant drugs in equal proportion, including Śveta and Kṛṣṇa Sarivā roots.

Used for gout, polyuria, diabetic carbuncle, syphilis and diseases due to vitiated blood.

Specific use of the root is against syphilis, gonorrhea, leucoderma, and as a blood purifier.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20-30 g of the drug for decoction.

Standardization basis marker compound: *iso*-vanillin NLT 0.02% w/w (IP).

LD₅₀ values of both aqueous and 95% ethanolic extracts of the root were found to be 2000 mg/kg p.o. in male Wistar albino rats.^{20(l)}

Hibiscus abelmoschus Linn.

Kastūrīlatikā

BOTANICAL SOURCE(S)

Hibiscus abelmoschus Linn. Syn. *Abelmoschus moschatus* Medik (Fam. Malvaceae)

Abelmoschus moschatus Medik syn. *Hibiscus abelmoschus* Linn.^{2(a),20(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kastūrīlatikā (Seed).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Not quoted.

Latākastūrī, Latākastūrīkā,²⁸ Kattaphala.²⁷

HABITAT

Cultivated in hotter parts of India.

Found wild all over Deccan and Karnataka in the hilly region, and in the foothills of the Himalayas.^{20(a)}

REGIONAL LANGUAGE NAMES

Beng: Latakasturi;
 Guj: Bhindo, Bhinda;
 Kan: Kasturi kande, Kadu kastuar;
 Mal: Kattu kasthuri, kasturi kanda;
 Mar: Kasturbhendi;
 Punj: Mushak dana, Lata kasturi;
 Tam: Kasturi-vendai;
 Tel: Kasturi benda.

Eng: Muskmallow, Musk seed, Ambette seed.⁷
 Urdu: Mushkdaanaa.⁷

H

CONSTITUENTS

Fixed oil and Volatile oils.

The ethanolic extract of the seeds was reported to contain farnesol, ambrettolide, sterols, terpenes, and aliphatic compounds.

Oil content in the seed was 19.5%. The oil contained 12, 13-epoxyoleic, malvalic and sterculic acids, phospholipids and a mixture of alpha-cephalin phosphatidylserine, its plasmalogen and phosphatidylcholine plasmalogen, as well as beta-sitosterol and its beta-D-glucoside.^{20(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Trsna, Vasti roga, Mukha roga

Used for thirst, diseases of the urinary bladder and diseases of the oval cavity (therapeutic uses based on texts from 1000 BC to sixteenth century).

Seeds were used for their carminative, stimulant, diuretic, demulcent, cooling, anti-septic, and anti-spasmodic properties.^{15,32} The seeds, steeped in water, are used for asthma, cold, influenza, and worms.

In the Philippines, a decoction of seeds is used in stomach cancer. The mucilage has shown anti-complementary activity in human serum and hypoglycemic activity in mice.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Karpuradyarka (Arkaprakasha, Ravana, period not known), contains distilled essence of 51 plant drugs, including Kasturilatika seeds. For impaired digestion, halitosis, tastelessness.

A decoction of seeds was used in prescriptions for vomiting, spleen disorders, and pectoral lesions (Charaka Samhita, 1000 BC).²⁷

Fruits were given as a part of the diet for their cooling, cleansing, laxative and diuretic properties and for halitosis (Sushruta Samhita, 1000 BC).²⁸

During the sixteenth century, the seeds were prescribed for promoting eyesight, in hysteria and other nervous disorders, and in folk medicine for spermaturia, urinary discharges, and painful micturation.¹⁸

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–4 g of the drug in powder form.

Hibiscus sabdariffa Linn.

Ambaṣṭhaki

BOTANICAL SOURCE(S)

Hibiscus sabdariffa Linn.
 (Fam. Malvaceae)

H. sabdariffa L. var. *altissima* Webster.²⁰⁽¹⁾
 In South India, Māchiphala, oak galls, are used as a substitute for Ambaṣṭhā.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Ambaṣṭhaki (Root).

API, Part I, Vol. III.

A controversial drug: either *Cissampelos pareira* root^{27,28} or fruits of *Hibiscus* spp. or galls of *Tamarix* or *Quercus*³⁰ were used.

Medicinal use of *H. sabdariffa* root is scarce in Ayurvedic medicine.

AYURVEDIC SYNONYMS

Ambashtha,³⁰ Ambalika, Dantashatha, Ambika.²⁰⁽ⁱ⁾ Ambashtha has been used as another name of Ambari/Patsana (*Hibiscus cannabinus* Linn.).³⁰ Charaka Samhita: Ambashthaki, Ambashtha, Ambaushta, Pala, Shreyasi, Veera, Pathi.²⁷ Sushruta Samhitā: Ambashthā, Ekaishikā, Pāthā.²⁸ (Pāthā is equated with *Cissampelos pareira* Linn.) Pāthā and Ambashthā are synonyms.³

HABITAT

Generally cultivated in hotter parts of India.

Native to tropical Africa or Asia. Now cultivated in Uttar Pradesh, Andhra Pradesh, West Bengal, Bihar, Punjab, Assam, and Tamil Nadu.

REGIONAL LANGUAGE NAMES

Eng: Jamaican sorrel;
Beng: Masta pal, Mesta;
Guj: Ambodi;
Hindi: Patsan, Patna;
Kan: Pudisoppu, Kempu pundrike pullichekir;
Mal: Pariccakarm, Pulicheera;
Mar: Lalambari;
Ori: Khataa, Kaunria, Tak bhend;
Punj: Kolada;
Tam: Pulichikire;
Tel: Pundikura, Gongura;
Urdu: Patsan.

Eng: Red sorrel, Roselle.^{2(a)}

CONSTITUENTS

Sterols and Polysaccharides.

H. sabdariffa root: tartaric acid and saponin.¹⁴⁹
H. cannabinus L. root: (–)-epicatechin gallate, (+)-catechin, and (–)-epicatechin.³²
Cissampelos pareira root: alkaloids hayatin (*dl*-bebeerine), *l*-bebeerine and hayatidine; proberberine alkaloids and bisbenzylisoquinoline alkaloids.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Pakvāsisāra, Kapharoga, Galaroga, Vātaroga, Asthibhagna, Vraṇa

Used for chronic diarrhea, diseases due to kapha imbalance, diseases of the throat, diseases of the nervous system, fractures, and ulcers (therapeutic uses based on texts from 1000 BC to eleventh century).

Charaka used Ambashthaki root, bark and leaves in prescriptions in assimilation disorders, jaundice, and colic.²⁷

Sushruta gave Ambashtha in persistent dysentery and non-healing ulcers, as well as for promoting adhesion of fractured bones.²⁸

(Pāthi and Pāthā were synonyms of Ambashthaki and Ambashthā in Charaka Samhitā and Sushruta Samhitā.)^{21,28}

IMPORTANT FORMULATION/ APPLICATIONS

Pushyānuga Chuūrna (Bhaishajya Ratnāvali, seventeenth century), contains 26 plant drugs in equal proportion; Ambashthaki root is one of them. For leucorrhea and vaginal disorders. (In South India, Machiphala, oak galls, are used as a substitute of Ambashthaki.)⁵

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

Hiptage benghalensis L.

Mādhavī

BOTANICAL SOURCE(S)

Hiptage benghalensis L.
(Fam. Malpigiaceae)

Syn. *H. madablota* Gaertn.;³ *Banisteria benghalensis* Linn.; *Hiptage parvifolia* W. & A.²⁰⁽¹⁾
Atimukta is also equated with *Tinisha* (*Ougeinia dalbergioides* Benth.) in Sushruta Samhitā.^{3,28}

PHARMACOPOEIAL AYURVEDIC DRUG

Mādhavī (Flower).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Atimuktā, Atimuktaka, Mādhailata.

Vimukta, Vasanti, Pundrika, Mandaka, Kúmuka.^{7,20(1)}

Nepali, Grishmaka, Luta, Mlayini, Vana-mallika, Varshiki, Triputa, Dhanya, Shrimatt, Shadpada-priya, Mandapa-kami, Pushpendra, Abhishtagandhaka.⁴

HABITAT

Throughout India and Andaman Islands, up to an altitude of 1,500 m.

REGIONAL LANGUAGE NAMES

Eng: Clustered hiptage;

Ben: Maadhivilataa;

Guj: Maadhavi, Ragatpiti;

Hindi: Maadhavi, Anetaa;

Kan: Maadhavi, Vasantadhuti;

Mal: Sitaampu;

Mar: Madhumaalati, Haladvel;

Pun: Boromali;

Tam: Benkar;

Tel: Maadhavi, Kurukkathi.

CONSTITUENTS

Not quoted in API.

Free flavonoids were maximal in flowers (0.006 mg/g dw) and bound flavonoids were maximal in leaves (0.007 mg/g dw). Total flavonoid content was maximal in leaves (0.008 mg/g dw) followed by flowers (0.007 mg/g dw). On the basis of Rf values, kaempferol (0.95) and quercetin (0.78) have been identified.¹⁵⁰

(Leaves of *O. dlalbergioides* also contain kaempferol and quercetin.)

The stem and bark contain friedelin, epi-friedelinol, octacosanol, alpha-amyrin, beta-sitosterol and beta-D-glucoside.^{2(c)}

Different extracts of leaf, stem and flower did not show anti-fungal activity against *Aspergillus niger* and *Trichophyton rubrum*.²⁰⁽¹⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya (degestive impairment), Kṛmi roga (worm infestation), Kaṇḍū (itching), Pāmā (eczema), Raktapitta (bleeding disorder), Sthaulya (obesity), Tvakroga (skin diseases).

Therapeutic uses based on texts from the thirteenth to sixteenth centuries.

Uses of flowers are not available in the literature. In ethnomedicine, leaves and flowers were used in ringworm infection.²⁰⁽¹⁾

Leaves were used in skin diseases; plant in chronic rheumatism and asthma; leaf buds as a vegetable in intrinsic hemorrhage; root with buttermilk or seed kernels in obesity; and oil of seeds in biliousness and flatulence.^{2(a),7,16(a)}

Tinisha (=Atimuktaka) was prescribed internally and externally in obesity, urethral discharges, jaundice and chronic skin diseases (Sushruta Samhita, 1000 BC).²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Chandrakalā Rasa (Yogarātnākara, sixteenth century), a herbo mineral, mercury containing drug, contains Mādhavi flowers among supplementary drugs.

Used for acute illness.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

The methanolic extract of the leaves (200 and 400 mg/kg for 6 days) showed protective activity against CC1₄-induced hepatotoxicity in rats. Its activity was comparable with the standard drug silymarin (50 mg/kg).²⁰⁽¹⁾

LD₅₀ of the ethanolic extract of the plant (excluding root) was found to be 750 mg/kg i.p. in mice.²⁰⁽¹⁾

Holarrhena antidysenterica (Roth) A. DC.

Kuṭaja

BOTANICAL SOURCE(S)

Holarrhena antidysenterica (Roth) A. DC.
(Fam. Apocynaceae)

Wrightia antidysenterica (L.) R. Br. is the current valid name (ICMR).²⁰⁽¹⁾
Stem bark of *Wrightia tomentosa* R. & S. and *W. tinctoria* R. Br. are often substituted for the genuine drug.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Kuṭaja (Stem bark).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Kaliṅga, Śakra, Vatsaka.

Shakrabhūraha, Kotivrikshaka.⁴
(Mallikā pushpa and Girimallikā⁴ are confusing synonyms.)

Flowers of *H. antidysenterica* are white and odorless, while those of *W. tinctoria* are reddish-brown and fragrant, being jasmine-like.^{2(d)}

HABITAT

Throughout India.

Especially found in wet forests and the tropical Himalayas, ascending up to 1200 m.

Holarrhena: four species are found in tropical Africa and Indo-Malesia.¹

Only one species occurs in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Ester tree, Conessi bark;

Assam: Dudhkuri;

Beng: Kurchi;

Guj: Kuda, Kadachhal, Kudo;

Hindi: Kurchi, Kuraiya;

Kan: Kodasige, Halagattigida, Halagatti Mara;

Kash: Kogad;

Mal: Kutakappala;

Mar: Pandhra Kuda;

Ori: Kurei, Keruan;

Punj: Kurasukk, Kura;

Tam: Kudasapalai;

Tel: Kodisapala, Palakodisa;

Urdu: Kurchi.

Eng: Tellichery bark.¹

CONSTITUENTS

Conessine and related alkaloids.

Alkaloids (0.22%–4.2%, average 2.2%)^{2(a)} include regholarrhenine-A, -B, -C, -D, -E and -F; pubescine, norholadiene, pubescimine, kurchinin, kurchinine, kurchinidine, holar-rifine, holadiene, kurchilidine, kurchamide, kurcholessine, kurchessine, conessine, cones-simine, and isoconessimine; and steroidal compounds kurchinacin and holadyson.^{2(c)}

(For a summary of chemical compounds isolated from different parts of *H. antidysenterica*, see Reference 201.)

THERAPEUTIC AND OTHER ATTRIBUTES

Pravāhikā, Atisāra, Jvarātisāra, Arśa, Kuṣṭha, Trṣṇā

Used for dysentery, diarrhea, diarrhea with fever, piles, obstinate skin diseases, and thirst (therapeutic uses based on texts from 1000 BC to sixteenth century).

Kutaja was considered the best single drug for diarrhea and dysentery (classical texts from 1000 BC to sixteenth century).^{16(a)}

The alkaloid conessine is used as a therapeutic drug for dysentery and helminthic disorders.^{2(c)}

Bio-iodide compound of total alkaloids, given orally, compares favourably with emetin bio-iodide.⁷

Conessine showed potent amebicidal action.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Kutajārishta (Bhaishajya Ratnāvali, seventeenth century), contains Kutaja stem bark as the main drug.

Used for amebic dysentery, diarrhea, and sprue. Kutajāvaleha (Sharangadhara Samhitā, thirteenth century) contains Kutaja stem bark as the main drug with 18 supporting herbs. Used for diarrhea, dysentery, and hyperacidity.

Kutaj-ghana vati (Siddha-yoga Sangraha by a contemporary scholar) contains kutaja stem bark as the main drug with only one supporting herb, Ativishā (*Aconitum heterophyllum*) root. Used for dysentery, diarrhea, and diarrhea with fever.

DOSAGE/USAGE/CAUTIONS/COMMENTS

20–30 g of the drug for decoction.

In one study, the bark powder (4 g/day in three separate doses for 15 days) produced side effects in 3 out of a total of 11 patients of amebiasis and giardiasis. Two patients had vertigo, while progressive hypotension and syncope in one male patient was observed.²⁰⁽¹⁾

H

Holarrhena antidysenterica Wall. Seed Indrayava

BOTANICAL SOURCE(S)

Holarrhena antidysenterica Wall.
(Fam. Apocynaceae)

Wrightia antidysenterica (L.) R. Br. is the current valid name (ICMR).²⁰⁽¹⁾

Two varieties of Kutaja have been mentioned in Ayurvedic texts, male and female. *Holarrhena antidysenterica* is supposed to be the male, and *Wrightia tinctoria* the female. The male variety fruits are bigger than the female variety. Bitter Indrayava is the fruit of *H. antidysenterica*; sweet Indarayava is the fruit of *Wrightia tinctoria* R. Br.⁷

PHARMACOPOEIAL AYURVEDIC DRUG

Indrayava (Seed).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Bhadra yava, Kalinga, Śakra, Vatsaka.

Tikta-Indrayava, Shakrāhva, Puruhuta.⁴

HABITAT

Throughout India.

Especially found in wet forests and the tropical Himalayas, ascending up to 1200 m.

Holarrhena: four species are found in tropical Africa and Indo-Malesia.¹

Only one species occur in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Ester tree, Conessi seeds;

Assam: Dudhkuri;

Beng: Kurchi;

Guj: Kuda, Kudo;

Hindi: Indrajau, Kurchi, Kuraiya;

Kan: Kodasige beeja;

Mal: Kutakappala;

Mar: Kudayache beej;

Ori: Kurei, Keruan;

Punj: Indrajau, Kaurasakh, Kura;

Tam: Kudasapalai;

Tel: Kodisapala vittulu, Palakodisa-vittulu;

Urdu: Tukhm-e-Kurchi, Indarjao talkh.

CONSTITUENTS

Alkaloids–Steroidal Alkaloid, Conessine etc., Fats, Tannin and Resin.

Seeds contain many of the alkaloids present in the bark (average 2.2%), but in lower concentrations (1.82%).^{2(a)}

A crystalline glucoalkaloid and other alkaloids, kurchiphyllamine, kurchiphylline, holarresmine, kurchessine, holarrhidine, holonarmine, holantosine E and trimethyl conkirchine, have been reported.

Seed oil contains a new alkaloid, holarricine.²⁵

Seeds gave amino acids in the free state, with aspartic acid and arginine being the major ones.³²

Seeds contain small amounts of tannins and resins.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra, Kuṣṭha, Jwarātisara, Kṛmi, Visarpa, Grahaṇī, Raktātisāra, Śūla, Chardi, Twakroga, Dāha

Used for diarrhea, leprosy, diarrhea with fever, worm infestations, erysipelas, sprue, diarrhea with blood, colic, vomiting, skin diseases and burning sensation (therapeutic uses based on texts from the thirteenth to fourteenth centuries).

Kutaja seeds alone were found to be capable of checking diarrhea (Ashtāngahridaya, seventh century).

Indrayava (40 g) decocted in water (with a diet of meat soup) was given for biliary diarrhea. To check diarrhea with blood, *ghee* cooked with Indrayava and barley-scum, along with liquid gruel, was given (Charaka Samhita, 1000 BC). In eruptive boils, a paste of Indrayava, pounded with rice water, was applied (Bhāvaprakāsha, sixteenth century).

Seeds are used in pessaries for promoting conception, as well as for toning up vaginal tissues after delivery.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Gangādhara Chūrna (not in AFI); Laghu Gangādhara Chūrna (Shārangadhara Samhitā, thirteenth century); contains Indrayava seeds with 5 other plant drugs in equal proportion. For diarrhea and dysentery.

Jwarghni Gutika (Shārangadhara Samhitā), wrongly quoted in the API, contains Indravārūni, not Indrayava.

Kṛmi Kuthār Rasa and Palāshabijādi Chūrna—non-classical, contemporary compounds—should be subjected to safety studies.

In other quoted compounds, Indrayava seeds are a supporting component.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g (Curna). 20–30 g. (Decoction).

The aqueous, ethanol and acetone extracts of seeds exhibited 16%, 24% and 19% inhibition of ACE, respectively, while similar extracts of the roots showed 13%, 5% and 6% inhibition, respectively.²⁰⁽¹⁾

H

Holoptelea integrifolia Planch.

Cirabilva

BOTANICAL SOURCE(S)

Holoptelea integrifolia Planch.
(Fam. Ulmaceae)

Syn: *Ulmus integrifolia* Roxb.

Two species of Karanja trees have been mentioned in texts: Pūtika (Chirabilva, Prakīrya) and Naktamāla (Udakīryā); equated with *Holoptelea integrifolia* and *Pongamia pinnata* Lierra, respectively.^{16(b)}

The third Karanja is a shrub, Kantaki Karanja or Lata Karanja, equated with *Caesalpinia bonduc* (L.) Roxb. It is a later addition.³

In Kerala, Chirabilva and Pūtikarnja are equated with *H. integrifolia*.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Cirabilva (Fruit).

API, Part I, Vol. III (Chirabilva).

Nowhere in Charaka Samhitā, Sushruta Samhitā (1000 BC) and Ashtāngahridaya (seventh century) have the fruit or seed of Pūtika, Pūtikaranja or Chīrabilva been used. Putika tree bark was among the purgative drugs.³⁰

Young leaves of Chirabilva have been used as a vegetable.³⁰

AYURVEDIC SYNONYMS

Pūtīgandha.

Pūtika, Pūtikaranja (AFI, Part I, page 323). Prakīryā.²⁰⁽¹⁾

HABITAT

Throughout the greater part of India up to an altitude of 600 m.

REGIONAL LANGUAGE NAMES

Guj: Kanjo, Chirbil, Chirmil;
Hindi: Chirabil, Chiramil, Papri;
Kan: Tapasimara, Chirabilwa;
Mal: Avil, Aval;
Mar: Baval, Vavala;
Ori: Duranja, Karanj, Putikaranj;
Punj: Papri, Chirbid;
Tam: Avil pattai;
Tel: Nemalinara, Tapazi;
Urdu: Papri.

Eng: Indian elm, Jungle cork tree, Monkey biscuit tree, Indian beech tree.¹⁵¹

CONSTITUENTS

Fixed oil.

The tree is known as the “Monkey biscuit tree”.¹⁵¹
Monkeys eat the fruits after conceiving or delivering babies.¹⁵²

Seed kernels (72.5%) yielded 37.4% of a fixed oil^{2(a)}; fatty acids: myristic 9.73%, palmitic 39.22%, stearic 4.06%, oleic 41.61%, linoleic 3.61% and linolenic 1.27%.^{2(d)}

Seeds contain triterpenoids beta-amyrin, friedelin, beta-sitosterol, epifriedelinol, friedel-l-en-3-one, lupeol, beta-sitosterol-beta-D-glucoside and sitgmasterol.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Chardi, Arśa, Kṛmi, Kuṣṭha, Prameha

Used for emesis, piles, worm infestations, obstinate skin diseases including leprosy and urinary disorders/polyuria including diabetes. *Therapeutic uses based on Bhavaprakasha text, quoted in the API, are about Bilva (Shriphala), which is totally different from Chirabilva.* The text quoted in the API should be ignored.

IMPORTANT FORMULATION/ APPLICATIONS

Gandharva-hastādi Kwāth Chūrna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains 8 plant drugs, including Chirbilva leaf (not fruit, according to AFI, “tender leaves instead of the seed of Chirabilva are used in some places”). Used for impaired digestion, constipation and anorexia.

Piyūshavalli Rasa (Bhaishajya Ratnāvali, seventeenth century), a herbo-mineral compound, contains 29 constituents in equal proportions, including Chirabilva (fruit pulp, according to the AFI). Used for diarrhea, dysentery and diseases of the liver and spleen.

Biological activities of the fruits have not been recorded; studies are available only on the leaves, stem bark, bark¹⁵¹ and seeds.^{2(d)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

Research potential: as an anti-obesity herbal drug.^{2(c)}

H

<i>Hordeum vulgare</i> Linn.	Fruit	Yava
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BOTANICAL SOURCE(S)

Hordeum vulgare Linn. Syn. *H. sativum* Pers. (Fam. Poaceae)

H. sativum Jessen.²⁰⁽¹⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Yava (Fruit).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Dhānyarāja, Tikṣṇaśuka, Hayeṣṭā, Divya.

Krūrakarmā.^{20(l)}

HABITAT

Cultivated chiefly in North India.

Important producers of barley are the former U.S.S.R., Canada, Germany, the U.S., France, Spain and Turkey. India ranks 15th.^{2(c)}

REGIONAL LANGUAGE NAMES

Eng: Barley;
Beng: Jab, Jau, Yava;
Guj: Jau, Java, Jau;
Hindi: Yav, Jav, Jau;
Kan: Jave godi, Barli akki;
Mal: Yavam, Baarli, Barley;
Mar: Jav;
Ori: Jav, Javadhana, Yava, Bansa;
Punj: Jav, Jau;
Tam: Barliarisi, Yavam;
Tel: Yavalu, Barlibiyam, Telia tumma, Barley;
Urdu: Jau.

CONSTITUENTS

Starch, Sugars, Fats, Proteins (Albumin, Globulin, Prolamin and Glutelin) also contains Flavone Glycosides viz, Orientoside, Orientin, Vitexin etc.

(See Reference 15 for details.)

Barley contains about 3%–11% dietary fiber made up of pentosans, beta-glucan and cellulose. Beta-glucan is a highly viscous soluble polysaccharide, with a linear, unbranched structure composed of 4-O-linked beta-D-glucopyranosyl units and 3-O-linked beta-D-glucopyranosyl units.¹³

The nutritive value of *H. vulgare* grains was analyzed at the National Institute of Nutrition, Hyderabad. For summarized results, see Reference 20l.

THERAPEUTIC AND OTHER ATTRIBUTES

Medoroga, Prameha, Tṛṣṇa, Urustambha, Kanṭharoga, Śvāsa, Kāsa, Pinasa, Tvagroga

Used for obesity, urinary disorders/polyuria, polydipsia, stiffness of the thigh muscles, ear diseases, asthma, cough, sinusitis and skin diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

Barley gruel mixed with honey (also with triphala, licorice or Āmalaka fruit) was given in fever, burning sensation, thirst, dysentery, vomiting and urinary disorders.^{7,16(a)}

Yavā maṇḍa was given as carminative and digestive stimulant, as well as in colic, flatulence and constipation.⁴

IMPORTANT FORMULATION/ APPLICATIONS

Agastya Haritaki Rasāyana, Dadhikā Ghrita, Dhanvantara Ghrita, Gandharvahasta Taila (Ashtāṅgahridaya, seventh century, compounds) contain Yava seeds as one of the base drugs.

In other quoted compounds, Yavā seeds are among the supporting herbs.

In Bhāvaprakāsha alone, there are more than 70 compounds incorporating Yava.

A barley, Kola (jujube fruit) and Kulattha (horsegram) combination was included in a number of compounds for urinary disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

100–200 g of the drug.

In clinical trials, dosages ranging from 3 to 10 g/day barley beta-glucan have been used for evaluating its effect on cholesterol. After the FDA ruling in August, 2008, barley now joins oats and other soluble fibers that are regarded as LDL cholesterol-lowering agents.

Patients with celiac disease should avoid the consumption of barley products.¹⁷

<i>Hordeum vulgare</i> Linn.	Plant	Yava
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BOTANICAL SOURCE(S)

Hordeum vulgare Linn. Syn. *H. sativum* Pers.
(Fam. Poaceae)

H. sativum Jessen.²⁰⁽¹⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Yava (Whole plant).

API, Part I, Vol. IV.

Barley grass is at its nutritional peak before the plant begins to produce flowers and seeds.¹⁷

AYURVEDIC SYNONYMS

Divya, Dhānarāja, Tikshṇaśhuka, Hayeṣṭā.

Krūrakarmā.²⁰⁽¹⁾

Yavakshāra (ash): Sukshmaṇaka, Yāvaśuka,
Yavāgraja.⁴

HABITAT

Cultivated.

Important producers of barley are the former
U.S.S.R., Canada, Germany, the U.S., France,
Spain and Turkey. India ranks 15th.^{2(c)}

REGIONAL LANGUAGE NAMES

Eng: Barley;
Beng: Jab, Jau, Yava;
Guj: Jau, Java, Jau;
Hindi: Yav, Jav, Jau;
Kan: Jave godi, Barli akki;
Mal: Yavam, Baarli, Barley;
Mar: Jav;
Ori: Jav, Javadhana, Yava, Bansa;
Punj: Jav, Jau;
Tam: Barliarisi, Yavam;
Tel: Yavalu, Barlibiyam, Telia tumma, Barley;
Urdu: Jau

CONSTITUENTS

Proteins, Carbohydrate, Free Amino- acids,
Vitamins, Tannins and Flavonoid glycosides-
Luteolin and Orientin.

The plant is rich in beta-carotene, calcium,
iron and vitamin C; it contains abun-
dant chlorophyll. Electrolytes (potassium,
phosphorus and magnesium). Vitamins
include B₁, B₂, B₆, B₁₂, pantothenic acid and
folic acid, as well as enzymes, particularly
superoxide dismutase and nitrogen reductase.
A number of C-glycosylflavones have been
isolated. Saponarin is the major flavone.¹³

**THERAPEUTIC AND OTHER
ATTRIBUTES**

Pinasa, Swasa, Kasa, Urustambha

Used for chronic rhinitis, sinusitis, asthma and
stiffness of the thigh muscles (therapeutic
uses based on texts from 1000 BC to sixteenth
century).
In Ayurvedic medicine, Yavakshāra (ashes of
green spikes of barley) is used for urinary
diseases, uric acid diathesis, uterine irritabil-
ity, colic, acid eructation, dyspepsia, piles
and in diseases of the liver and spleen. Its
solution is used topically in chronic skin
diseases.⁷

**IMPORTANT FORMULATION/
APPLICATIONS**

Ethanol extract of green leaves exhibited anti-
oxidant, anti-inflammatory and anti-allergic
activities. An indole alkaloid gramine showed
anti-bacterial activity.^{2(c)}
Cholesterol-lowering effects have been
attributed to hexacosyl alcohol and beta-
sitosterol fractions. (Recommended only
as an adjuvant to hypercholesterolemic
treatment.)
Blood levels of oxygen free radicals were reduced
by supplementation with 15 g/day barley
leaf extract in patients with type 2 diabetes
mellitus.
A dietary regime that included barley grass
showed improvements in fibromyalgia
syndrome.¹³

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g.

A dose of 15 g/day dried barley leaf extract has been used for cholesterol lowering. This dosage provided 40–45 mg total phenols, 3500–4000 units beta-carotene and 15–20 mg vitamin C.¹³

Hydnocarpus pentandra (Buch.-Ham.) Oken Tuvaraka

BOTANICAL SOURCE(S)

Hydnocarpus pentandra (Buch.-Ham.) Oken;
Syn. *H. laurifolia* (Dennst.) Sleumer.
H. wightiana Blume
(Fam. Flacourtiaceae)

Chalmogra: *Hydnocarpus kurzii* (King) Warb.;
syn. *H. laurifolia* Sleumer.; *H. wightiana* Blume;
Taraktogenos kurzii King; *Munnicksia laurifolia*
Dennst. (identified by ICMR).^{20(k)}

H. kurzii: syn. *H. heterophylla*; *Taractogenos kurzii*
(identified by CIMAP)³² and *H. laurifolia*;
syn. *H. wightiana*; *H. inerbrians* have been
mentioned separately.³² The first species is
found in Northeast India;³² the second one is
endemic to Western Ghats.³²

PHARMACOPOEIAL AYURVEDIC DRUG

Tuvaraka (Seed).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Kaṭukapittha.

Kushthavairi.^{20(k)}

HABITAT

Endemic to tropical forests of Western Ghats, up
to 600 m.

Also in Northeast India.³²

REGIONAL LANGUAGE NAMES

Eng: Chaulmugra;
Ben: Chaulmugraa;

Hindi: Chaalmograa;

Kan: Garudphala, Toratti, Suranti;

Mal: Kodi, Vrikshamroti, Marotti;

Mar: Kadukavatha;

Tam: Nirati muthu;

Tel: Nirudu, Niridi;

Urdu: Chaalmograa.

CONSTITUENTS

Apigenin, hydnocarpin, isohydnocarpine
methoxyhydnocarpin and fixed oils.

The seeds yielded leucopelargonidin, hydnocarpin,
isohydnocarpin, methoxyhydnocarpin, neohyd-
nocarpin, apigenin, chrysoeriol and luteolin.

Fatty acids are estimated as chaulmoogric 21.0%;
hydnocarpic 19.6%; palmitic 5.8%; myristic
5.9%; gorlic 26.6%, oleic 11.3% and linoleic 4.4%.

Seeds yield Chaulmoogra oil (the oil mixed
with Neem oil or oil of *Psoralea corylifolia* is
reported to cure leprosy).^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Ānāha (distension of abdomen due to obstruc-
tion to passage of urine and stools), Arśa
(piles), Gṛdhrasī (Sciatica), Gaṇḍamālā (cervi-
cal lymphadenitis), Gulma (abdominal lump),
Jvara (fever), Kaṇḍū (itching), Kaphavātaja roga
(disorders due to kapha and vāta doṣa), Kṛmi
(helminthiasis), Kuṣṭha (Leprosy/diseases of skin),
Śoṭha (oedema), Prameha (metabolic disorder),
Raktavikāra (disorders of blood), Tvakroga (skin
diseases), Udara (urticaria), Udāvarta (partial
intestinal obstruction), Vraṇa (ulcer).

Therapeutic uses based on texts from 1000 BC to
fifteenth century.

Tuvaraka seeds are mainly used for leprosy and obstinate skin diseases. Other attributes should have been carefully selected.

IMPORTANT FORMULATION/ APPLICATIONS

Tuvaraka Taila.

Tuvaraka Taila (Sushruta Samhitā, 1000 BC) contains Tuvaraka fruit oil, *Acacia catechu* heart wood decoction and Tuvaraka seed paste. The prepared oil was to be kept in the hot ash of cow dung for 15 days before use. Dose: 10–20 drops for topical application. Prescribed for all skin diseases, including leprosy, with cow's milk or butter.

In mice, intraperitoneal and subcutaneous administration of chaulmoogra fatty acids demonstrated anti-microbial activity against *Mycobacterium leprae*.¹⁴

Three flavonolignans (hydnowightin, hydnocarpin, and neohydnocarpin) isolated from the seeds showed *in vitro* cytotoxicity against various cancer cell lines.^{20(l)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 1 to 3 g.

LD₅₀ of hydnocarpic acid, isolated from the oil, was found to be 325 mg/kg p.o. in mice.^{20(l)}

Hyoscyamus niger Linn.

Pārasīkayavānī

BOTANICAL SOURCE(S)

Hyoscyamus niger Linn.
(Fam. Solanaceae)

Seeds of *H. niger* and *H. muticus* Linn. are official source of Pārasīkayavānī.

H. muticus is Egyptian henbane.

Commercial samples of the drug sold in Gujarat were found to be seeds of *Cleome viscosa* Linn.^{2(d)}

PHARMACOPOEIAL AYURVEDIC DRUG

Pārasīkayavānī (Seed).

API, Part I, Vol. V.

Applicable part in Western herbalism is the leaf. International Pharmacopoeial name: Hyoscyami folium.⁸

AYURVEDIC SYNONYMS

Khurāsānī yavānī, Yawānī, Turuṣakā, Madakāriṇī.

Yúvani.^{16(c)}

Yawānī (Yavānī) is equated with *Trachyspermum ammi* (L.) Sprague.

Turuṣakā (Turskā?) is a confusing synonym.

Turuṣka of Ayurveda is equated with balsam of *Liquidamber orientalis* Miller (AFI).

HABITAT

Native to the Mediterranean region and temperate Asia, Western Himalayas from Kashmir to Kumaon at an altitude of 1600 to 4000 m.

H. muticus: found in the Northwestern Himalayas; also cultivated in the plains of North India.^{20(j)}

REGIONAL LANGUAGE NAMES

Eng: Henbane;

Beng: Khorasani ajwan;

Guj: Khurasanee ajma, Khurasanee ajmo;

Hindi: Khurasanee ajvayan,

Kan: Khurasanee, Ajawaana;

Mal: Khurasaanee, Paarasika, Yavaani;

Mar: Khurasanee ova;

Punj: Khurasanee ajvain, Bangidewana;

Tam: Kuraasanee yomam;

Tel: Kurasanee vamu, Khurasanee omam;

Urdu: Ajvayanee khursanee.

Eng: Indian henbane, Black henbane.⁷

CONSTITUENTS

Tropane alkaloids hyoscyamine, (its racemic mixture and atropine) and hyoscine.

Alkaloids in plant parts: roots 0.16%, leaves 0.045%–0.08%, flowering tops 0.07%–0.10%, and seeds 0.06%–0.10%.^{2(c)} Principal alkaloids: hyoscyamine and hyoscyne or scopolamine, traces of tropine and scopoline. Mature leaves richer in hyoscyamine, tender leaves richer in hyoscyne.^{2(a)} Leaves additionally yield hyoscypikin and atropine.^{2(c)}

Leaves are used in herbal medicine, while seeds are used mainly for the extraction of alkaloids.^{2(a)}

Seeds were reported to contain hyosgerin, venkatasin, cleomiscosin A and B, hysomin, hyoscyamal, balanophonin, and pongamosides C and D.²⁰⁽¹⁾

(Hyosmin has been characterized.)²⁰¹

THERAPEUTIC AND OTHER ATTRIBUTES

Rajahkṛcchra, Śighrapatana, Svpanadoṣa, Udaśūla, Ānāha, Gulma, Kṛmi, Aśmarī, Kāsa, Śvāsa, Anidrā, Unmāda, Śūla, Sandhiśūla

Used for dysmenorrhea, premature ejaculation, nocturnal discharges, abdominal colic, abdominal distention, abdominal lumps, calculus, cough, asthma, insomnia, insanity, spasmodic pain, and joint pain (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Seeds are used as a sedative, anti-spasmodic, stomachic, anthelmintic (prevent griping pain when added to cathartics), astringent and

anodyne¹⁵ in Ayurvedic and Unani systems. Leaves are preferred in other systems.

Seeds possess narcotic properties, and in large doses produces poisonous effects like datura poisoning.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Sarpagandhāghna Vati (Siddhayoga Sangraha by a contemporary scholar), contains Sarpagandha root (10 parts), Khurāsāni yavāni (2 parts), (Nardostachys) jatāmānsi root (1 part) and Bhangā (*Cannabis sativa*) leaves (1 part). 750 mg to 1.125 g pills for insomnia.

Sarpagandhā (*Rauvolfia serpentina*) entered into medicine after 1946 for lowering blood pressure and treating mental illness. Additive effect of Sarpagandhā, Jatāmānsi and Bhangā leaves needs revalidation.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

125–500 mg.

Average single dose of leaf: 0.5 g of standardized powder, corresponding to 0.25–0.35 mg total alkaloid.⁸

Contraindicated in tachycardias, prostatic hyperplasia, narrow-angle glaucoma, acute pulmonary edema, stenosis of the gastrointestinal tract, and megacolon.⁸

BOTANICAL SOURCE(S)

Illicium verum Hook. f.
(Fam. Magnoliaceae)

Star anise fruit is adulterated with the fruit of *I. anisatum* grown in Japan (the fruit is poisonous).^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Takkola (Fruit).

API, Part I, Vol. VI.

In Charaka Samhitā, Takkola was a synonym of Kakkola, Sthula maricha, Koraka, Kaṅkolaka. It has been identified as *Piper cubeba* Linn. fruits.²⁷

In the South, star anise fruits are the source of Takkolam (Tamil and Malayalam).⁶

Piper cubeba fruits continue to be the source of Kaṅkola/Kaṅkolaka in the South, as well as in the North.

AYURVEDIC SYNONYMS

Illicium verum entered into Unani medicine as Bādiyān khatai, known as Star anise worldwide, in Spain as Bādiyān.¹⁹

Pimpinella anisum remained the source of Bādiyān Roomi (Anis in Germany, France, and Spain).¹⁹

HABITAT

A native of China and is sometimes cultivated in India. Most of the drug available in the market is imported.

REGIONAL LANGUAGE NAMES

Eng: Star anise of China;
Assam: Baadiyaane khataai;
Hindi: Ansafal;
Mal: Takkolpputtli;
Mar: Baadiyaan;
Tam: Anushappu, Anushuppu, Annashuppu;

Tel: Anasapuveru;
Urdu: Baadiyaan khataai.

CONSTITUENTS

Essential oils, flavonol glycosides, and veranisatins A, B & C.

The essential oil contains *trans*-anethole 71.98% and feniculin 14.56% as the major constituents.^{2(c)} A sample from China contained *trans*-beta-bergamotene in large proportions.^{2(d)} A characteristic phenolic constituent of *Apiaceae*, 4-(beta-D-glucopyranosyl)-benzoic acid, has been isolated from the fruit.^{2(d)} Flavonoids rutin and kaempferol glycosides have been reported. *I. anisatum* (the adulterant) contains a volatile oil, together with sesquiterpenes, anisatins, shikimic acid, and the toxins skimotoxin and skimin.³¹

THERAPEUTIC AND OTHER ATTRIBUTES

Ādhmāna (flatulence with gurgling sound), Aruci (tastelessness), Gulma (abdominal lump), Mukhadurgandha (Halitosis), Sandhivāta (arthritis), Śūla (pain/colic)

Therapeutic uses based on a *shloka* composed by a contemporary Malayalam scholar.

IMPORTANT FORMULATION/ APPLICATIONS

Karpurādi Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Takkola rhizome (not fruits) (AFI). Used for cough, bronchitis, asthma, and phthisis. (In South Indian drugs, Star anise fruits are used.)⁶

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 250 to 625 mg.

The ethyl acetate extract of the fruit caused severe convulsions; veranisatins A and B, isolated from the extract, showed convulsive effects

and lethal toxicity in mice.^{2(c)} The intake of *trans*-anethole (1.0%) did not show any chronic toxicity or carcinogenicity in rats.^{2(c)}

Imperata cylindrica (Linn.) Beauv.

Darbah

BOTANICAL SOURCE(S)

Imperata cylindrica (Linn.) Beauv.
(Fam. Poaceae)

Saccharum arundinaceum Retz. is used as Darbha in Kerala. Kusha and Darbha are treated as synonyms.³

Desmostachya bipinnata (L.) Stapf is also known as Darbha in Kerala.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Darbah (Root).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Yajnāmūla, Ulu, Kutuka, Kharadarbha, Śvetadarbha.

Sūchiyagra.^{16(c)}

HABITAT

Distributed in the hotter parts of India from Punjab southwards.

Common in tropical Africa, Southern Europe and eastward to Afghanistan, India, Sri Lanka, Malaya, Java, China, Japan, and Australia.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Thatch grass, Cogon grass;
Beng: Ulu;
Guj: Daabhdo, Darabh;
Hindi: Daabha, Siru, Ulu;
Kan: Sanna dabac hullu;
Mal: Vidulam;
Mar: Darsnaa, Dhub;

Punj: Daaba, Sil;
Tam: Darbhaipul, Nanal;
Tel: Darbalu, Darbha gaddi, Modewa gaddi.
Eng: Spear grass.

CONSTITUENTS

Contains five triterpenoids viz. cylindrin, arundoin, fernenon, isoburneol, and simiarenol.

Rhizomes contain biphenyl ethers cylindol A and B, phenolic compounds imperanene and sesquiterpenoid cylindrene, lignans graminone A and B, flavonoids sinensetin, eupatorin, tetra-O-methylscutellarein and 3'-hydroxy-5, 6, 7, 4'-tetramethoxyflavone.^{2(c,d)}

The root is one of the constituents of *Tr̥na Panchamūla* of Ayurvedic medicine, which is specific for urinary disorders, dysuria, and urolithiasis.

THERAPEUTIC AND OTHER ATTRIBUTES

Mūtrakṛcchra, Aśmari, Mūtraghāta, Baṣṭisūla, Tr̥ṣā, Dāha, Raktapradara, Raktārsa, Pradara, Raktapitta, Jvara, Vsarpa, Pittabhisyanda

Used for dysuria, calculus, retention of the urine, pain in the urinary bladder, sacral pain, menorrhagia/metrorrhagia, bleeding piles, leucorrhea, bleeding disorders, fever, erysipelas, and conjunctivitis (therapeutic uses based on texts from 1000 BC to sixteenth century).

Tr̥napanchamūlādi kashāya was found to be effective in kidney disorders of experimental albino rats.

A decoction of roots completely inhibited the development of organ tumors and significantly reduced the formation of tumors.^{2(d)}

Roots contain anti-bacterial substances;^{2(c)} they are considered to be a blood-purifying drug in venereal diseases.

IMPORTANT FORMULATION/ APPLICATIONS

Brahmarasāyana (Ashtāṅgahridaya, seventh century); Sukumar Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica): contain Tr̥ṇa panchmūla as one of the constituents. Trikantaka Ghrita (Sahasrayoga) contains 16 plant drugs in equal proportions, including Darbha root. Used for dysuria and other urinary disorders.

Karpuradyarka (Ark Prakash, Ravana, period not known) contains 50 plant drugs in equal proportions, Darbha root is a supporting component. Tr̥ṇapanchamūlādi kashāya (Sahasrayoga, not quoted in the AFI) is prescribed as a diuretic in urinary disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g for decoction.

Indigofera aspalathoides Vahl ex DC.

Śiva-Nīlī

BOTANICAL SOURCE(S)

Indigofera aspalathoides Vahl ex DC.
(Fam. Fabaceae)

Mal: Sivanar vayambu, Manneli;
Mar: Shiva-nimba;
Tam: Sivanarvembu;
Tel: Nela vempali.

PHARMACOPOEIAL AYURVEDIC DRUG

Śiva-Nīlī (Root and Stem).

API, Parti, Vol. VI.
(Non-classical.) Shivanimba.^{2(a),32,33(a)}

AYURVEDIC SYNONYMS

Bhū-nīlī.

Bhū-nīlī is a confusing synonym. Nīlī is an accepted name for *Indigofera tinctoria* Linn.

HABITAT

A stiff silvery, hoary under shrub with trifoliate leaves, found in the plains of South India.

Plains of Karnataka, Andhra Pradesh, and Tamil Nadu.³²

REGIONAL LANGUAGE NAMES

Eng: Wiry indigo;
Kan: Shiva-malli, Nila;

CONSTITUENTS

Fixed oil.

Compounds isolated from the plant:
n-butyl ester of nanodecanoic acid,
1-octadecanol, 4-heneicosanone, alpha-
amyrin, *n*-octacosanol, beta-sitosterol,
salicylic acid, ethroxydiol X, ethroxydiol Y,
beta-sitosterol-beta-D-glucopyranoside.²⁵³

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta (rheumatism), Aruṁṣikā (dandruff),
Dantaśūlā (tooth ache), Gulma (abdominal lump),
Kuṣṭha (Leprosy/diseases of skin), Plihāroga
(splenic disease), Udararoga (diseases of
abdomen), Vātarakta (Gout), Vidradhi (abscess),
Visarpa (Erysepales). Used as single drug.

For therapeutic uses, classical sources are not quoted.

IMPORTANT FORMULATION/ APPLICATIONS

Leaves, flowers, tender shoots are cooling and demulcent. They are used in the form of

decoction for leprosy and cancerous affections. Leaves are applied to abscesses. Root is chewed in toothache and aphthae. Whole plant is used for edematous tumors. Plant ashes are used in preparations for dandruff. The plant is an ingredient of a medicinal oil used for syphilitic and other skin affections. Trials,

however, have shown that the plant does not possess any of the properties attributed to it.^{2(a)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

Cūrṇa (powder): 3 to 6 g.

***Indigofera tinctoria* Linn.**

Nīlī

BOTANICAL SOURCE(S)

Indigofera tinctoria Linn.
(Fam. Fabaceae)

The species is very variable.³ It has been suggested that Nili should be equated with *I. tinctoria* and Nilini and Nilinika with *Ipomoea hederaceae* (L.) Jacq.^{30,3}

PHARMACOPOEIAL AYURVEDIC DRUG

Nīlī (Leaf).

API, Part I, Vol. II.
Root: API, Part I, Vol. II.
Whole plant: API, Vol. III.

AYURVEDIC SYNONYMS

Nilika, Nilinī, Rangapatrī.
Nilpuṣpa, Kāleśī (API, Vol. III).
Shriphalikā is also equated with Nili.³⁰

HABITAT

Widely cultivated in many parts of India.

REGIONAL LANGUAGE NAMES

Eng: Indigo;
Assam: Nilbam;
Beng: Nil,
Guj: Gali, Galiparna;
Hindi: Nili;
Kan: Karunili;
Mal: Neelamar;
Mar: Neel;

Ori: Nili, Nila;
Punj: Neel;
Tam: Avuri;
Tel: Nili chettu, Nili;
Urdu: Neel

CONSTITUENTS

Leaf, root, whole plant: Glycoside (indican).

Plant contain appreciable amounts of conjugated indoxyl (indican), the putative precursor of isatin, together with rotenoids, viz. deguelin, dehydrodeguelin, rotenol, rotenone, tephrosin, and sumatrol.

Plant parts yield indicaine (5–15 mg/g dry basis) and flavonoids, apigenin, kaempferol, luteolin and quercetin.

Presence of coumarins, cardiac glycosides, saponins, and tannins is also reported.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Leaf, root: Amavāta, Vātarakta, Udararoga, Udāvarta, Plihāroga, Gulma, Jvara, Kāsa, Viṣavikāra, Kṛmiroga

Used for rheumatism, gout, diseases of the abdomen, abdominal distension, enlargement of the spleen, abdominal lumps, fever, cough, toxicosis, and worm infestations (therapeutic uses based on texts from 1000 BC to sixteenth century). (For details, see References 7 and 16[a].)

Additionally, whole plant is used for Moha and Bhrama (delusion and vertigo).

Alcoholic extract of the aerial parts are hepatoprotective and hypoglycemic (experimentally).^{2(c)} Plant is used in endogenous

depression,^{2(c)} epilepsy, nervous disorders, and bronchitis. Topically, it is used as an ointment for sores, old ulcers, and hemorrhoids.^{2(a)} A decoction of the leaves is given in blennorrhagia and leucorrhea. It is also included in hair oils for inducing hair growth.^{2(c)}

Root is prescribed internally for dysuria and skin diseases.⁷ Indirubine and indigotine prevent allergic contact dermatitis.^{2(c)} Indirubine has been identified to be an anti-tumor agent.

IMPORTANT FORMULATION/ APPLICATIONS

Leaf:

Nilibhr̥ngādi Tailam (Sahasrayoga, a non- Samhitā, Kerala Materia Medica), contains leaf as one of the main plant drugs. Hair oil for arresting hair fall and graying, for hair growth.

Mahāpanchagavya Ghrita (Ashtāngahridaya, seventh century) is a compound of cow's milk, curd, *ghee*, urine, and dung extract with 42 plant drugs.

Root: Arvindāsava (Bhaishajya Ratnāvali, seventeenth century) contains 23 plant drugs,

including Nilini root. Used as a tonic for children.

Triphalādi Tailam (Sahasrayoga) contains 11 main plant drugs, and Nili leaf (AFI)/root (South India) is among 24 supporting herbs. Used as a hair oil for treating balding and graying.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Leaf: 50–100 g of decoction. Root: 48 g of the drug for decoction. Whole plant: 10–20 g of the drug for decoction.

Indigofera tinctoria exhibited protective effects against carbon tetrachloride-induced hepatotoxicity, which is opposite to the hepatotoxic effect observed with other members of this genus.¹⁷

I. spicata Forssk. (Creeping indigo, Africa, naturalized)¹⁹ is recognized as a teratogen. The active principle indospicine is hepatotoxic and teratogenic.¹⁷

Inula racemosa Hook. f.

Puṣkara

BOTANICAL SOURCE(S)

Inula racemosa Hook. f.
(Fam. Asteraceae)

The plant is restricted to the Western Himalayas. Even in Bhavaprakasha (sixteenth century), Kushtha (*Saussurea lappa*) was a substitute for Pushkaramūla.³

The accepted source of the drug in Kerala was *Coffea travancorensis* Wt. & Arn. (*Psilanthus travancorensis*), which is scarce.⁵

Roots of *Saussurea lappa* are commonly found mixed with commercial samples of Pushkaramūla.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Puṣkara (Root).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Poushkara, Kashmira.

Kúshmira, Padmapatra, Pausharāhva, Pausharānghrikā, Pushkara-jatāmūla, Vīra, Sugandhika.⁴

Known as Kushtha-bheda (in practice).

HABITAT

Western Himalayas up to 2600 m.

Temperate and alpine Himalayas from Chitral to Nepal at 1500–4200 m.⁷

Saussurea lappa: Kashmir, Himachal Pradesh, and Garhwal at 2500–3000 m. Cultivated in Kashmir and neighboring regions.⁷

Psilanthus travancorensis: Western Ghats in Malabar and Travancore, as well as in Sri Lanka.⁵

REGIONAL LANGUAGE NAMES

Eng: Orris root;
Assam: Pohakarmul, Puskar;
Beng: Pushkara, Pushkaramula;
Guj: Pushkarmula;
Hindi: Pohakar mul;
Kan: Pushkara moola;
Mal: Puskara;
Mar: Pokhar mool;
Ori: Puskara;
Punj: Pokhar mool;
Tam: Pushkarmulam;
Tel: Pushkara mulamu.

CONSTITUENTS

Essential oil.

Roots contain inulin 10% and an essential oil 1.3%.^{2(a)}

Essential oil and extractives from roots contained alantolactone, alantolactone, inunolide, dihydroinunolide, neoalantolactone, and dammara-20-24-olien-3 beta-yl-acetate.

Essential oil also contained heptadeca-1, 8, 11, 14-tetraene (aplotaxene) 22%, phenylethanol, phenylacetonitrile 2%, beta-ionone, beta-elemene, ar-curcumene and several sesquiterpene aldehydes and alcohol.^{2(c,d),32}

THERAPEUTIC AND OTHER ATTRIBUTES

Hikka, Kasa, Svasa, Parsvasula, Sopha, Ardita, Pandu, Aruci, Jvara, Adhmana

Used for hiccup, cough, asthma, intestinal colic, edema, facial palsy, anemia, tastelessness, fever, and flatulence (therapeutic uses based on texts from 1000 BC to sixteenth century).

Throughout the classical period, Pushkara mūla remained a specific remedy for cough, asthma, chest diseases, and hiccup (Charaka Samhita, 1000 BC; Ashtāngahridaya, seventh century; Vrindamadhava, eighth century).^{16(a)}

In experimental and clinical trials, the root powder showed expectorant, hypolipidemic, hypoglycemic, hypotensive, anti-histaminic, anti-5-HT, beta-blocking and anti-anginal activities.^{2(c,d),32}

IMPORTANT FORMULATION/ APPLICATIONS

None of the quoted compounds represent the unique profile of Pushkara mūla.

Pushkarādi Chūrnam (Bhaishajya Ratnāvali, seventeenth century) contains Pushkara mūla, Atees, Pistacia galls, *Fagonia cretica* and long pepper. Used as an anti-catarrhal drug for children.

Pushkara mūla Chūrnam (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains powdered root of Pushkara as a single drug. Used for cough, asthma, and chest pain.

Original source of this drug is Charaka Samhitā and Ashtāngahridaya.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

A massage liniment that contained alantolactone was reported to cause allergic dermatitis. However, isoalantolactone has been found to be non-allergenic in humans.^{2(d)}

It is a promising cardio-protective drug. Encouraging results were observed when used in combination with *Commiphora wightii* gum-resin and *Terminalia arjuna* bark.^{2(d)}

***Ipomoea digitata* Linn.**

Kṣhīravidārī

BOTANICAL SOURCE(S)

Ipomoea digitata Linn. Syn. *Ipomoea paniculata* (Linn.) R. Br.
(Fam. Convolvulaceae)

Ipomoea digitata Auct. non-Linn. = *I. mauritiana* Jacq. syn. *I. paniculata* (L.) R. Br. non-Burm. f., *I. digitata* sensu Baker & Rendle.^{2(d)}
(Indian plant is *I. digitata* Auct. non-Linn.)^{2(d)}

Kerala physicians accept *Ipomoea mauritiana* Jacq. as the source of Kshiravidāri.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Kshiravidāri (Root).

API, Part I, Vol. V.

Vidāri is equated with *Pueraria tuberosa* DC.

In vidārīgandhādi *varga* (group of herbs), both Vidāri and Vidārīgandhā have been included. Vidārīgandhā is equated with Sālaparnī (*Desmodium gangeticum* DC.). It should not be confused with Kshiravidāri.

AYURVEDIC SYNONYMS

Ikṣugandhā, Ikṣuvallī, Payasvini, Dirghakandā.

Vīrā (AFI).

Kshiravallī and Kshirashuklā have been mentioned in Charaka Samhita together with Kshiravidāri, although they appear to be synonyms.³⁰

HABITAT

Distributed throughout the warm and moist regions of India.

Found in Bihar, Odisha, West Bengal, Assam, Deccan, and the West coast from Konkan to Kerala, mostly in moist areas, monsoon forests, and coastal tracts.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Giant potato;

Beng: Bhuh kumdaa, Bhooi kumhdaa;

Guj: Vidaaree kand;

Hindi: Vidaaree kanda, Bhuh kumdaa, Bhui kumbhadaa;

Kan: Nelkumbal, Naadakumbala;

Mal: Paalmutakku;

Mar: Bhui kohalaa;

Ori: Bhui kakhaarū;

Tam: Nilappuchani, Paalmudamgi;

Tel: Paalagummudu, Nelagummudu.

Eng: Alligator yam, French honeysuckle tuber.⁶

CONSTITUENTS

Glycosides, steroids, tannins and fixed oil.

Root tuber yielded paniculatin, scopoletin, scoparone, beta-sitosterol, and its 3-O-beta-glucoside, taraxerol acetate, umbelliferone; 1-O-ethyl-beta-D-glucopyranoside, mandelamide.¹⁵

Fixed oil contains palmitic, oleic, limoleic, and linolenic acids.²⁰⁽¹⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Sanyavikara, Pittaja śūla, Raktavikāra, Mahāvātavyādhi, Mūtraroga, Vraṇa, Bhagna

Used for lactal disorders, biliary colic, diseases due to vitiated blood, acute diseases of the nervous system, urinary diseases, ulcers, and fractures (therapeutic uses based on texts from 1000 BC to sixteenth century).

Kshīra vidāri tuber enters into compounds that are nutritive, diuretic, expectorant, anti-catarrhal, and anti-pyretic. Roots are given for diseases of the spleen and liver, for menorrhagia, debility, and hyperlipemia. Crushed roots are applied to swellings.^{2(a)}

Scopoletin, the bioactive marker of the drug, is reported to possess anti-inflammatory, immunomodulatory and anti-oxidant activities.

IMPORTANT FORMULATION/ APPLICATIONS

Shivāgutikā (Laghu), Yogaratnākara, sixteenth century, does not contain Kshiravidāri. Details of any other formulation of Shivāgutikā are not available in AFI and Bhaishajya Ratnāvali. It was a Shilājatu compound for dysuria and debility.

Vidāryādi Ghrita (Ashtāngahridaya, seventh century, not quoted in the API) contains all seven herbs of *Vidāryādi gana* with 13 supporting herbs, all in equal proportions. Used for cough, phthisis, lung cavities and emaciation (Kshiravidāri is used as Vidāri).⁶

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

BOTANICAL SOURCE(S)

Jasminum officinale Linn.
(Fam. Oleaceae)

J. officinale Linn. forma *grandiflorum* (L.)
Kobuski; *J. officinale* L. var. *grandiflorum* (L.)
Stokes.^{2(d),3}

In South India, *Jasminum grandiflorum* Linn.
and *J. angustifolium* Vahl. are used as Jāti in
Ayurvedic formulations.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Jāti (Leaf).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Mālātī.

Jātika.³
Priyamvadā, Rājī, Mālātī.⁴
Jāti,^{3,28}
Jātipatrī, Jitikosha and Mālātipatrikā are equated
with *Myristica fragrans* Houtt. (leaf and fruit).^{3,4}
Even in Bhāvaprakāsha, Jāti indicates *Myristica*
fragrans in yoga sannipātajwara and yoga
Dantanādi.³

HABITAT

Kashmir at an altitude of 900-2700 m, also cultivated throughout India.

REGIONAL LANGUAGE NAMES

Eng: Jasmine;
Assam: Yasmeen;
Beng: Chamelee;
Guj: Chamelee;
Hindi: Chamelee;
Kan: Jati maltiga, Sanna jati mallige;
Mal: Pichi;
Mar: Chamelee;
Punj: Chamelee;
Tam: Pichi, Jatimalli;

Tel: Jati, Sannajati;
Urdu: Chameli, Yasmeen.

CONSTITUENTS

Resin, Salicylic acid, Alkaloid (Jasmanine), and essential oil.

Leaves yielded ascorbic acid, anthranilic acid and its glucoside, indole oxygenase, jasminine and salicylic acid. (Z, Z, Z)-3, 6, 9-dodecatrien-1-ol and the ester of (Z)-3, 5-hexadien-1-ol have also been encountered in the plant.¹⁵
Leaves showed anti-bacterial activity against *S. aureus* but not against *E. coli*.²⁰⁽²⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Śīroroga, Akṣīroga, Viśaroga, Kuṣṭha, Vraṇa, Arśa, Mukhapāka, Putikarṇa, Stana śoṭha, Raktavikāra

Used for diseases of the head, eye diseases, toxemia, obstinate skin diseases, ulcers, piles, stomatitis, attic suppuration, inflamed breast, and blood disorders (therapeutic uses based on texts from the fifteenth to sixteenth centuries).

Leaves are chewed for relief in cases of ulceration of the mucus membrane. Fresh juice of the leaves is applied on corns.^{2(a)} An oil preparation with the juice of the leaves is used as ear drops in otorrhea.

Whole plant is used as an anthelmintic, deobstruent, diuretic, and emmenagogue.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

Jātyādi Taila (Shārangadhara Samhitā, thirteenth century), contains Jāti leaf with 16 other herbs and a mineral, blue vitreol; all in equal proportion.

Used for non-healing ulcers.

Jātyādi Ghrita (Ashtāngahridaya, seventh century) contains Jāti leaf with 13 other herbs and a mineral, blue vitreol, all in equal proportions. Used for non-healing ulcers.

Vasanta Kusumākara Rasa (Rasendra sār sangraha) is a polymineral drug. Used for diabetes and polyuria.

When tried on a second-degree burn wound in rats, the acceleration of healing time was approximately 20% with unmedicated *ghee* and 30% with jasmine-medicated *ghee*.

Leaf juice of jasmine showed marked wound-healing properties in cases of skin wounds compared with musculo-peritoneal wounds.²⁰⁽²⁾

DOSAGE/USAGE/CAUTIONS/COMMENTS

10–20 g of powder for decoction.

LD₅₀ of the ethanolic extract of the whole plant, excluding the roots, was >1000 mg/kg i.p. in mice.²⁰⁽²⁾

Jatropha glandulifera Roxb.

Dravanti

J BOTANICAL SOURCE(S)

Jatropha glandulifera Roxb.
(Fam. Euphorbiaceae)

Croton tiglium Linn. seeds are used as a substitute of seeds of Dravanti, known as Jayapāla³⁰ (AFI, Part I, page 312).

J. glandulifera has been recognized as the official “Dravanti” by the Ayurvedic Pharmacopoeia Committee (AFI, Part I, page 312). However, the commercially available drug is rarely from this species.¹⁵⁴ Botanically, Dravanti has been referred to *J. curcas* Linn.¹⁵⁴

PHARMACOPOEIAL AYURVEDIC DRUG

Dravanti (Seed).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Bṛhaddanti, Vyāghrairaṇḍa, Putraśeṇī.

HABITAT

In the black cotton soil of Deccan, also in plains of northern India.

REGIONAL LANGUAGE NAMES

Eng: Purging nut;

Guj: Ratanjota;

Hindi: Laal Bagharend, Jangali erandi;

Kan: Erandane danti, Totla;

Mal: Katalaavanakku;

Mar: Thoradanti, Mogali eranda;

Tam: Kattamanakku, Adalai;

Tel: Adavi amadam, Vatti amudamu.

Eng: Physic nut, Purging nut (*J. curcas* L.).^{2(c)}

CONSTITUENTS

Jatrophin, jatropholone A, fraxetin, coumarinolignan (I).

(Quoted constituents have been isolated from roots.)¹⁵³

Plant contains alkannins (*iso*-hexenylnaphthazarins), 3, 3-dimethylacrylylshikonin, and acetylshikonin. The presence of alkannins in a plant of Euphorbiaceae should be considered an exception.³²

Hexane extract of the plant gave fraxetin, naringenin, octacosanol, and beta-sitosterol.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktavikara, Kandu, Kustha, Sotha, Pandu, Gulma, Udara, Anaha, Udavarta, Ajirna, Sula, Hrdroga, Grahaniroga, Trsna, Jvara, Garavisa, Prameha, Bhagandara, Amavata, Paksaghata, Urustambha, Granthi, Parsvasula, Pliharoga, Dustavrana, Dustaapaci

Used for vitiated blood, pruritus, obstinate skin diseases including leprosy, edema, anemia, abdominal lumps, diseases of the abdomen, distension of the abdomen, upward movement of gases, dyspepsia, colic, heart disease, mal-absorption syndrome, excessive thirst, fever, accumulated poisonous substances, urinary disorders, fistula-in-ano, rheumatism, paralysis/hemiplegia, stiffness of the thigh muscles, cysts, backache, splenic disease, non-healing ulcers and chronic scrofula (therapeutic uses based on texts from 1000 BC to fourteenth century).

IMPORTANT FORMULATION/
APPLICATIONS

Miśraka Sneha (Ashtāngahridaya, seventh century), contains 21 plant drugs, including Dravantī seeds, in equal proportion. For

abdominal lump, constipation, colic, abscess, neurological diseases.
Oil from seeds: anti-rheumatic and anti-paralytic; used in chronic ulcers and ringworm. Root and oil from seed: purgative. Root: used in stomach disorders and glandular swellings.³²
The extracts from the plant, seed oil and latex were tested for their anti-microbial activities. The latex showed strong anti-bacterial activity against *Bacillus subtilis*, *Klebsiella pneumonia*, *Malassezia pachydermatis*, *Enterococcus faecalis*, *Xanthomonas* sp. and *Fusarium oxysporum*.¹⁵⁵

DOSAGE/USAGE/CAUTIONS/
COMMENTS

250–500 mg after purification.
LD₅₀ of the ethanolic extract of the aerial parts was 100 mg/kg i.p. in mice.²⁰⁽²⁾

J

Juglans regia Linn. Akṣoḍa

BOTANICAL SOURCE(S)

Juglans regia Linn.
(Fam. Juglandaceae)

Akṣoḍa or Aksota were used by both Charaka and Sushruta, together with Vatama (almond), Abhisuka (pista) and other dry fruits. Its synonym Parvarta pilu¹³⁰ raises doubts about its equation with Juglans regia. (Pilu is equated with Salvadora oleoides Decne; the fruit is a smooth yellow and the seed is greenish.)

PHARMAKOPEIAL AYURVEDIC DRUG

Akṣoḍa (Cotyledon).
API, Part I, Vol.11.

AYURVEDIC SYNONYMS

Akṣoṭa, Sailabhava, Karparala.
Akṣoḍaka, Vṛntaphala, Kandarāla, Pṛthuchhada.⁴

HABITAT

Throughout the Himalayas up to an altitude of 900–3300 m.
Native to Iran. Cultivated in Kashmir, Himachal Pradesh, Khasi hills, and the hills of Uttar Pradesh.⁷

REGIONAL LANGUAGE NAMES

Eng: Walnut;
Assam: Akalbasing;
Beng: Aakharotu;
Guj: Akharoda;
Hindi: Akharot;
Kan: Akrod pappu;
Mal: Akrottu;
Mar: Akrod;
Ori: Akhrot;
Punj: Akharota;
Tam: Akrotu;
Tel: Akrotu;
Urdu: Akhrot.

CONSTITUENTS

Walnut oil and tannin.

Walnuts contain 3%–4% water, 60% oil and 15%–20% protein (approximately 700 calories per 100 g).

Mineral content includes iron and zinc (approximately 3 mg/100 g each), sodium (2 mg/100 g), selenium (19 µg/100 g), calcium, magnesium, potassium, copper and phosphorus, as well as vitamins E and C.

Walnuts predominantly contain polyunsaturated fatty acids and alpha-linolenic and linoleic acids, rather than unsaturated fatty acids like other nuts.

The chief chemical constituent is juglone (5-hydroxy-1, 4-naphthoquinone). Also present are the tannins galloylglucose and ellagitannins.¹⁷

tonic. Sushruta gave oil of the seeds as a digestive tonic.¹⁸

Walnut kernels with dried figs and raisins (bigger varieties) are prescribed as a brain tonic; roasted kernels are used during cold and cough; also as a supplement to rheumatic patients.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Amṛtaprāsha Ghṛta (Ashtāṅgahridaya, seventh century), contains goat's meat extract as one of the 4 main drugs, with 37 supporting herbs including Akṣoda, in equal proportion. A restorative tonic for nervous debility and wasting diseases, for normalising body functions.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–25 g.

The juice of unripe fruits showed significant thyroid hormone-enhancing activity.

Prolonged use may cause serious side effects.

Research potential: development of a thyroid drug.

Daily dosage used in clinical trials (for assessing cardiovascular effects): 20–84 g/day. (Four shelled walnuts equals approximately 20 g.)

Results are inconsistent. Walnut interferes with the absorption of iron.¹⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Kṣāta, Kṣāya, Vataroga

Used for wounds, phthisis and diseases of the nervous system (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta (1000 BC) used the edible nut kernel in prescriptions for anemia, phthisis, debility, senility, and as a vitalizing

Juniperus communis Linn.

Hapuṣā

BOTANICAL SOURCE(S)

Juniperus communis Linn.

(Fam. Cupressaceae)

Most authors equate Hapuṣā with *J. communis*, but in South India, *Sphaeranthus indicus* Linn. is used as the drug source.^{5,6}

Kerala physicians consider Hapuṣā and Mundi to be synonymous.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Hapuṣā (Fruit).

API, Part I, Vol. III.

International Pharmacopoeial name: Juniperi pseudo-fractus.

AYURVEDIC SYNONYMS

Havuşā, Matysagandha.

Vapuṣā, Visrā, Vigandhā, Viśva gandhikā, Matsyagandhikā (related sp.).⁴

Matsyagandha is also a common name of *Alternanthera sessilis*, *Lippia nodiflora*, and *Phyla nodiflora*.

HABITAT

The Himalayas from Kumaon westwards at an altitude of 1500–4250 m.

Sphaeranthus indicus: found throughout the plains in India in wet places. Also found in Sri Lanka, Myanmar, Malesia, and Australia.

REGIONAL LANGUAGE NAMES

Eng: Juniper berry, Common juniper;

Assam: Arar, Abahal, Habbul;

Beng: Hayusha;

Guj: Palash;

Hindi: Havuber, Havubair;

Kan: Padma beej;

Mar: Hosh;

Punj: Havulber;

Tel: Hapusha;

Urdu: Abhal, Aarar.

CONSTITUENTS

Essential oil and flavonoids.

Essential oil 0.8%–1.6%;^{2(a)} contains mainly alpha- and beta-pinene (80%), sabinene, limonene, terpinen-4-ol, borneol and geraniol, together with sesquiterpenes (including alpha- and beta-cadinene).¹²

Terpinen-4-ol is considered to be the main diuretic compound.¹²

Fruit contains flavonoids, luteolin-O-beta-D-glucoside, kaempferol-3-O-alpha-rhamnoside, quercetin, apigenin, luteolin, robustaflavone, podocarpusflavone A and hinokiflavone,^{2(d)} catechol tannins and proanthocyanins.^{24(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Pittodara, Arśa, Grahani, Gulma, Śūla, Kṛmi, Vātodara, Plihārōga

Used for biliary flatulence, piles, sprue, tympanites, colic, worm infestations, enlargement of the abdomen and splenic diseases (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Juniper berry is used internally in dyspeptic complaints, as an appetite stimulant, in cystitis and other benign urinary tract disorders, rheumatism, arthritis and gout. Juniper oil preparations are used externally in rheumatic and arthritic pain.^{24(b)}

IMPORTANT FORMULATION/ APPLICATIONS

None of the quoted compounds represent the unique profile of Hapuṣā.

Juniper berry, in other countries, is taken as a tea for dyspepsia, flatulence, heartburn, and as aquaretic. The tea is prepared by steeping 1 teaspoonful of crushed berry (about 2–3 g) in 150 mL of boiling water for 10 minutes and then straining it.¹³

The berry may not work in a polyherbal compound when included among 20–30 (or more) supporting herbs. No Ayurvedic compounds contain Hapuṣā as the main drug.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–6 g in powder form.

Contraindicated in acute or chronic inflammation of the kidneys. The drug may influence glucose levels in diabetics.^{11(b)}

Terpinen-4-ol, the diuretic principle of the volatile oil, was found to be toxic in mice (orally) at 1.85 mg/kg.¹⁸

Alpha- and beta-pinene content in the berry oil is associated with renal toxicity.¹⁴

BOTANICAL SOURCE(S)

Lagenaria siceraria (Mol.) Standl. Syn. *L. leucantha* Rusby., *L. vulgaris* Ser.
(Fam. Cucurbitaceae)

Syn. *Cucurbita siceraria* Molina¹⁵ (equated with Bitter bottle-gourd).

Cucurbita lagenaria Linn. is equated with Sweet bottle-gourd.

PHARMACOPOEIAL AYURVEDIC DRUG

Tumbinī (Fresh fruit).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Alābu, Tumbī.

Ikshavāku, Katu-tumba, Katukālāvu, Tiktālāvu, Tiktekshvāku, Tumbā, Tumbī, Pindaphalā, Lambā.³⁰

(Sweet variety is used as a vegetable, bitter variety is used in medicine.)³⁰

Alābu is the sweet variety. The bitter variety is Kātukālābū.^{16(a)}

HABITAT

Cultivated throughout India.

REGIONAL LANGUAGE NAMES

Eng: Bottle gourd;

Beng: Laus, Loki;

Guj: Dudi, Tumbadi;

Hindi: Lauki, Ghia;

Kan: Isugumbala, Tumbi;

Mal: Chorakka, Churan, Choraikka, Piccura, Tumburini, Cura, Tumburu;

Mar: Phopla;

Punj: Tumbi, Dani;

Tam: Shorakkai, Surai, Suraikkai;

Tel: Sorakaya, Anapakaya;

Urdu: Ghiya, Lauki.

CONSTITUENTS

Saponin and fatty oil.

Bitter fruits yield 0.13% of a solid foam containing cucurbitacins B, D, G and H, mainly cucurbitacin B. These principles are present in the fruit as aglycones.

Fruit juice contains beta-glycosidase (elaterase).

Plants with non-bitter fruits contain no bitter principle or elaterase.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jwara, Kāsa, Śvāsa, viṣa roga, Śopha, Vraṇa, Śūla

Used for fever, cough, toxemia, edema, ulcers, and colic (therapeutic uses based on texts from 1000 BC to fifteenth century).

Ikshavāku fruit was given internally as an emetic and in adenitis; added with *Yavakshāra* (barley ash) and sugar for calculus; used as a cardiac tonic, antidote to poisoning and for alleviating bronchitis, cough, asthma, and biligenic affections.

Decoction of the leaves was given in jaundice.

Seeds were prescribed in dropsy and as diuretic and anthelmintic.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Mahāvishagarbha Taila (Bhaishajya Ratnavālī, seventeenth century), a 72 plant drug compound. Tumbini is among 46 basic herbs, all in equal proportion.

Used for diseases of the nervous system.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 mL of fresh drug in juice form.

Lawsonia inermis Linn.

Madayanti

BOTANICAL SOURCE(S)

Lawsonia inermis Linn.

(Fam. Lythraceae)

Nil Madyantika could not be traced in classical texts.

Madayanti/Madayantikā is mentioned in Bhāvaprakāsha (sixteenth century), but it was equated with Mallikā, a Jasmine species.³

Henna (Mehendi) was originally an Unani plant drug. The classical Ayurvedic drug was Mendi, Mendikā, Madyantikā (Charaka, Sushruta, 1000 BC; Vāgbhata, sixth to seventh centuries). It was included in Mahānila Ghrit of Sushruta, which was specific for leprosy.

PHARMACOPOEIAL AYURVEDIC DRUG

Madayanti (Leaf).

API, Part I, Vol. IV.

Possibly, the classical drug could not be equated with the proper botanical name.

AYURVEDIC SYNONYMS

Nil Madayantika.

Nakharanjani (Sushruta), Medika (Charaka).

Mālati synonyms during the sixteenth century: Mallikā, Medini, Mukṭā, Bandhini and Madyantikā.⁴ (See References 3 and 16[c].)

HABITAT

Cultivated and naturalised all over India.

A hedge plant found throughout India; as a commercial dye crop, it is cultivated mainly in Punjab and Gujrat, as well as in Madhya Pradesh and Rajasthan. Important centers are the Gurgaon district (Haryana) and Bardoli and Madhi in the Surat district (Gujarat).^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Henna;

Beng: Mehadi;

Guj: Mendi;

Hindi: Mehendi;

Kan: Goranta, Korate, Madarangi;

Mal: Mailanelu;

Mar: Mendi;

Punj: Mehndi;

Tam: Marudum;

Tel: Gorinta;

Urdu: Mehendi, Hina.

Eng: Egyptian privet.^{2(a)}

Henna should not be confused with Henna root (*Alkanna tinctoria*).

CONSTITUENTS

Glycosides, colouring matter (Lawsone), Hennotannic acid, Essential oil containing β -Ionone.

Leaves gave 7- and 4'-glucosides of apigenin, 7- and 3'-glucosides of luteolin, 2-hydroxy-alpha-naphthaquinone (lawsone), beta-sitosterol-3-O-glucoside and coumarins, mainly fraxetin, scopoletin, and esculetin.^{15,2(d)} Air-dried leaf powder contained tannins 4.9%–10.21%.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jwara, Kandu, Raktapitta, Kamala, Raktapittahara, Kustha, Mutrakrcchra, Bhrama, Vrana

Used for fever, pruritus, bleeding disorders, jaundice, obstinate skin diseases, dysuria, vertigo, and ulcers (therapeutic uses based on texts from 1000 BC to nineteenth century).

The entire plant of Madayantikā was an ingredient of a medicinal *ghee* for internal and external use in epilepsy, malignant jaundice, and gray hair (Charaka Samhitā, 1000 BC).²⁷ Madyanti was an ingredient of a medicinal oil for external application on malignant ulcers (Sushruta Samhitā, 1000 BC).²⁸

Madyanti, with honey, was given for hematuria (Ashtāngahridaya, sixth century). It was also used in intrinsic hemorrhage (Gadanigraha, twelfth century). Leaf juice

of Madyanti was prescribed for 1 month to alleviate consumption (Bangasena, eighteenth century).^{16(a)}

single-herb preparation. Used for bleeding disorders.

IMPORTANT FORMULATION/ APPLICATIONS

Madayantiyādi Churna (Not in AFI, Part I and II, details not known.)
Madayanti Kvātha (Sahasrayoga, a non-Samhitā, Kerala Materia Medica, CCRAS text) is a

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 ml (Swarasa).

LD₅₀ of the ethanolic extract of the whole plant excluding the root was >1000 mg/kg i.p. in albino mice.²⁰

Lens culinaris Medic.

Masūra

BOTANICAL SOURCE(S)

Lens culinaris Medic.
(Fam. Fabaceae)

Syn. *Ervum lens* L.

PHARMACOPOEIAL AYURVEDIC DRUG

Masūra (Seed).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Supya, Pittabheṣaja.

Masūrīkā, Mangalyā, Mangalyaka.¹⁸
Masuraka.²⁷

Masūrā was also a synonym of the black variety of Trivṛt (Noshotha).⁴

HABITAT

Cultivated throughout North India, particularly in Uttar Pradesh, Bihar, and West Bengal, to a smaller extent in Punjab, Rajasthan, Maharashtra, and Gujarat.

REGIONAL LANGUAGE NAMES

Eng: Lentil;
Beng: Masuri;
Guj: Masura, Masoor, Masur;

Hindi: Masur;
Kan: Masura bele;
Mal: Chanam payar, Vattupparupu;
Mar: Masur, Massora;
Punj: Masur, Masara;
Tam: Masoor paruppu;
Tel: Masura pappu, Masooralu,
Urdu: Masur.

CONSTITUENTS

Flavonoids and Vitamins.

Flavonoids, kaempferol-3-O-alpha-L-rhamno-pyranoside-7-O-beta-glucopyranoside and kaempferol-7-O-rutinoside; saccharides, cic-eritol, D-glucose, D-fructose, sucrose, raffinose, stachyose and verbacose; sterols, 24-methylene-25-methylcholesterol, 24-ethyl cholesterol and 24-ethyl-22E-dehydro cholesterol.
Seeds also contain imidazole, O-acetylethanol-amine, a saponin (0.11%) and several triterpene alcohols.^{2(c)}

(For protein, vitamin, and mineral content, see Reference 2[a].)

THERAPEUTIC AND OTHER ATTRIBUTES

Atisara, Muttrakrcchra, Jwara, Raktapitta

Used for diarrhea, dysuria, fever, and bleeding disorders (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Cooked as a food or as an ingredient of prescriptions, Masura was given in griping pain, hemothermia, and spleen diseases.²⁷

Masūra Ghrita (extract of Masūra in clarified butter) was prescribed for diarrhea and malabsorption syndrome. For chronic diarrhea, Masūra soup mixed with the paste of *Aegle marmelos* (Bilva) fruit and ginger powder was given. Parched flour of Masūra, mixed with honey and pomegranate juice, was administered in acute vomiting (Shūrangadhara Samhitā, thirteenth century; Vrindamūdhava, eighth century).^{16(a),18}

IMPORTANT FORMULATION/ APPLICATIONS

Masūra grains were used in a number of cosmetic preparations during the classical period.

Masūra grains, fried and dehusked, pounded with milk and mixed with *ghee*, were applied topically for freckles (Shārangadhara Samhitā). For lustrous, blemish-free skin, Masūra paste was applied over the face (Vrindamādhava, eighth century; Bhāvaprakāsha, sixteenth century).

A face-pack of red sanders, madder (Manjishtha), Lodhra, costus root, Banyan tender leaf and Masūra was used for localized hyper-pigmentation and dark spots on the face (Bhaishajya Ratnāvali, seventeenth century).

When milk was not available, juice of Masūra was used.^{3,4}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g.

L

Leonotis nepetaefolia R. Br.

Granthiparṇī

BOTANICAL SOURCE(S)

Leonotis nepetaefolia R. Br.
(Fam. Lamiaceae)

In texts, Granthiparna and its varieties Sthauneyaka (*Taxus baccata* Linn.)³⁰ and Choraka (*Angelica glauca* Edgw.)³ have been described, hence several plants have been suggested.³

One species known as Granthiparna was a substitute of Karpura.³

PHARMACOPOEIAL AYURVEDIC DRUG

Granthiparṇī (Root).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Kākapuccha.

(Kākapuccha is a non-classical synonym; not in the AFI.)

Granthiparna, Nila pushpa, Shukapushpa, Vivarnaka.⁴

(When Karpūra [camphor] was not available, Granthiparni was used.)^{3,4}

Granthi, Granthikā, Granthiparna and Granthiparni have been equated with *L. nepetaefolia* in the AFI.

Granthika and Granthi are also equated with *Piper longum* root.³

HABITAT

Cultivated and naturalized throughout the hotter parts of India.

Native to tropical Africa.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Knod grass;
Assam: Granthika;
Beng: Hejurchei;
Guj: Hatisul;
Hindi: Gathivan;
Mar: Dipmal;
Tel: Ranathem.

Eng: Bald-head, Bird-honey, Lion's tail, Johnny Collins.¹⁹

CONSTITUENTS

Sterols.

The root contains *n*-octacosanol, *n*-octacosanoic acid, quercetin, 4,6,7-trimethoxy-5-methylchromene-2-one, campesterol and beta-sitosterol-beta-D-glucopyranoside.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Swāsa, Kaṇḍu, Viṣa

Used for asthma, pruritus, and toxemia (therapeutic uses based on Bhāvaprakāsha, sixteenth century). The plant is considered to be a depurative, emmenagogue, febrifuge, laxative, and narcotic. Used in skin diseases, amenorrhea, and fevers. Leaves are used in rheumatic afflictions.^{2(a)} Plant extract is used in tribal medicine for epilepsy and insanity. An ethanolic extract of the plant showed activity against Walker's carcinosarcoma.^{2(c),256}

The ethyl acetate-methanol (4:1) extract of the leaves showed anti-bacterial activity against several Gram-positive and Gram-negative bacteria at a minimum dose of 16 mg/mL.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Brhat Guḍūchi Taila (Bhaishajya Ratnāvali, seventeenth century), contains Guduchi (*Tinospora cordifolia*) as the main plant drug, with 33 supporting herbs including Granthiparna root, all in equal proportion. For jaundice, anemia, urinary, and skin diseases. Mr̥tasanjivani Surā (Bhaishajya Ratnāvali) contains the Granthiparni plant as a minor herb.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g of the drug in powder form.

Lepidium sativum Linn.

Candraśūra

BOTANICAL SOURCE(S)

Lepidium sativum Linn.
(Fam. Cruciferae)

Entered into Ayurvedic medicine after the sixth century. Not mentioned in Brhatrayī.³

PHARMACOPOEIAL AYURVEDIC DRUG

Candraśūra (Seed).

API, Part I, Vol. I.
International Pharmacopoeial name: Lepidii semen.

AYURVEDIC SYNONYMS

Candrikā.

Vāsapushpā, Pashumehankārika.^{16(c)}
Chandra is equated with Karpura.³ Chandrikā is also a synonym of Vākuchi.⁴

HABITAT

Cultivated throughout India.

Cultivated in most of the hill stations of India.³² Indigenous to Egypt and West Asia.¹ 220 species are found in cosmopolitan areas, especially in temperate zone. Five species occur in India.¹

REGIONAL LANGUAGE NAMES

Eng: Common Cress;
Assam: Halim;
Beng: Chand Shura, Halim;
Guj: Aseriya, Aseliyo;
Hindi: Chansur;
Kan: Allibija, Kapila;
Kash: Alian;
Mal: Asali;
Mar: Ahaliva, Haliv;
Ori: Chandasara, Chandasura;

Punj: Holon, Taratej;
 Tam: Allivirai;
 Tel: Adityalu, Aadalu;
 Urdu: Halim.

Eng: Garden cress, Water cress.

CONSTITUENTS

Alkaloids, essential oil, fixed oil and mucilage.

Seeds contain the alkaloid, lepidine, in addition to N, N'-dibenzylurea, N, N'-dibenzylthiourea and sinapic acid ester,^{2(d)} mucilaginous matter (5%) and uric acid (0.108 g/kg).

Volatile oil showed pronounced estrogenic activity.^{2(a)} Yield is less than 1%.^{2(c)}

Fixed oil yield up to 25.5%, with unsaponifiable matter containing beta-sitosterol and alpha-tocopherol.

The mucilage is used as a substitute for tragacanth and gum arabic, consisting of a mixture of cellulose (18.3%) and uronic acid-containing polysaccharides.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Hikkā, Atisāra, Vātarakta

Used for hiccup, diarrhea, and gout (therapeutic uses based on Bhāvaprakāsha, sixteenth century).

Seeds are a good source of iron but the bioavailability is poor (5.4% of total iron). They are used for the rapid healing of bone fractures.

Ethanollic extract of seeds significantly increased collagen synthesis and its deposition at bone fracture position in treated rats. The seeds showed high cholinesterase activity. Seed extract showed hypotensive effects with transient respiratory stimulation and antispasmodic effects on isolated guinea pig ileum. Cardiostimulant effects were also observed. Seeds are used for treating skin diseases, fever, amebic dysentery, and asthma.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Kastūrādi (Yayu) Gutika (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains deer musk, semen of civet cat, calcined iron, purified mercury, borax (ore), black antimony, realgar, cinnabar, fuller's earth, barley ash with 30 herbs which do not include Chandraśūra. Chandra of CCRAS text and Indu of AFI text are equated with Karpura. Pashupashi, mentioned in the compound, is equated with *Myristica malabarica* (AFI).

Chandrashūra Rasa (a decoction of the seeds) was used for hiccup (Bhāvaprakāsha, sixteenth century).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

LD₅₀ of the ethanollic extract was 1000 mg/kg i.p. in mice.²⁰

Leptadenia reticulata W.&A.

Jivanti

BOTANICAL SOURCE(S)

Leptadenia reticulata W.&A.
 (Fam. Asclepiadaceae)

Syn. *Gymnema aurantiacum* Wall. ex Hooks, f. Market drug in most parts of the country: whole herb of *Ephemerantha macraei* (Lindl.). Hunt & Summerh. syn. *Dendrobium macraei* Lindl., known as Swarna Jivanti.

Roots of *Holostemma ada-kodien* J.A. Schutes are used as Jivanti in South India, especially in Kerala.^{5,36}

PHARMACOPOEIAL AYURVEDIC DRUG

Jivanti (Root).

API, Part I, Vol. VI.

The majority of Ayurvedic practitioners has probably been using different orchid species having similar appearances and belonging to *Pholidota* spp. or *Desmotrichum fimbriatum* Bl. syn. *Dendrobium macraei* Lindl.³⁰

AYURVEDIC SYNONYMS

Jīvantī, Śākaśreṣṭha, Jīvanī.

HABITAT

Throughout the plains of India, along hedges.

Found in the sub-Himalayan tracts of Punjab and Uttar Pradesh, and throughout the Deccan peninsula up to an altitude of 900 m.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Cork swallow-wort;
Ben: Jiwanti;
Guj: Dodee;
Hindi: Dodi shak, Jivanti;
Mal: Atapatayan;
Mar: Kheerakhodee, Kharkhoda;
Tam: Palalkkodi;
Tel: Palatige, Mukkuttummudu.

CONSTITUENTS

Hentriacontanol, α - and β -amyrin, stigmasterol, β -sitosterol and flavonoids-diosmetin and luteolin. (Constituents of leaves and twigs have been quoted from *Planta med*, 1975, 27: 395.)³²

Plant also yielded pregnane glycosides reticulin, deniculatin and leptaculatin (structures elucidated), which, on hydrolysis, gave calogenin tocopherols.¹⁵⁶

Water-soluble constituents isolated from the root include essential amino acids, L-phenyl alanine, L-tryptophan, L-arginine and L-lysine; phenolic acids isolated from methanolic and aqueous extracts include vanillic acid, syringic acid, ferulic acid and *p*-coumaric acid.¹⁵⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra (diarrhoea), Dāha (burning sensation), Jvara (fever), Kṣaya (pthisis), Kāsa (cough), Śoṣa (emaciation), Mukharoga (disease of mouth), Naktāndhya (night blindness), Netraroga (diseases of the eye), Raktapitta (bleeding disorder), Trṣṇā (thirst), Urahksata (pulmonary cavitation), Vraṇa (ulcer)

The plant was valued as a pot herb (Shākashreshtha, “the best among vegetables”) and as a stimulant and restorative. The plant has been clinically tested and found useful in the treatment of habitual abortion.^{2(a)}

The lactogenic effect of the plant has also been assessed clinically by many investigators.²⁰⁽²⁾

IMPORTANT FORMULATION/ APPLICATIONS

Jivanti belongs to *Jivan panchmūla* (the Five Vitalizing Roots) of Ashtāngahridaya and to *Jivaniya varga* (the Ten Vitalizing Group of herbs) of Charaka. The root is a constituent of all the quoted compounds for its rejuvenating and age-sustaining properties.

Jivantiyādi Ghritam (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Jivanti as the main plant drug with eight supporting herbs. Used for eye diseases.

Anu Tailam (Ashtāngahridaya, seventh century) is used as nasal drops in diseases of eyes, nose, and throat; also used in headache and cold.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

LD₅₀ of the ethanolic extract of the whole plant, excluding the roots, was >1000 mg/kg i.p. in mice.²⁰⁽²⁾

***Leucas cephalotes* Spreng.**

Droṇapustī

BOTANICAL SOURCE(S)

Leucas cephalotes Spreng.

(Fam. Lamiaceae)

L. indica (L.) R. Br. Vatka and *L. aspera* (Willd.)

Spr. are also used as Dronapushpi.^{5,3}

PHARMACOPOEIAL AYURVEDIC DRUG

Dronapuspi (Whole plant).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Katumba.

Devadronī.¹⁵

Dronā, Svasanakah, Pālindi, Kumbha-yonikā,

Kshatrātikshatrikā, Kaundinya.⁴

HABITAT

The Himalayas at an altitude of 600–1800 m and on waste land throughout India.

REGIONAL LANGUAGE NAMES

Assam: Dronaphool;

Beng: Bholghasiya;

Guj: Kubo;

Hindi: Guma;

Kan: Tumbe;

Mal: Tumba;

Mar: Tumba;

Ori: Gaisha;

Punj: Gomobati, Gumma, Mal-bheda;

Tam: Tumbai;

Tel: Tummi

CONSTITUENTS

Alkaloid, Glycoside, β -Sitosterol and Flavonoid.

L. cephalotes: plant contains beta-sitosterol glycoside and traces of an alkaloid.³² Seeds gave octadeca-5,6-dienoic acid (laballenic acid).¹⁵

L. indica: acacetin, chrysoeriol, isopimaradiene, linifolioside, pimaradiene, and sandaracopimaradiene were isolated from aerial parts.³²

L. aspera: plant gave oleanolic acid, ursolic acid, and beta-sitosterol.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Kāmalā, Śoṭha, Tamaka śvāsa, Kāsa, Agnimāndya,
Visamajvara

Used for jaundice, edema, bronchial asthma, cough, digestive impairments, and intermittent fever (therapeutic uses based on the texts from the eighth to sixteenth centuries).

A reputed home remedy in Kerala for worms, fever and intestinal catarrh in children. Fresh juice of the plant is extensively used in jaundice and skin diseases.⁵

The plant is used as a pot herb. A syrup of the flowers is used as a domestic remedy for coughs and cold (also flowers of *L. aspera* in North Bengal).^{2(a)} Fresh plant juice is used in scabies. *L. aspera* juice is also used in chronic skin eruptions and psoriasis.^{2(c)}

The plant failed to exhibit hepatoprotective activity against CCl₄-induced hepatotoxicity in mice and rats (CCRAS).²⁶

IMPORTANT FORMULATION/ APPLICATIONS

Gorochanādi Vati (Vaidyayoga Ratnāvalī; Eng. edn. published by IMPCOPS, excluded the compound), contains solid bile of ox (Gorochana) and other animal products, 6 mineral drugs and 32 plant drugs, all in equal proportion. Used for high fever with extreme prostration and as an emergency drug. It is now obsolete.

Plihāri Valika (Bhaishajya Ratnāvali, seventeenth century) is a herbo-mineral compound processed in the plant juice of Dronapushpi. Used for diseases of the spleen and liver.

Details of Bālarogāntaka-Rasa,^{25,26} quoted by CCRAS, are not available in the AFI. (A mercury-based herbo-mineral drug

of Bhaishajya Ratnavali does not contain Dronapushpi. Used for high fever with delirium.)

LD₅₀ of the 90% ethanolic extract of the aerial parts was found to be 1000 mg/kg i.p. in rats.²⁰⁽²⁾

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–3 g of the drug in powder form. 5–10 mL of the drug in juice form.

Lilium polyphyllum D. Don

Kākoli

BOTANICAL SOURCE(S)

Lilium polyphyllum D. Don
(Fam. Liliaceae)

Tuberous roots of *Roscoeia procera* Wall. are also used as Kākoli.³⁰

Withania somnifera Dunel. roots are used as a substitute of Kākoli and Kshirakākoli (in double quantities).³

Hindi: Kakoli;
Kan: Kakoli;
Mal: Kakoli;
Mar: Kakoli;
Ori: Kakoli;
Tam: Kakoli;
Tel: Kakoli, Kakoli moola, Kandhambu;
Urdu: Kakoli

PHARMACOPOEIAL AYURVEDIC DRUG

Kākoli (Tuberous Root).

API, Part I, Vol. III.

Belongs to the *Ashta varga* (the “Eight Tonic Herbs”), which were used as one component for their synergistic action in cooling, nourishing, as a spermatopoetic aphrodisiac and in recuperating.

AYURVEDIC SYNONYMS

Vāyasoli, Svādumānisi.

Svādumāmsi, Kāyasthā, Vīraśuklikā, Dhvānkshakoli, Payasvini,⁴ Vayasthā.⁷

HABITAT

Western temperate Himalayas from 1800–3600 m from Kumaun to Kashmir.

REGIONAL LANGUAGE NAMES

Beng: Kakoli;
Guj: Kakoli;

CONSTITUENTS

Sugars.

Bulb contains linalool and alpha-terpineol.

The methanolic extract of the bulb yielded three steroidal glycerides: beta-sitosterol-3-glyceryl-2'-linoleyl-3'-linoleate, glyceryl-1-*N*-octadec-9-enoyl-2-*N*-decanoyl-3-*N*-decanate and glyceryl-1-octadec-9'-enoyl-2-octadec-9'', 12''-denoyl-3-tetracosanoate.¹⁵⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Śoṣa, Jwara, Swāsa, Kāsa, Kṣaya, Dāha

Used for bleeding disorders, cachexia, fever, asthma, cough, phthisis, and burning sensation (therapeutic uses based on texts from the thirteenth to fifteenth centuries).

Tuberous roots are used as a tonic in emaciation and as a source of energy after dry roasting.⁷

Bulbs are used in agalactia, cough, bronchitis, seminal weakness, general debility, stranguary, and vitiated conditions.¹⁵⁸

IMPORTANT FORMULATION/ APPLICATIONS

All the quoted compounds contain all the drugs of the “*Ashta varga*” or their substitutes.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

All the eight specific plant drugs of the “*Ashta varga*” were used as a composite drug in Ayurvedic tonic compounds.

Linum usitatissimum Linn.

Atasī

BOTANICAL SOURCE(S)

Linum usitatissimum Linn.
(Fam. Linaceae)

About 123 types of linseeds have been grouped under various categories. The diploid chromosome number of the Indian types is 30, while that of the flax types, grown in Europe and other countries, is either 30 or 32. Attempts to grow flax types in India have met with little success.^{2(a)}

Guj: Alshi, Arasi;
Hindi: Alsi;
Kan: Agasebeeja, Semeagare, Agasi;
Kash: Alsi;
Mal: Agastha, Agasi, Cheru charm;
Mar: Atshi;
Ori: Atushi;
Punj: Ali;
Tam: Ali, Virai;
Tel: Avisā;
Urdu: Alsi, Katan.

Eng: Flax seed (European linseed).

PHARMACOPOEIAL AYURVEDIC DRUG

Atasī (Seeds).

API, Part I, Vol. I.

International Pharmacopoeial name: Lini semen.⁸

CONSTITUENTS

Fixed oil, mucilage and protein.

Fixed oil (30%–45%); triglycerides of linolenic, oleic, stearic, palmitic and myristic acids; proteins (20%–25%); mucilage (3%–10%) yielding after hydrolysis 8%–10% galactose, 9%–12% arabinose, 13%–29% rhamnose, 25%–27% xylose and galacturonic and mannuronic acids (approximately 30% each); sterols and triterpenes and cyanogenic glycosides (0.1%–1.5%).⁹

The mucilage consists of water-soluble polysaccharides, with rheological properties resembling those of guar gum.^{2(c)}

Flax seed oils are among the best natural sources of alpha-linolenic acid, a precursor to essential omega-3 fatty acid.¹⁷

AYURVEDIC SYNONYMS

Umā, Kṣumā.

Kshumā, Kshauma.³⁰

Masranā, Nilapushpi.⁷

HABITAT

Cultivated.

Unknown in the wild state.

Linum: more than 230 species are found in temperate and subtropical regions, especially Mediterranean regions.¹

REGIONAL LANGUAGE NAMES

Eng: Linseed;

Assam: Tisi, Tusi;

Beng: Masina, Atasī;

THERAPEUTIC AND OTHER ATTRIBUTES

Śīroroga, Kṛmiroga, Kuṣṭha, Prameha

Used for diseases of the head, worm infestations, obstinate skin diseases, and urinary disorders/polyuria (therapeutic uses based on Bhāvaprakāsha, sixteenth century).

Linseed is official in the Indian Pharmacopoeia.

It is a demulcent, emollient, expectorant, and diuretic; it is astringent after roasting.

The whole seed is prescribed as a laxative in the same manner as ispaghula husks. The mucilaginous infusion is used internally as a demulcent in colds, coughs, bronchial afflictions, inflammation of the urinary tract, and diarrhea.

Crushed seeds are applied as a poultice.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Sarshapādi Pralepa (Bhaishajya Ratnāvali, seventeenth century), a medicinal paste for

external application as poultice or plaster, contains Atasī and 5 other seeds, processed in cow's curd. Used for external application on cysts, goiters, and cervical lymphadenitis. Seeds were used externally for tearing of abscesses and as a poultice or plaster in gout and inflammations. Seeds and oil were used internally as a laxative for urinary diseases and intestinal parasites (Charaka Samhitā, Sushruta Samhitā, 1000 BC).^{27,28}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

For preparing mucilage, soak 2–3 tablespoons of milled seeds in 200–300 mL water and strain after 30 minutes.⁸

Contraindicated in ileus of any origin.⁸

L

Litsea chinensis Lam.

Medāsakah

BOTANICAL SOURCE(S)

Litsea chinensis Lam.

Syn. *L. glutinosa* (Lour.) C.B. Robins,

L. sebifera Pers.

(Fem. Lauraceae)

Maida lakadi is available in the form of broken quills or pieces.

PHARMACOPOEIAL AYURVEDIC DRUG

Medāsakah (Wood).

Medāsakah (Stem bark).

API, Part I, Vol. V.

(Used by Unani practitioners for treating fractures and joint dislocation as a plaster.)

AYURVEDIC SYNONYMS

Medāsaka (a folk name in Punjab).

Maghāse Hindi and Maida-lakdi in Unani medicine.

Sanskrit synonym Vasa^{15,33(a)} could not be validated.

HABITAT

Throughout India, ascending up to an altitude of 1350 m in outer Himalayas.

Found in the Himalayas, Southeast Asia to Australia, and South Africa.¹

REGIONAL LANGUAGE NAMES

Beng: Kukurchite;

Guj: Meda lakdee;

Hindi: Maida lakdee;

Mar: Meda lakdee;

Punj: Medasaka;

Tam: Medalakavi;

Tel: Meda.

CONSTITUENTS

Wood: Alkaloids (Laurotetanine, actinodaphine, boldine, norboldine).

Stem bark: Alkaloids (laurotetraline, actinodaphine, boldine, norboldine, sebiferine, and litseferine).

(Source of API text: Phytochemistry, 1972, 11:1149; Indian J Chem, 1976, 14B:150.)

Bark contains a water-soluble arabinoxylan (D-xylose and L-arabinose in a 1.0:3.4 ratio).^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Wood: Śoṭha, Śūla, Vātavikāra, Agnimāndya, Atisāra, Raktasrāva

Stem bark: Śoṭha, Śūla, Vātavikāra, Agnimāndya, Atisāra, Raktasrāva, Asthibhanga.

Therapeutic uses are based on one Sanskrit *shloka* composed by a contemporary Ayurvedic scholar.

Wood: inflammation, colic pain, rheumatic afflictions, digestive impairments, diarrhea, and bleeding; stem bark additionally used for bone fractures.

In practice, a paste of powdered wood⁶³ and Gil-e-armani (red soil, silicate of Alumnia) is applied over dislocations of joints and bone fractures.

The bark powder, mixed with honey, is prescribed in inflammatory conditions including gout and sciatica.

Bark mucilage is used in diarrhea and dysentery.⁶³

IMPORTANT FORMULATION/ APPLICATIONS

Wood: Aileyaka Taila (Chitrakādi Taila), Vātaghna lepa (Chintāmani Rasa); stem bark: Asthi-sandhānaka lepa.

Chitrakādi Taila is used for fistula-in-ano and does not contain Medasakah. Details of other quoted products are not available.

The bark exhibited anti-bacterial activity against *Bacillus subtilis*, *B. megaterium*, *Sarcina ultea*, *Micrococcus lysodeikticus*, *Staphylococcus citreus*, *S. aureus*, *S. albus*, *Streptococcus pyogenes*, *Salmonella typhi*, *Shigella shigi*, *S. sonnei*, *S. flex*, and *E. coli*.^{2(d)} Bark essential oil: anti-fungal.³²

Ethanollic extract of the bark decreased ejaculation frequency in male rats.^{2(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Wood: 1 to 3 g powder.

Stem bark: 5–10 g powder.

Lodoicea maldivica Pers.

Aklāri

BOTANICAL SOURCE(S)

Lodoicea maldivica Pers.
Syn. *L. seychellarum* Labill.
(Fam. Arecaceae)

Female species bear double coconuts, having a suggestive shape like female hindquarters. Nuts are reported to be imported into India.

PHARMAPOEIAL AYURVEDIC DRUG

Aklāri (Endosperm).

API, Part I, Vol. IV.

(Aklāri, an herbal drug of Sahasrayoga [AFI, Part I, page 307], could not be traced in classical Ayurvedic texts.)

Abdhinārikela²⁹ is also a non-classical Sanskritized synonym.

Dariyāyi Nāriyal of Unani medicine (Siddhayoga Sangraha) was a better option.

AYURVEDIC SYNONYMS

Samudra Nūrikela.

HABITAT

Growing on all types of soils from sandy shore to arid mountain top and also cultivated.

Native to Seychelles.

REGIONAL LANGUAGE NAMES

Eng: Double coconut;
Beng: Narikel, Jora narikel;
Guj: Dorai nareal;
Hindi: Dariyai nariyal;
Kan: Joditengu;
Mal: Aklari;
Mar: Dariyacha naral;
Ori: Samudra narikela;
Punj: Dariyai nariyal;
Tam: Thunga, Kadal thengai;
Tel: Samudra tenkaya kohari;
Urdu: Narjeel daryae.

Eng: Coco-demer.¹

CONSTITUENTS

Sugars and Sterols.

On the basis of doctrine of signatures, aphrodisiac qualities were attributed to the endosperm.

THERAPEUTIC AND OTHER ATTRIBUTES

Visucika, Hrdroga, Sita jvara

Used for gastro-enteritis, heart disease and rigorous fever (therapeutic uses based on a Sanskrit *shloka* composed by a contemporary scholar).

In Unani medicine, powdered kernels or kernels processed in rose-water are given in cholera and as an antidote to poisons. It works as a strong emetic until the poison is completely washed out. It is also applied on inflammations and poisonous bites.⁶³

The water of green fruits and their soft kernels are considered anti-bilious and antacidic.^{2(a)} Traditionally, dried kernels are used in pediatric disorders. Processed with *Terminalia chebula* (Haritaki) in water and given cold alleviates impurities of the blood, boils, and skin eruptions, and also acts as an anthelmintic.⁷

IMPORTANT FORMULATION/ APPLICATIONS

Gorochanādi Vati (Vaidyayoga Ratnāvali; English edn. published by IMPCOPS, excluded the compound), contains 8 animal products, 6 mineral drugs and 32 herbs, Aklāri is one of them, all in equal proportion. An obsolete drug.

Mrtasanjivani Gutikā (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains 8 animal products, 6 mineral drugs and 22 herbs, with Aklāri being one of them, all in equal proportions. Used for high fever, epilepsy, and delirium.

Javāhara Moharā (Siddhayoga Sangreha, by a contemporary scholar) contains ten minerals, two animal products and three herbs, including Dariyāyi Nāriyal fruit powder. Used for Hrddaurbalya ("weakness of the heart").

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 gm of the drugs in powder form.

Dose: 0.5–1 g in powder form.⁶³

***Luffa acutangula* (Linn.) Roxb.**

Koṣṭakī

BOTANICAL SOURCE(S)

Luffa acutangula (Linn.) Roxb.
(Fam. Cucurbitaceae)

L. acutangula (L.) Roxb. var. *amara* Clarke is equated with the bitter variety.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Koṣṭakī (Whole plant).

API, Part I, Vol. III.
(Katukoṣṭakī.)

AYURVEDIC SYNONYMS

Kṛtavedhanā, Jāli, Dhāmārg.

Rājākoshātaki, Dhāmārgava.³⁰

HABITAT

Wild, also cultivated throughout greater part of India.

REGIONAL LANGUAGE NAMES

Eng: Ribbed gourd;

Beng: Zinga;

Guj: Turiya, Kadawa, Turiya;

Hindi: Turai, Satputia;

Kan: Hire-valli;

Mal: Peerkam kai;

Mar: Dodka turiya;

Ori: Tarada;

Punj: Turiya;

Tam: Peerkku;

Tel: Beera, Chedu beeha, Varri beera;

Urdu: Turai.

CONSTITUENTS

Bitter principles, Saponins, Sapogenins and fixed oil.

Luffa acutangula var. *amara*: plant yielded acutal-sodies A, B, D, E and G and cucurbitacin E, as well as beta-sitosterol and its D-glucoside, luteolin-7-glucoside and oleanolic acid.

Seeds contain 2-deoxycucurbitacin (amarinin), cucurbitacins B, D, G and H and acutal-sodies H and I. Cucurbitacins B and D were isolated from the root.¹⁵

All parts of the plant are extremely bitter.^{2(a)}

Ripe seeds of the fruit of the edible variety also contain cucurbitacins B, D, G, and H.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Pāṇḍu, Plīhāroga, Śopha, Gulma, Ādhmāna, Garaviṣa, Arśa, Kāmalā, Gaṇḍamālā

Used for obstinate skin diseases, anemia, splenic disease, edema, obstructive jaundice, flatulence, accumulated toxic substances, piles, jaundice, and cervical lymph adenitis (therapeutic uses based on texts from 1000 BC to thirteenth century).

Whole plant: bitter tonic, diuretic, laxative and beneficial in asthma, skin diseases and spleen enlargement; in folk medicine, used in convulsions, cramps, and scabies.

Fruits: bitter tonic, cathartic, demulcent, diuretic, and emetic.

Seeds: anti-dysenteric, emetic, expectorant, and purgative.

Oil: applied in cutaneous diseases.

Leaves: decoction in amenorrhea and uremia; paste applied in hemorrhoids, leprosy and splenitis.

Root: laxative and prescribed for dropsy.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

Abhay lavana (Bhaishajya Ratnāvali, seventeenth century), contains alkaline ashes of 17 herbs, Koshātaki plant is one of them. For diseases of liver and spleen, obstructive jaundice, diabetes.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

Plant juice: 10–20 mL.^{16(b)}

Lycium barbarum L.

Kaṇṭakīgulma

BOTANICAL SOURCE(S)

Lycium barbarum L.

Syn. *L. europaeum* L.

(Fam. Solanaceae)

Syn. *L. vulgare* Dunal; *L. halimifolium* Mill.¹⁹

Not in AFI, Part I and Part II.

Lycium barbarum is neither used in Unani medicine, nor in Ayurvedic medicine. Its use in ethnomedicine should be analyzed.

Chirchitā of Unani medicine is a different herb.

PHARMACOPOEIAL AYURVEDIC DRUG

Kaṇṭakīgulma (Aerial part).

API, Part I, Vol. VI.

Sanskritized, non-classical nomenclature of “spinous shrub” (Chirchitā/Chirchatā of Unani medicine).³⁷

The National Academy of Ayurveda equated *Lycium barbarum* with Khichar and Chirchatā.²⁹

Apāmārga of Ayurvedic medicine, equated with *Achyranthes aspera* Linn., is also known as Chirchitā.⁷

AYURVEDIC SYNONYMS

Sitakāṇḍa, Chatrakeśara.

Sanskritized synonyms.

HABITAT

The drier plains of central and southern peninsula.

Found in Punjab, Rajasthan, Gujarat, and Saurashtra.^{2(a)}

REGIONAL LANGUAGE NAMES

Guj: Gangro;

Hindi: Chiritta;

Mar: Gangro;

Pun: Ganger, Chirchitta;

Urdu: Chirchitta.

Punjab: Chirchitta.

Delhi: Chirchitta.^{2(a)}

CONSTITUENTS

Tropane alkaloid like atropine, streoidal sapogenin like diosgenin and flavonoids like quercetin and rutin.

Alkaloid percentages in shoots 1.26%, fruits 1.24%, calli 0.83%, and roots 0.67%.

Fruits had highest atropine content (0.95%) and shoots had highest hyoscyamine content (0.33%).

Leaves and flowers contain free quercetin 1.28 and 1.54 mg/g dry weight, and bound kaempferol 1.32 and 0.94 mg/g dry weight, respectively.^{2(c)}

Plant contains the sterols cholesterol, campesterol, stigmasterol, beta-sitosterol, lanosterol, and isofucosterol.^{2(d)}

Fruits contain beta-carotene (8 mg/100 g dry weight) and free amino acids (1.0%–2.67%).^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya (digestive impairment), Dantaśūla (toothache), Jalodara (ascites), Kaiṇḍū (itching), Raktārśa (bleeding piles) Used as a single drug. (Non-classical attributes.)

The plant is poisonous to camels and livestock.^{2(a),19}

Both isolated and purified flavonoids are active against *Staphylococcus aureus*, *E. coli*, and *Candida albicans* (quercetin was not active against *Candida albicans*).^{2(c)}

Aerial parts showed anthelmintic activity against *Nippostrongylus brasiliensis*.^{2(d)}

The plant showed an immunoregulating effect, stimulating T- and B-lymphocyte proliferation.^{2(d)}

Leaves contain betain,^{2(a)} which has uterine-stimulant properties and is an emmenagogue and abortifacient.¹³

IMPORTANT FORMULATION/ APPLICATIONS

Polysaccharide extracted from fruits showed immunostimulatory, antiproliferatory, and antiaging activities; acts as an antioxidant; prevented the CCl₄-induced increase in lipid peroxidases in liver, also protected against genetic damage from mutagenic and genotoxic compounds, which led to its potential use in preventing the adverse effects of chemotherapeutic agents.^{2(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 2 to 5 g.

Lycium chinense is the source of Lycium juice (Gochi and goji berry juice), though both *Lycium chinense* and *Lycium barbarum* have been quoted in literature.^{13,17}

BOTANICAL SOURCE(S)

Madhuca indica J.F. Gmel
Syn. *M. latifolia* (Roxb.) Macbride
Bassia latifolia Roxb.
(Fam. Sapotaceae)

M. longifolia (Koenig) Macb.
Syn. *Bassia longifolia* Koenig is equated with
South Indian Mahua and Mowra Butter Tree.

PHARMACOPOEIAL AYURVEDIC DRUG

Madhūka (Flower).

API, Part I, Vol. II.

Not to be confused with Madhuka (*Glycyrrhiza glabra*).

AYURVEDIC SYNONYMS

Gūḍapūṣpā.

Madhupushpa, Madhusrav.⁷

According to the National Academy of Ayurveda,
M. longifolia (Koen.) Macb. is Madhūka (*Jala*),
Madhūlaka, and Jala-mahuwā.²⁹ The aquatic
(*Jalaja*) variety of Madhuka (*Glycyrrhiza glabra*
Linn.) still remains unidentified.

Jala-madhuka may be Jalaja Maduka of classical
texts.

HABITAT

Throughout India, also cultivated.

M. longifolia (Koenig) Macb. is common in
monsoon forests of Western Ghats from
Konkan southwards, and extends into Deccan
and many parts of South India.

REGIONAL LANGUAGE NAMES

Eng: The Indian butter tree, Mahawash tree;
Assam: Mahua, Mahuwa;
Beng: Mahuwa;
Guj: Mahudo, Mahuwa;
Hindi: Mahuwa;
Kan: Hippegida, Halippe, Hippe, Hippenara,
Madhuka, Ippa, Eppimara;

Mal: Irippa, Ilippa, Iluppa, Eluppa;
Mar: Mohda; Ori: Mahula;
Punj: Maua, Mahua;
Tam: Katiluppai, Kattu iluppai, Iluppi;
Tel: Ippa puvvu;
Urdu: Mahuva.

CONSTITUENTS

Sugars.

The aroma of fresh flowers is attributed to 2-acetyl
1-1-pyrroline.^{2(d)}

Corollas contain 72.9% sugars: sucrose, maltose,
glucose, fructose, arabinose, and rhamnose.^{2(a)}

Dried flowers contain comparatively less
sucrose, whereas glucose and fructose are
almost equal. They also contain polysaccha-
rides which on hydrolysis gave D-galactose,
D-glucose, L-arabinose, L-rhamnose, D-xylose,
and D-glucuronic acid.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Tṛṣṇā, Dāha, Śrama, Śvāsa, Kṣata, Kṣaya

Used for excessive thirst, burning sensation,
fatigue, wounds and phthisis (therapeutic
uses based on texts from 1000 BC to sixteenth
century).

Flowers are regarded as being cooling, a tonic,
and a demulcent. Used in coughs, colds,
and bronchitis. Flowers show anti-bacterial
activity against *E. coli*.^{2(a)} Also used in renal
diseases.³²

IMPORTANT FORMULATION/ APPLICATIONS

Madhūkāsava (Ashtāngahridaya, seventh cen-
tury), contains Madhūka flowers as the main
drug with 8 other herbs. A digestive and blood
purifier.

Drākshādi Kvātha Churna (Ashtāngahridaya)
contains seven plant drugs, including
Madhūka flowers, all in equal proportions.
Used for alcoholism, vertigo, and vomiting.

Elādi Modaka (Bhaishajya Ratnāvali, seventeenth century) contains 17 plant drugs, including Madhūka flowers, all in equal proportions. Used for alcoholism and associated disorders.

DOSAGE/USAGE/CAUTIONS/COMMENTS

10–15 g of the drug.

Malaxis acuminata D. Don

Jivakaḥ

BOTANICAL SOURCE(S)

Malaxis acuminata D. Don
Syn. *Microstylis wallichii* Lindl.
(Fam. Orchidaceae)

Malaxis mucifera (Lindley) Kuntz.
Syn. *Microstylis musifera* Ridly is also used as Jivaka.⁷

Malaxis acuminata is used as Rshbhaka.⁷
Pueraria tuberosa DC. is used as a substitute for Jivaka and Rshbhaka.³

REGIONAL LANGUAGE NAMES

Eng: Jeevak;
Hindi: Jeevak;
Mal: Jeevakam;
Tam: Jeevakam;
Tel: Jeevakamu.

CONSTITUENTS

Alcohol (ceryl alcohol), glucose, rhamnose and diterpenes.

Beta-sitosterol has been isolated from the ethyl acetate extract of *M. acuminata*. Other reported compounds include piperitone, citronellal, eugenol, limonene, 1, 8-cineole, *P*-cymene, O-methylbatatasin, and ceryl alcohol.¹⁵⁹

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Dāha, Ksaya, Raktavikāra, Kārsya, Svāsa, Kūsa, Śoṣa

Used for bleeding disorders, burning sensation, phthisis, diseases due to vitiated blood, emaciation, asthma, cough, and cachexia (therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/APPLICATIONS

All the quoted compounds contain drugs of the *Ashta varga*, either the original ones or the substitutes.

Balā Taila and its variants of South India do not contain drugs of the *Ashta varga*.

M**PHARMACOPOEIAL AYURVEDIC DRUG**

Jivakaḥ (Pseudo-bulb).

API, Part I, Vol. V.
Belongs to the *Ashta varga* (the “Eight Tonic Herbs”), which were used as one component for their synergistic action: cooling, spermopo-etic, aphrodisiac, and recuperating.

AYURVEDIC SYNONYMS

Jivya, Dīrghāya, Cirajīvi.

Shringi, Hrasvānga, Kūrcha-shirshaka.⁴
Bandhura, Dhira, Durdhara, Gopati, Indrāksha, Kakuda, Matrika, Visani, Virsa, Vrishnabha.¹⁵⁹

HABITAT

Throughout India on hills at an altitude of 2000–3000 m.

M. mucifera: Northern Himalayas at altitudes of 1500–2800 m.⁷

The genus *Malaxis Soland* ex Sw. (Orchidaceae) is also distributed in Indo–China and Malesia.¹⁹

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

5–10 g.

Tuber: 3–6 g powder (CCRAS).
All the eight specific plant drugs of the *Ashta
varga* were used as a composite drug in tonic
compounds.

Mallotus philippensis Muell. Arg. Kampilla

BOTANICAL SOURCE(S)

*Mallotus philippinensis** Muell. Arg.

(Spelt wrongly.)
(Fam. Euphorbiaceae)

Rottlera tinctoria Roxb.³¹

PHARMACOPOEIAL AYURVEDIC DRUG

Kampilla (Glands and hairs of fruit).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Rajanaka, Kampillaka.

Rechana, Rechi, Rakta-chūrṇaka, Vraṇa-shod-
hana, Rohita, Shamana.⁴

HABITAT

Out Himalayas ascending to 1500 m.

Found from the Northwest Himalayas to
Australia.¹ Distributed in tropical and subtrop-
ical regions of the Old World. About 20 species
are found in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Kamala;
Assam: Lochan;
Beng: Kamlagudi;
Guj: Kapilo;
Hindi: Kabila;
Kan: Chandrahettu, Kapila, Kapilathettu;

Kash: Kameelak;
Mal: Kampippala, Kampipalu;
Mar: Shendri, Kapila;
Ori: Kamalagundi;
Punj: Kamila;
Tam: Kamala, Kampila;
Tel: Kampillamu;
Urdu: Kamila.

Eng: Monkey-face tree.
Nicobar Islands: Roiyan.^{2(c)}

CONSTITUENTS

Resinous colouring matter (rottlerin).

Phloroglucinol derivatives (red to yellow
47%–80%): chief constituents include rottlerin
(about 1%), *iso*-rottlerin (about 0.1%),
3-hydroxyrottlerin, 3, 4-dihydroxyrottlerin,
methylene-*bis*-methyl phloroacetophenone,
and their resinous polymers. The drug also
contains bergenin and tannins.¹⁴

Rottlerin (red compound) along with small
amounts of *iso*-allorottlerin (yellow compound)
constitute 11% of the powder. Yield of powder is
1.3%–3.7% of the weight of the fresh fruit.^{2(a)}

**THERAPEUTIC AND OTHER
ATTRIBUTES**

Vibandha, Kṛmiroga, Ādhmāna, Gulma, Vraṇa

Used for constipation, worm infestations, acute
flatulence, abdominal lumps, and ulcers
(therapeutic uses based on texts from the
thirteenth to sixteenth centuries).

Used internally in acute constipation, intesti-
nal paralysis, and abdominal swellings; fruit
and flower pollen used as a purgative; used as
an ingredient of a medicinal oil in sinusitis,

* *philippensis*,^{2(a,c)}
phillipinensis (AFI, Part I, page 336.)

malignant ulcers, and skin diseases; oil of seeds used internally in urinary diseases and intestinal parasites (Sushruta Samhitā, 1000 BC);²⁸ Kampallika, mixed with lavish quantity of honey, was prescribed for diseases of the spleen (Vrindamadhava, eighth century).^{16(a)} It is specific as a tenifuge.

**IMPORTANT FORMULATION/
APPLICATIONS**

Dhānvantara Ghrita (Ashtāngahridaya, seventh century), contains 27 main drugs and 11 supporting herbs, including Kampilla fruit glands and hair, in equal porportion. For diabetes, anemia, urinary disorders, abdominal lump, splenic diseases.
Mishraka Sneha (Ashtangahridaya) contains 21 plant drugs, all in equal proportions, including Ranjakā. Used for constipation, abdominal lumps, colic, and abscesses.

Kampilla showed 35.69% and 78.21% anthelmintic effects in albino rats; it also has anti-fungal, hemostatic, wound-healing, anti-inflammatory, anti-histaminic properties experimentally.²⁶

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

0.5–1.0 g of the drug in powder form.
Before use, Kampilla is triturated in the juice of citron (*Citrus medica*) and fresh ginger by repeating the *bhāvanā* process three times (API).
A rottlerin and *iso*-rottlerin 1:1 mixture is more active as a purgative.^{2(a)}
Chronic treatment with Kampilla caused reductions in body weight, and gastrointestinal bleeding should be watched for.²⁶
LD₅₀ in chonic toxicity tests was 200 mg.²⁶

M

<i>Mangifera indica</i> Linn.	Seed	Āmra
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BOTANICAL SOURCE(S)

Mangifera indica Linn.
(Fam. Anacardiaceae)
“Chausā”, “Dusehri” and “Desi”—all three varieties are to be studied independently for their chemical constituents and uses in medicine.

**PHARMACOPOEIAL AYURVEDIC
DRUG**

Āmra (Seed).
API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Āmrabijamajjā.
Fruit: Āmra, Chūta, Sahakār.³⁰
Vanotsava, Atisaurabha, Mākanda, Pikabandhu, Rasāla, Kumavallabha.⁴

HABITAT

Found wild or cultivated throughout India.
Found in the Indian subcontinent and Indo–China, and widely cultivated in the tropics.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Mango;
Beng: Am;
Guj: Aambaro, Ambanoo, Aambo, Keri;
Hindi: Aam;
Kan: Amavina;
Mal: Manga;
Mar: Aamba;
Ori: Amkoili; Ambakoiti;
Punj: Amb;
Tam: Mangottai paruppu, Maangottai;
Tel: Mamidi-jeedi;
Urdu: Aam.

CONSTITUENTS

Tannins—Pyrogallotannins.

Seed kernels contain alpha- and beta-amyrin, gallotannin, glucogallin, and sterols.^{2(c)} 68%–70% natural lipids, a small fraction of phospholipids and galactolipids. Oleic acid (42%) and stearic acid (39%) are the principal fatty acids in the oil.

Raw mango seed kernels, besides tannins (12.4% tannic acid equivalent), contain phenols (13.8% tannic acid equivalent) and condensed tannins (0.24%).^{2(d)}

The kernels exhibited anti-bacterial and anti-fungal activities.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra, Pravāhikā, Chardi, Dāha, Tvagroga

Used for diarrhea, dysentery, vomiting, burning sensation, and skin diseases (therapeutic uses based on texts from the fifteenth to sixteenth centuries).

Charaka (1000 BC) gave seed kernels in prescriptions for diarrhea and intrinsic hemorrhage.

A decoction of seed kernels with honey and sugar was administered as a single drug in emesis and diarrhea (Vrindamādhava, eighth century; Bhāvaprakāsha, sixteenth century). Seed

kernels, pounded with Haritaki (*Terminalia chebula*), were applied to the scalp for dandruff. A paste of seed kernel, honey, and camphor was recommended for treating a relaxed vagina (Shārangadhara Samhitā, thirteenth century).^{16(a)} Powdered stone was used for restoring normal color of the skin (Charaka Samhitā).

IMPORTANT FORMULATION/ APPLICATIONS

Ashokārishta (Bhaishajya Ratnāvali, seventeenth century), contains stem bark of Ashoka as the main drug, with 16 supporting herbs, Āmra seed kernel is one of them. Used for leucorrhea and other menstrual disorders, and as a female tonic.

Pushyānuga Chūrna (Bhaishajya Ratnāvali) contains 25 plant drugs, including Āmra seed kernels, all in equal proportions. Used as a uterine tonic for leucorrhea and other disorders.

Brihat Gangādhara Chūrna (Shārangadhara Samhitā, thirteenth century) contains Āmra seed kernels with 13 plant drugs, all in equal proportions. Used for diarrhea and dysentery.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g of the drug in powder form.

Mangifera indica Linn.

Stem bark

Āmra

BOTANICAL SOURCE(S)

Mangifera indica Linn.
(Fam. Anacardiaceae)

“Chausā,” “Dusehri,” and “Desi”—all three varieties are to be studied independently for their chemical constituents and uses in medicine.

PHARMACOPOEIAL AYURVEDIC DRUG

Āmra (Stem bark).

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The variation in chemical constituents of the different cultivars should be noted before using the stem bark.

AYURVEDIC SYNONYMS

Fruit: Chūta, Sahakāra.³⁰

Vanotsava, Atisaurabha, Mākanda, Pikabandhu, Rasāla, Kūmavallabha.⁴

HABITAT

Found wild or cultivated throughout India.

Found in the Indian subcontinent and Indo-China, and widely cultivated in the tropics.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Mango;
Beng: Am;
Guj: Aambaro, Ambanoo, Aambo, Keri;
Hindi: Aam;
Kan: Amavina;
Mal: Manga;
Mar: Aamba;
Ori: Amkoili; Ambakoiti;
Punj: Amb;
Tam: Mangottai paruppu, Maangottai;
Tel: Mamidi-jeedi;
Urdu: Aam.

CONSTITUENTS

M

Tannins – Protocatechuic acid, Catechin, Mangiferin, Alanine, Glycine, α -Aminobutyric acid, Kinic and Shikimic acids.

For chemical constituents of stem bark of “Chausā” and “Dusehri”, see Reference 2(c); for “Desi”, see Reference 2(d).

Stem and root bark contains mangiferolic, mangiferonic, hydroxymangiferonate, methyl mangiferonate, methyl isomangiferolate, alpha- and beta-amyrins and cycloartenol, in addition to several other triterpenoids and sterols.

Phenolic compounds include gallicocatechin and protocatechuic acid. Tannin extract (4.1%) exhibits anti-microbial activity.^{2(c)} Methanol extract is cytotoxic.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra, Vraṇa, Agnimāndya, Grahani, Prameha, Yoni roga

Used for diarrhea, ulcers, digestive impairments, malabsorption syndrome, urinary disorders, and vaginal diseases (therapeutic uses based on texts from the eighth to nineteenth centuries).

During the classical period, bark powder and juice of the bark extracted by closed heating or its cold infusion was given to treat diarrhea with blood and mucus. Bark, pounded and added to milk and sugar, was prescribed for gonorrhea.^{16(a)}

Stem bark extract exhibited anti-microbial activity against *E. coli*, *E. piracoli*, *Citrobacter diversus*, *Klebsiella pneumoniae*, *Salmonella enteritidis*, *Shigella flexneri*, and *Staphylococcus aureus*.^{2(c)} (Justifies bark's use in diarrhea.)^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Nyagrodhādi Churna (Yogarātnākara, sixteenth century), contains 28 plant drugs including 15 herbs, in equal proportion.

Chandanāsava (Bhaishajya Ratnāvali, seventeenth century) contains 22 plant drugs in equal proportions.

Mūtrasangrahanīya Kashāya Chūrna (Charaka Samhitā, 1000 BC) contains ten plant drugs in equal proportions.

All three compounds are used for dysuria, polyuria, and cystitis.

Nyagrodhādi Kvātha Chūrna (Ashtāngahridaya, seventh century) contains 21 plant drugs in equal proportions.

Grahinimihira Taila (Bhaishajya Ratnāvali) contains 32 plant drugs in equal proportions.

Both compounds are used for diarrhea, dysentery, and bleeding disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of powder. 25–50 g for decoction.

Maranta arundinacea L.

Ārāroṭa

BOTANICAL SOURCE(S)

Maranta arundinacea L.
(Fam. Marantaceae)

PHARMACOPEIAL AYURVEDIC DRUG

Ārāroṭa (Rhizome).

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Starches obtained from *M. arundinacea* and *Curcuma angustifolia* are not distinguished in the Indian trade.^{2(a)}

Frequently adulterated with starches of potato, sago, tapioca, sweet potato, and certain *Curcuma* spp.^{2(a)}

AYURVEDIC SYNONYMS

Sita tavakṣīra.

(Non-classical.)

Tvakshiri, Tikhuri and Tikhura of the classical period, derived from *Curcuma angustifolia* Roxb., were substitutes of Vamshalochana (due to its scarcity) during the period of Bhāvaprakāsha (sixteenth century).³

HABITAT

Cultivated in India, often found in wild, as an escape.

Indigenous to tropical America. Its cultivation spread to tropical countries, India, Sri Lanka, Indo-China, Indonesia, the Philippines, Queensland (Australia), Isle of Reunion and Natal.

West Indies is the main center. Two types of plants are grown in Kerala, blue and yellow (color of the rhizome). The blue type gives higher yields of starch than the yellow one.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: West Indian arrowroot;
Ben: Ararat;
Hindi: Araaruta;
Kan: Araaruta;

Mar: Tavakira;
Ori: Araaruta;
Pun: Araaruta;
Tam: Aruruttukkilangu;
Tel: Palagunda.

Eng: *Marantae amylum*, Maranta starch.
Curcuma angustifolia: East Indian arrowroot, Travancore starch.^{2(c)}

CONSTITUENTS

Starch (25-30%), dextrin and sugars.

Analysis of a specimen of rhizome: moisture 63.4%, crude protein 1.6%, fat 0.2%, starch 27.8%, dextrin and sugars 2.1%, crude fibre 3.9%, and ash 0.9%.^{2(a)}

The tuber contains a protease inhibitor, which inhibits bovine trypsin, enterokinase, alpha-chymotrypsin, and proteolytic activity in human and bovine pancreatic secretions.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kasa (cough), Svasa (Asthma), Daha (burning sensation), Trsna (thirst), Ksaya (pthisis), Agnimandya (digestive impairment), Raktadosa (disorders of blood).

Used as a single drug. (Non-classical attributes.)

Used as a nutritional food for infants and convalescents; as a dietary aid in gastrointestinal disorders; and also for diarrhea, especially in pediatrics.

It is a demulcent and soothing agent.¹⁴

IMPORTANT FORMULATION/ APPLICATIONS

Tavakshiri (*Curcuma angustifolia*): Dried powder of the tuber mixed with milk and sugar is used as a diet in dysentery, typhoid fever, ulcerations of bladder, bowels with blood; also in painful micturition.¹⁵

Dadimāshṭaka Chūrṇa (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Tugakshiri with seven plant drugs. The compound proved efficacious in amebic dysentery in a clinical trial.^{2(c),160}

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (powder): 5 to 10 g.

Marsdenia tenacissima Wight. & Arn.

Murvā

BOTANICAL SOURCE(S)

Marsdenia tenacissima Wight. & Arn.
(Fam. Asclepiadaceae)

Marsdenia tenacissima (Roxb.) Moon.
Syn. *Asclepias tenacissima* Roxb.³²
M. tenacissima is wrongly supplied in the Northern markets under the name of Trivrit.³ Jingini was used as a substitute for Mūrvā during the sixteenth century.^{3,4} (Jingini is equated with *Lannea coromandelica* [Houtt.] Merrill.)³ In Kerala, *Chonemorpha fragrans* (Moon) Alston is the accepted source of Mūrvā.^{5,3} *Sansevieria roxburghiana* Schult. is used in Tamil Nadu.⁶

Hindi: Murva, Jartor;
Kan: Koratige Hambu, Kallu shambu, Koratige, Halukaratige, Kadaluhaleballi;
Mal: Perumkurumba;
Mar: Morvel;
Ori: Murva, Murga;
Tam: Perumkuringan;
Tel: Chagaveru;
Urdu: Turbud safed.

Eng: Safed Nishoth, Rajmahal Hemp.³²

CONSTITUENTS

Resin.

Roots and seeds are rich in pregnane glycosides of 2-deoxysugars, which, on hydrolysis, gave genins and sugars, including cissogenin, tenasogenin, tenacissigenin, *iso*-drevogenin P, drevogenin Q, D-cymarose, asclepobiose, D-canarose, 3-O-methyl-6-deoxy-D-allose, 17- α and 17- β marodenin, β -D-glycosyl-L-thevetose and cinnamic and acetic acids.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Medoroga, Meha, Mukha śoṣa, Kṛmiroga, Hṛdroga, Kaṇḍū, Arśa Raktapitta, Tr̥ṣṇā

Used for fever, hyperliposis, polyuria, dryness of mouth, worm infestations, heart disease, pruritus, bleeding piles and excessive thirst (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Mūrvā was used for urinary and skin diseases, intermittent fevers and as a blood purifier and purgative.

Mūrvā belongs to the Āragvadhādi group, which was specific for obstinate urinary disorders, skin diseases, pruritus, vomiting, and toxemia.

PHARMACOPEIAL AYURVEDIC DRUG

Murvā (Root).

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AYURVEDIC SYNONYMS

Madhusrava, Madhurasā.

Piluparni.^{3,30}
Devi, Devashreṇi, Snigdhaparni, Pr̥thakparni, Moratā, Piluparnikā.⁴

HABITAT

Throughout India.

Found in the Himalayas from Kumaun to Assam, up to an altitude of 1500 m., extending southwards to the Deccan peninsula.^{2(a)}

REGIONAL LANGUAGE NAMES

Assam: Murha;
Guj: Moravel;

IMPORTANT FORMULATION/ APPLICATIONS

Patolādi Kvātha Chūrna (Ashtāngahridaya, seventh century), contains 6 plant drugs including Madhusravā root, in equal proportion. For jaundice, fever, skin diseases. Āragvadhādi Kvātha Chūrna (Ashtāngahridaya); the Madhurasā root is among 20 plant drugs in equal proportions. Used for toxemia, urinary disorders, and skin diseases. Sudarshana Chūrna (Bhaishajya Ratnāvali, seventeenth century); Mūrvā is among 44 plant drugs in equal proportions. Used for

intermittent fevers and diseases of the liver and spleen.

Prameha Mihira Taila (Bhaishajya Ratnāvali) contains Shatavari (*Asparagus racemosus*) juice as the main drug. The Mūrvā root is among 41 supporting herbs. Used for urinary disorders, intermittent fevers, and sexual debility.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–6 g of the drug in powder form. 10–20 g of the drug for decoction.

Martynia annua Linn.

Kākanāsikā

BOTANICAL SOURCE(S)

Martynia annua Linn.
Syn. *M. diandra* Glox.
(Fam. Martyniaceae)

Fam.: Pedaliaceae; Martyniaceae.^{2(c)}
Seeds of *Anamirta paniculata* W. & A. are used as Kākanāsika in Tamil Nadu.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Kākanāsikā (Seed).

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In Dhanvantari Nighantu (prior to the thirteenth century), Kākanāsā, Kākajandhā and Kākādani were mentioned as “Kākamāchi-visheshā”, as a post-script after Kākamāchi.^{16(a)}

AYURVEDIC SYNONYMS

Kākāmgi, Śirobal, Cerasnaya.

(Source of quoted synonyms could not be traced. Cerasnaya is an illegible synonym.)

Vyālankhā of Raja Nighantu has been equated with *Martynia annua*.¹⁵

HABITAT

Throughout India in waste places.

Native of Mexico.^{7,32}

REGIONAL LANGUAGE NAMES

Eng: Tiger's claw, Devil's claw;
Beng: Kurki, Kaih, Baghnoki;
Hindi: Bichu hathajori, Kawathodi;
Kan: Garuda mugu;
Mar: Vinchuachajada;
Punj: Kaktundi, Bichu, Hathajari;
Tam: Kakatundi;
Tel: Garudamukku, Telukondikaya.

Eng: Devil's claw, Small-fruit devil's claw.¹⁹

CONSTITUENTS

Fixed oil (Semidrying type).

Fruit contained gentisic acid in addition to *p*-hydroxybenzoic acid.²⁰⁽²⁾

Seeds yield 10.35% fixed oil. Fatty acids of the oil are: palmitic 8.08%, stearic 11.25%, arachidic 1.34%, oleic 35.84%, and linoleic 32.37%.^{2(a)}

A minor source of epoxy (7.0%) and cyclopropanoid (malvalic acid 7.8% and sterculic acid

4.4%) fatty acids, previously unknown in the Pedaliaceae family.¹⁶¹

Ethanol extract of seeds exhibited 36.36% and 65.70% fungal toxicity against *Alternaria alternata* and *Aspergillus niger*, respectively.²⁰⁽²⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Palita

Used for graying of hair (therapeutic use based on a *shloka* of Raja Nighantu, fourteenth century).

The essential oil moderately inhibited passive cutaneous anaphylaxis in animal studies.^{2(c)}
The oil is applied in eczema.^{2(d)}

The leaves of the plant are reported to be used in epilepsy and applied to tuberculous glands of the neck; the juice is used as a gargle for sore throat. The fruit is considered alexiteric and useful in inflammations.^{2(a)} The ash of

fruits, mixed with coconut oil, is applied on burns.

IMPORTANT FORMULATION/ APPLICATIONS

Chyavanprāsha (Charaka Samhitā, 1000 BC), contains Kākanāsikā fruit among 42 supporting herbs.

Tryushanādi Ghrita (not in the AFI; Sahasrayoga, CCRAS text) does not contain Kākanāsikā.

Tryushana is a synonym of Trikatu (the group of dry ginger, long pepper, and black pepper, the “Three Pungents”).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–5 g.

LD₅₀ of the ethanolic extract of seeds was 100 mg/kg i.p. in mice.²⁰⁽²⁾

M

Melia azedarach Linn.

Mahānimba

BOTANICAL SOURCE(S)

Melia azedarach Linn.
(Fam. Meliaceae)

Syn. *Melia toosendan* Siebold A. Juss.¹⁹

PHARMAPOEIAL AYURVEDIC DRUG

Mahānimba (Stem bark).

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AYURVEDIC SYNONYMS

Ramyaka, Dreka.

Nimbaraka, Kārmuka, Vishamushtika, Girika, Udreka, Kshira, Kesha-mushtikah.⁴
Mahapichumanda, Akshiva.³⁰

HABITAT

Occurring wild in the sub-Himalayan tract up to 1,800 m. Naturalized throughout India.

Native to West Asia. Naturalized throughout warm countries.

M. toosendan: found in the Indian subcontinent, East Asia, China, Malesia, Australia, and Southwest Pacific; naturalized in the Americas.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Persian lilac;

Assam: Khammaga;

Beng: Ghoranim;

Guj: Bakan limado, Bakai nimbu;

Hindi: Bakain, Drek;

Kan: Kadu bevu;

Mal: Malaveppu;

Mar: Bakana nimb;

Punj: Dharek, Bakain, Drek;

Tam: Malaivembu;

Tel: Turakavepa;

Urdu: Neem.

Eng: Chinaberry, Sichuan pagoda tree.¹⁹

CONSTITUENTS

Tannins and Alkaloids.

Bark: nimbinine, azaridine, paraisine, isochuanliansu, 6H-beta-hydroxy-4-stigmasten-3-one, and 6-beta-hydroxy-4-campesten-3-one.

Stem bark includes: 4', 5'-dihydroxyflavone-7-O-alpha-L-rhamnopyranosyl-(1 → 4)-beta-D-glucopyranoside; 1,8-dihydroxy-2-methylanthraquinone-3-O-beta-D-galactopyranoside; 1,5, dihydroxy-8-methoxy-2-methylanthraside; kuline, kulactone, and kulinone.^{2(d),15}

THERAPEUTIC AND OTHER ATTRIBUTES

Prameha, Kustha, Hrlasa, Svasa, Gulma, Arsa, Musika visa, Visuci, Bhrama, Chardi, Visama jvara

Used for urinary disorders/polyuria, obstinate skin diseases, nausea, asthma, abdominal lumps, piles, rat bites, gastro-enteritis, vertigo, emesis, and intermittent fever (therapeutic uses based on texts from the twelfth to sixteenth centuries).

Bark: anti-diarrheal; leaf, fruit, and stem bark: antileprotic;³² used for ascariasis.^{2(a),5}

Broad-spectrum anthelmintic activity of the bark against *Ascaris* spp. and *Hymenolepis nana* has been reported.^{2(c)} Gedunin, present in the plant, inhibits *Plasmodium falciparum*.^{2(c)} A decoction of the bark is used as a tonic in dyspepsia.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Brhn manjishthādi kvāth chūrna (Shārangadhara Samhitā, thirteenth century), contains stem bark of both Nimba and Mahānimbā with 45 plant drugs used for chronic skin diseases. Mahā vishagarbha taila (Bhaishajya Ratnāvali, seventeenth century) contains the stem bark of both Nimba and Mahānimbā, with 73 constituents. Used for diseases of the nervous system and inflammatory conditions.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

LD₅₀ of the ethanolic stem bark extract was 250 mg/kg i.p. in mice.²⁰⁽²⁾

M

Mentha viridis Linn.

Pudīnāḥ

BOTANICAL SOURCE(S)

Mentha viridis Linn.

Syn. *M. spicata* var *viridis* Linn.
(Fam. Lamiaceae)

M. sylvestris auct. non-L.

M. cordifolia auct. non-Opiz.³²

PHARMACOPOEIAL AYURVEDIC DRUG

Pudīnāḥ (Aerial part).

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(Non-classical nomenclature based on the herb's common name.)

AYURVEDIC SYNONYMS

Pūtiḥā, Rocanī, Podīnakah.

Pūtiḥā and Pīti-nāshaka-karpura were introduced as Sanskritized synonyms by the National Academy of Ayurveda during 1998.²⁹

Putihā = the herb that removes bad odor; this is not an appropriate synonym.

HABITAT

Cultivated throughout the plains of India.

Cultivated in the plains of Punjab, Uttar Pradesh, and Maharashtra.³²

REGIONAL LANGUAGE NAMES

Eng: Spear-mint, Garden mint;
Beng: Pudinaa;
Guj: Phudino;
Hindi: Pudeenaa;
Mar: Pudinaa;
Punj: Purari pudina;
Tam: Pudeenaa;
Tel: Pudeenaa

CONSTITUENTS

Essential oil (0.2 to 0.8 per cent) containing terpene such as carvone (60%) and limonene (10%) as major constituents.

The major constituent of the essential oil is carvone; other constituents include *l*-limonene, dihydrocarvone, carvomenthone, *iso*-menthone, and dihydrocarvylacetate.³²

Indian spearmint oil is reported to have a higher percentage of limonene (26.82%) compared to Italian and American oil. (Carvone to limonene ratio: 2.3:1.0 from shade-dried spearmint).^{2(d)}

Leaves gave the flavonoids diosmin, diosmetin-7-O-beta-D-glucuronide, and luteolin-3'-O-beta-D-glucuronide.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Ādhmāna, Śūla, Chardi, Kṛmi, Jvara, Jīṛṇa jvara, Mūtrakṛcchra, Kaṣṭārtava, Prasūtijvara, Aruci, Kāsa, Hikkā, Śvāsa, Mada, Agnimāndya, Visucikā, Atisāra, Grahani, Ajīrna, Vaktrajādyā

Used for acute flatulence, colic, emesis, worm infestations, fever, chronic fever, dysuria,

dysmenorrhea, puerperal fever, tastelessness, cough, hiccup, asthma, intoxication, digestive impairments, gastroenteritis, diarrhea, malabsorption syndrome, indigestion, and liver disorders (therapeutic uses based on non-classical Sanskrit *ślokas* composed by contemporary scholars).

Leaf and flowering top: stimulant, carminative, anti-spasmodic, nervine, and anti-emetic.

Leaf: febrifuge and antidote for intestinal toxemia.³²

IMPORTANT FORMULATION/ APPLICATIONS

Pudinārka (Āyurvada Sūra Sangraha, a contemporary Ayurvedic Materia Medica). Distilled essence of Pudina leaf. Used for emesis, indigestion, abdominal pain, and digestive impairments.

The essential oil in 1/100 dilution exhibited strong anti-bacterial activity against *E. coli*, *Salmonella typhimurium*, *Rhizobium leguminosarum*, *Staphylococcus aureus*, and *Bacillus subtilis*.

Leaves show anti-bacterial activity against *Streptococcus faecalis*, *Salmonella typhi*, *Shigella shigi*, *S. sonnei*, and *S. flexneri*.^{2(d)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 mL patra svarasa. 20–40 mL phanta. 1–3 drops taila.

Enteric coated capsules used for irritable bowel syndrome.

Mint oil pearls used for digestive disorders.

Merremia tridentata (L.) Hall. f.

Matsyapatrikā

BOTANICAL SOURCE(S)

Merremia tridentata (L.) Hall. f.
Syn. *Ipomoea tridentata* (L.) Roth.
(Fam. Convolvulaceae)

Prāsarini is officially equated with *Paederia foetida* Linn. (Fam. Rubiaceae), but in South India, *M. tridentata* subsp. *tridentata* and subsp. *hastata* are the sources of Prasārani or Prasārini.^{5,6}

PHARMACOPOEIAL AYURVEDIC DRUG

Matsyapatrikā (Whole plant).

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South Indian plant drug should be Tala

Nili-Prasārini.

AYURVEDIC SYNONYMS

Prasārini keraliya. (Non-classical Sanskritized name.)

Prasārini is a plant drug of Charaka Samhitā, Sushruta Samhitā (1000 BC). It cannot belong to two altogether different families, Rubiaceae and Convolvulaceae.

Ayurveda should not be divided into North–South segments.

Prasārani synonyms: Chāruparni, Pratānikā, Saraṇi, Sāraṇi, Bhadra parṇi, Suprasara, Sarā and Rājabalā.⁴ (Rāja balā indicates that the drug is superior to Balā in activity.)

HABITAT

In the plains throughout India as a weed.

M. tridentata subsp. *tridentata* is found in the plains of South India.

M. tridentata subsp. *hastata* is found almost throughout peninsular India.⁵

REGIONAL LANGUAGE NAMES

Mal: Talaneeli;

Ori: Bhuin kumdda;

Tam: Mutiyarkunthal, Irippanpul, Savolikkoti;

Tel: Sitasavaram.

Eng: Field bind weed.⁴

CONSTITUENTS

Flavonoids like diosmetin, luteolin, diosmetin-7-O-P-glucoside and luteolin-1-O-(3 glucoside). (Cited from Reference 2c.)

P. foetida (Prasarini) contains paederoside, paederosidic acid, gamma-lactone rutin, 7-O-xylosil glucose, scandoside, and deacetyl asperuloside. It has a greater number of constituents than *M. tridentata* and may have better efficacy than *M. tridentata*.¹⁶²

M. tridentata aerial parts contain the flavonoids diosmetin, luteolin, and their 7-O-beta-D-glucoside.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa (piles), Dhātuksya (tissue wasting), Pakṣāghāta (paralysis/hemiplegia), Sandhiśoṭha (arthritis), Śoṭha (inflammation), Vibandha (constipation), Vraṇa (ulcer)

(Therapeutic properties of Prasarini, quoted from Guduchyādi and Parpapatādi *varga* of classical texts.)

The plant is used in the treatment of rheumatism, hemiplegia (in massage oils) and for piles, urinary disorders, and nervous debility.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Prasāranyādi-Tailam (Keraliya) Prasārini tailam (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) and its 6 variants, Ashtadosha-shatikam, Aikādosha-shatikam, Trishati, Sapta-shatikam and Prasarini Tailam (Kubje) and Prasarini Tailam (Mahārāja). All these compounds contain Prasarini as the main plant drug. Prābhanjana Vimardana Tailam (Sahasrayoga) also contains Prasārini as one of the main plant drugs.

Used in rheumatic afflictions with contraction and stiffness of the joints and paralysis.⁵

Balārishta (Bhaishajya Ratnāvali, seventeenth century) also contains Prasārini (*Merremia tridentata* in South Indian products, *Paederia foetida* in North Indian products).

Prasārinyādi Ghritam consists of two compounds (Sahasrayoga): one for external application on ulcers; the other is used internally for urinary disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g. Svarasa (juice): 5 to 10 mL.

Mesua ferrea Linn.

Nāgakeśara

BOTANICAL SOURCE(S)

Mesua ferrea Linn.
(Fam. Guttiferae)

Substitutes: flower buds of *Mammea suriga* (Ham.) Kesterm (Fam. Clusiaceae), known as Rakta-nāgakesara; immature fruits of *Cinnamomum tamala* Nees. & Eberm, known as Krishna-nāgakesara; immature fruits of *Dillenia pentagyna* Roxb., known as Malabar-kesara.³⁶

In Tamil Nadu and adjacent states, tender fruits of *Cinnamomum wightii* or fruits of *Dillenia pentagyna* are used as Nāgakeśara.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Nāgakeśara (Stamen).

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Mesua ferrea is an official drug representing both Keshara and Kesara (AFI, page 317).

AYURVEDIC SYNONYMS

Keśara, Nāgapuṣpa, Nāga, Hemā, Gajakeśara.

Keśan, Tungi.²⁷
Keśarāhva.²⁸

HABITAT

The Himalayas from Nepal eastwards, Bengal, Assam, evergreen rain forests of North Kanara, Konkan, forests of Western Ghats and Andhra Pradesh.

REGIONAL LANGUAGE NAMES

Eng: Cobras saffron;
Assam: Negeshvar, Nahar;
Beng: Nagesvara, Nagesar;
Guj: Nagkesara, Sachunagkeshara, Nagchampa, Pilunagkesar, Tamranagkesar;
Hindi: Nagkesara, Pila nagkesara;
Kan: Nagsampige, Nāgakesari;

Mal: Nangaa, Nauga, Peri, Veluthapala, Nagppu, Nagappovu;
Mar: Nagkesara;
Ori: Nageswar;
Punj: Nageswar;
Tam: Naugu, Naugaliral, Nagachampakam, Sirunagappu;
Tel: Nagachampakamu;
Urdu: Narmushk, Nagkesar.

CONSTITUENTS

Essential oil and Oleo-resin.

The stamen contains mesuaferrone A and B, mesuaferrol, mesuanic acid, alpha- and beta-amyryn, and beta-sitosterol.^{2(c),32}
Mesuaferrone A was identified as 8,8'-bi-naringenin; mesuaferrone B was considered to be a bioflavonoid composed of maringenin and apigenin.²⁰⁽²⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Vātarakta, Śopharoga, Vastiroga, Raktapitta

Used for gout, edema, diseases of the urinary bladder, and bleeding disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).
Stamens used as an astringent and hemostatic agent, particularly in uterine bleeding and renal diseases.⁷
Stamens, with butter and sugar, used for bleeding piles, irregular fever and jaundice (Charaka Samhitā, 1000 BC),²⁷ as well as for skin eruptions and blood poisoning; concentrated extract was used as an ointment in advanced cases of leprosy (Sushruta Samhitā, 1000 BC).²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Chandana-balā-lakshādi Taila (Yogarasnāgara, sixteenth century), contains 4 main plant drugs with 26 supporting herbs, including Nagakusuma, in equal proportion. Used for

bleeding disorders, nervine disorders, cough, asthma, and fever. Used externally as an oil bath in burning sensation and skin diseases. Kumāryāsava (Shārangadhara Samhitā, thirteenth century); Nāgakeśara is among the 42 herbo-mineral complex, all in equal proportions. Used for dysuria, dysmenorrhea, and debility. Nāgakesarādi Churna (not in the AFI, authentic composition not known).

Nāgapushpādi Churna, Sahasrayoga, CCRAS text (not quoted in the API) contains powdered Nāgakesara and cumin seeds. Used with honey for excessive thirst.

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–3 g of the drug in powder form.

Michelia champaca Linn.

Campaka

BOTANICAL SOURCE(S)

Michelia champaca Linn.
(Fam. Magnoliaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Campaka (Flower).

API, Part I, Vol. IV.
(Champaka.)

AYURVEDIC SYNONYMS

Campeya, Hamapuspa.

(Hemapushpa.)

Kānchana,⁴

Svarna champaka.³

Champaka of Ayurveda: Kshira champaka (*Plumeria acuminata* Ait.); Panasa-gandhi champaka (*Artabotrys hexapetalus* [Linn. f.] Bhandari); Bhūchampaka (*Ochna pumila* Buch-Ham ex D. Don.).³

HABITAT

Eastern Himalayas, North-East India and Western Ghats; planted throughout India.

REGIONAL LANGUAGE NAMES

Eng: Golden champa;

Beng: Champa, Champaka;

Guj: Raichampo, Pilo champo;

Hindi: Champa;

Kan: Sampige;

Mal: Campakappuv;

Mar: Sonachanpha;

Punj: Champa;

Tam: Sampagi;

Tel: Chattu sampangi;

Urdu: Champa.

CONSTITUENTS

Volatile oil.

Volatile oil contains cineole, isoeugenol, phenyl ethyl alcohol, benzaldehyde and methyl anthranilate.^{2(d)}

Extraction of flowers with benzene gave 0.26% concrete, which, on steam distillation, yielded 26.3% of a volatile oil.^{2(a)}

The laboratory-prepared concrete contained alpha- and beta-ionone 26.8%, linalool 11%, dihydro-beta-ionone 10%, and *cis*-linalool oxide 7%.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Krmi, Mutrakrcchra, Vatarakta, Kustha, Kandu, Vrana

Used for worm infestations, dysuria, gout, obstinate skin diseases, pruritus and ulcers (therapeutic uses based on texts from 1000 BC to sixteenth century).

Flowers were prescribed internally in hemoptysis and excessive bile secretion (Sushruta Samhita, 1000 BC).²⁸

Flowers are valued for their stimulant, anti-spasmodic and diuretic activities, and find applications in dyspepsia, fever, and renal diseases. Flower oil is used as an application in cephalalgia, ophthalmia, gout, and rheumatism.^{2(a)}

The benzene extract of the anthers showed 67% post-coital anti-implantation activity in rats (1000 mg/kg/day).^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Chandana-balā-lakṣhādi Taila (Yogarātnākara, sixteenth century), contains Champaka flowers

among 26 supporting herbs, all in equal proportion.

Used for bleeding disorders, cough, asthma, and fever.

Balā-dhātryādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Champaka flowers among 46 supporting herbs, all in equal proportions. Used as nasal drops in diseases of the eye and head; and also as a massage oil in nerve diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Puspa curna 1–3 g.

Mimosa pudica Linn.

Lajjālu

BOTANICAL SOURCE(S)

Mimosa pudica Linn.
(Fam. Fabaceae)

Not to be confused with *Biophytum sensitivum* (Linn.) DC., suggested as Viparītalajjālu by the National Academy of Ayurveda.²⁹

PHARMACOPOEIAL AYURVEDIC DRUG

Lajjālu (Whole plant).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Samaṅgā, Varākrāntā, Namaskārī.

Śamipatrā, Anjalikārikā, Raktapādi.²⁵
Lājavanti.³

Mohini, Sprṅkā, Khadirā, Gandhākarinī.⁴

HABITAT

Found nearly throughout hotter and moist regions of India.

Native of tropical America, naturalized throughout tropical and subtropical parts of India. The species is highly polymorphic; it includes three

varieties, var. *hispida* Brenan, var. *tetrandra* DC. and var. *unijuga* Griseb.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Touch-me-not;
Assam: Lajubilata, Adamalati;
Beng: Lajaka, Lajjavanti;
Guj: Risamani, Lajavanti, Lajamani;
Hindi: Chhuimui, Lajauni;
Kan: Muttidasenui, Machikegida, Lajjavati;
Mal: Thotta vati;
Mar: Lajalu;
Ori: Lajakuri;
Punj: Lajan;
Tam: Thottavadi, Tottalchurungi;
Tel: Mudugudamara;
Urdu: Chhuimui.

Eng: Sensitive plant.^{2(a)}
Common name: Chhui-mui.

CONSTITUENTS

Alkaloid.

Mimosine, a toxic alkaloid, is identical to leucenine from *Leucaena glauca* Benth.^{2(a)} Turgorins,^{2(c)} beta-sitosterol, D-panitol and norepinephrine, crocin, demethyl ester, and

tannins¹⁵ have been isolated. The plant also contains a phytohormone and tubulin, which have the ability to bind colchicine with its sulfhydryl groups.

Periodic leaf movement is due to the presence of derivatives of 4-O-(beta-D-glucopyranosyl-6'-sulfate) gallic acid.

Aerial parts contain C-glycosylflavones, 2''-O-rhamnosylorientin and 2''-O-rhamnosyliso-orientin.^{2(c)} (See also Reference 25.)

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapita, Atisāra, Yoniroga, Śopha, Dāha, Śvāsa, Vraṇa, Kuṣṭha

Used for bleeding disorders, diarrhea, vaginal diseases, edema, burning sensation, asthma, ulcers, and obstinate skin diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Suhruta (1000 BC) prescribed a decoction, with Smaṅgā as an important ingredient, in hemothermia, piles, diarrhea, and persistent dysentery, and as an ointment for piles, ulcers, and wounds.^{27,28}

Leaf juice is used in sinusitis, sores, piles and fistulae; a paste is applied to glandular swellings and hydrocele.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

Smaṅgādi Churna (Chakradatta, eleventh century), contains Smaṅgā plant with 3 other plant drugs. Used for hemorrhagic diarrhea and bleeding piles.

Pushyānuga Churna (Bhaishajya Ratnāvali, seventeenth century) contains Smaṅgā root/plant among a compound of 25 plant drugs, all in equal proportions. Used for leucorrhea and other menstrual disorders.

Brihat Gangādhara Churna (Shārangadhara Samhitā, thirteenth century); Lajjālu plant is among 14 plant drugs, all in equal proportions. Used for diarrhea and dysentery.

Kutajāvleha (Shārangadhara Samhitā); Lajjālu plant is among 18 supporting herbs, all in equal proportions. Main drug is Kutaja bark. Used for diarrhea, dysentery, and other enteric infections.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g of the drug for decoction.

LD₅₀ of the ethanolic extract of the whole plant was >1000 mg/kg i.p. in mice.²⁰⁽²⁾

M

Mollugo cerviana Seringe

Griṣmachatraka

BOTANICAL SOURCE(S)

Mollugo cerviana Seringe
(Fam. Aizoaceae)

Mollugo oppositifolia L. is used as Parpata in Kerala;²⁹ *M. cerviana* is the source of Parpata in Tamil Nadu.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Griṣmachatraka (Whole plant).

API, Part I, Vol. VI.

(Non-classical nomenclature.)
Grishma-sundara.^{16(b)}

AYURVEDIC SYNONYMS

Uṣṇasundara.

Parpata of Tamil Nadu.⁶ Substitute of Parpata in South India.²⁹

HABITAT

Found in dry and sandy areas, commonly in Indian plains.

Found in the Upper Gangetic plains, Punjab, Delhi, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Odisha, Tamil Nadu, and Karnataka.⁷

REGIONAL LANGUAGE NAMES

Ben: Ghimasak;
Hindi: Jimasaka;
Kan: Parpataka;
Mal: Parpatakapullu;
Mar: Pada; Ori: Pitta sag;
Tam: Parpadangam;
Tel: Parpatakamu.

CONSTITUENTS

Flavonoid: orientin, vitexin and their 2'-O-glucosides.^{2(d)}

Orientin (luteolin-8-C-glucoside) and vitexin (apigenin-8-C-glucoside).³²

M. oppositifolia: bitter principles of the plant have been characterized as triterpenoid saponins. Several sapogenins, spergulagenic acid, spergulagenin-A, spergulagenin-C, spergulagenol, spergulacin, spergulacin-A, and spergulagenin have been isolated.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya (digestive impairment), Jvara (fever), Dāha (burning sensation), Kāmālā (Jaundice), Prameha (metabolic disorder).

Used as a single drug.

(No reference quoted from Ayurvedic texts.)

Plant: febrifuge, stomachic aperient, blood purifier, emmenagogue and cardiostimulant.

Tender shoots and flowers: diaphoretic.³²

Used as a bitter tonic for liver disorders. An infusion of the plant is given to promote lochial discharge.⁷

IMPORTANT FORMULATION/ APPLICATIONS

Sudarshana Churna (Shārangadhara Samhitā, thirteenth century), prescribed for intermittent fevers, contains *Mollugo cerviana* as Parpataka in products of Tamil Nadu. Also a constituent in Chandanāsava (Bhaishajya Ratnāvali, seventeenth century), Amritārisha (Bhaishajya Ratnāvali), Mahātikta Ghrita (Ashtāngahridaya, seventh century).⁶

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

M

Momordica charantia Linn.

Kāravallaka

BOTANICAL SOURCE(S)

Momordica charantia Linn.
(Fam. Cucurbitaceae)

Wild variety is equated with *M. balsamina* Linn., and the smaller variety (Karkotika, Karkota) with *M. dioica* Roxb. ex Willd.

PHARMAPOEIAL AYURVEDIC DRUG

Kāravallaka (Fresh fruit).

API, Part I, Vol. II (Kaaravellaka).³, AFI, Part I, 83

International Pharmacopoeial name: Fructus momordicae.¹⁰⁽⁴⁾

AYURVEDIC SYNONYMS

Kāravella, Kathilla, Varivalli, Kāravalli.

HABITAT

Throughout India, up to an altitude of 1,500 m; cultivated.

REGIONAL LANGUAGE NAMES

Eng: Bitter gourd;
Assam: Kakiral, Kakral;
Beng: Karolla;
Guj: Karela;
Hindi: Karela;
Kan: Hagalakai;
Mal: Kaippa, Pavackkai;
Mar: Karla;
Ori: Kalara, Salara;
Punj: Karela;
Tam: Paharkai;
Tel: Kaakara kaaya;
Urdu: Karela.

CONSTITUENTS

Alkaloid (Momoridicine) and Glycosides.

Immature fruits gave several non-bitter and two bitter cucurbitacin glycosides. F₁, F₂, G, and I momordicosides are non-bitter; momordicosides K and L are bitter. Fruits also gave 5-hydroxytryptamine and a neutral compound charantin (steroidal glucoside), diosgenin, cholesterol, lanosterol, and beta-sitosterol.³²

Fruit and seed yielded a polypeptide, P-insulin, which was considered similar to bovine insulin.^{2(c)}

Bio-immunoassay of the polypeptide gave negative results against bovine insulin.²⁰⁽²⁾

Seed gave vicine, a hypoglycemic principle.^{2(c)} (Details in Reference 15.)

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Prameha, Kāmalā, Pāṇḍu, Kṛmiroga, Raktavikāra, Jvara, Śvāsa, Kāsa, Aruci

Used for obstinate skin diseases, urinary disorders/polyuria, jaundice, anemia, worm infestations, diseases due to vitiated blood, fever, asthma, cough, and tastelessness (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta (1000 BC) prescribed a decoction of fruits and leaves in prescriptions for hemothermia and cough; in toxic conditions, as an antiseptic and purgative; in fevers, hiccup, cough, urinary diseases, skin diseases, and gout.^{27,28}

Fruits: anti-rheumatic, febrifuge, useful in gout, spleen, and liver complaints and for wound healing. Juice used as an emmenagogue.¹⁵

For hypoglycemic and anti-diabetic activity, see details of experimental in clinical trials in Reference 10(4) (WHO).

IMPORTANT FORMULATION/ APPLICATIONS

Mahā-vishagarbha Taila (Bhaishajya Ratnāvali, seventeenth century), contains 46 plant drugs, including Kāravelli fruit, all in equal proportion, with 26 herbomineral supplementary constituents. For diseases of the nervous system and inflammatory conditions.

Clinical trials evaluating the effect of bitter melon in type 2 diabetes are largely of poor methodology. There is insufficient evidence to recommend the use of bitter melon as a therapeutic option (2009–2010 analysis).¹⁷

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–15 ml juice fo fresh drug.

Researchers have warned that *M. charantia* extract leads to a false-negative test for sugar in urine (due to its ability to maintain the indicator dye in the glucose oxidase strips and the alkaline copper salts in a reduced state).²⁰⁽²⁾

Chronic administration (for 60 days) of *M. charantia* fruit extract (1.75 g/day) to dogs led to testicular lesions with mass atrophy of spermatogenic elements.²⁰⁽²⁾

Momordica dioica* Roxb. ex Willd.*Karkaśa****BOTANICAL SOURCE(S)**

Momordica dioica Roxb. ex Willd.
(Fam. Cucurbitaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Karkaśa (Root).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Karkoṭakī, Vandhyā karkoṭakī.

Karkota, Karkotaka, Karkotikā,
Karkotikā-vandhyā.³

Karkoti is commonly known as the female and
Vandhyakarkoti as the male plant.^{16(a),30}

Roots of female plants are larger than those
of male plants and are preferred for
medicinal use.^{2(a)}

(Kāravalli is wrongly quoted as a synonym of
M. dioica in Reference 15.)

HABITAT

Throughout India up to an altitude of 1,500 m,
also cultivated for its fruits which are used as
vegetables.

REGIONAL LANGUAGE NAMES

Beng: Titkaankarol;

Guj: Baanjhakartolaa, Kankodi;

Hindi: Vanakakodaa, Baanja, Khekhassaa, Kakodaa;

Kan: Maadadaangal;

Mar: Vaanjh-kartoli, Kartole;

Ori: Kaankada,

Tam: Paluppakai;

Tel: Aagaakar.

Eng: Small bitter gourd, Bur cucumber.

Common name: jangali karelā, Ban-karelā, Bhat-
karelā, Dhar-karelā.⁷

CONSTITUENTS

α-eleostearic acid, 2-acetyl-5-chloropyrrole.

Roots contain glycosides G₁ and G₂, an alkaloid
and beta-sitosterol.^{2(d)} Three triterpenoids
and two steroidal compounds from dry roots
were isolated: alpha-spinasterol octadecanone,
alpha-spinasterol-3-O-beta-D-glucopy-
ranosyl, 3-O-beta-D-glucuronopyranosyl
gypsogenin, 3-O-beta-D-glucopyranosyl
gypsogenin, and 3-O-beta-D-glucopyranosyl
hederagenin.¹⁶³

THERAPEUTIC AND OTHER ATTRIBUTES

Visarpa, Sarpaviṣavikāra, Mūtrakṛcchra, Sarpaviṣa,
Jvara, Kāsa, Śvāsa, Hikkā, Arśa, Kṣaya, Raktārśa,
Madhumeha, Netraroga, Śīroroga, Kāmalā, Aśmārī

Used for erysipelas, the aftereffects of snake
bites, dysuria, snake poison, fever, cough,
asthma, hiccup, piles, phthisis, bleeding piles,
diabetes, diseases of the eye, diseases of the
head, jaundice, and calculus (therapeutic
uses based on texts from 1000 BC to sixteenth
century).

Mucilaginous tubers of the female creeper are used
in bleeding piles and bowel infections. Roasted
root is used to stop bleeding from piles.

Root of male creeper is used for treating ulcers.¹⁶³

Root is an astringent, febrifuge, spermi-
cidal, anthelmintic, antiallergic, and
sedative.^{2(c),20(2),32}

Root exhibited moderate anti-bacterial and poor
anti-fungal activity.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Quoted compounds: Hiraka Rasāyana, Kakadaī
Taila, Kālāgnirudra Rasa, Sannīpāta
Vidhvanisa Rasa, Chandrarudra Rasa. All the
compounds are obsolete drugs; do not feature
in AFI and other reference works. It is doubt-
ful if these represent the profile of Karkaśa
root.

Viśanāshaka Yoga (Ayurveda Prakash) has been quoted to validate the use of Karkaśa tuber in snake bites during the classical period.

No claims regarding the effect of a number of (herbal or herbo-mineral) drugs on snake venom poisoning could be

proved either clinically or experimentally (CCRAS).²⁶

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g.

Monochoria vaginalis Presl.

Indīvara

BOTANICAL SOURCE(S)

Monochoria vaginalis Presl.
Syn. *Pontederia vaginalis* Burm. f.
(Fam. Pontederiaceae)

On the basis of its blue flowers and being aquatic, *M. vaginalis* is equated with Indlvara in Kerala. Throughout North India, Indīvara is equated with *Nymphaea stellata* Linn. Indivaraka and Indivara-kanda are still unidentified plant drugs of Sushruta Samhitā and Ashtāṅghridaya.

PHARMACOPOEIAL AYURVEDIC DRUG

Indīvara (Rhizome).

API, Part I, Vol. VI (Indīvara-kanda).

AYURVEDIC SYNONYMS

Bhagapatrā.

(Non-classical; Sanskrit translation of *vaginalis*.)

HABITAT

Throughout India, ascending up to 1,500 m in the hills.

An aquatic herb with short, sub-erect spongy root stocks found in rice fields, ditches, margins of tanks and pools, swamps and marshes. The entire plant, except root, is eaten as vegetable.^{2(a)}

REGIONAL LANGUAGE NAMES

Mal: Karinkuvvalam;
Tam: Karunkuvalam, Cenkalunir kilanku;
Tel: Nirkanca.

CONSTITUENTS

Stigmasterol 3-O-beta-D-glucopyranoside.

Alcoholic extract of the root showed the presence of glycosides, flavones, and tannins.¹⁶⁴

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha (burning sensation), Daurbalya (weakness), Dhātukṣya (tissue wasting), Raktapitta (bleeding disorder), Yakṛtvikāra (disorder of liver). Used as single drug.

(No reference quoted.)

Classical references: See analysis in ref. 30, Pages 44–45.

IMPORTANT FORMULATION/ APPLICATIONS

Root is considered sedative, nervine tonic, and antispasmodic.^{2(a)}

Prescribed for stomach and liver disorders.⁷

Alcoholic extract of the root showed significant analgesic activity in mice (200 mg/kg bw).¹⁶⁴ Methanolic extract

exhibited anti-oxidant and hepatoprotective activity in rats.¹⁶⁵
Diuretic activity of the root stock is attributed to the high content of an amino acid, citrulline.¹⁶⁶

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

Curna (powder): 3 to 6 g.

<i>Moringa oleifera</i> Lam.	Leaf	Śigru
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BOTANICAL SOURCE(S)

Moringa oleifera Lam.
Syn. *Moringa pterygosperma* Gaertn.
(Fam. Moringaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Śigru (Leaf).

API, Part I, Vol. II.

Three varieties of Śigru are mentioned in the texts:

Shyamā, Shveta and Rakta. *Moringa oleifera* is the white-flowered variety; *M. concanensis* Nimmo is identified as the pinkish–yellow- or red-flowered variety. Shyamā, the blue–black-flowered variety, is still unidentified.

The white variety is known as Harita-chhada; the red variety has been identified as Madhu śigru.⁴ Seeds are called Shveta maricha.⁴

AYURVEDIC SYNONYMS

Śobhāñjana, Bahala, Tīkṣṇagandhā, Akṣīva, Mocaka.

Krishna-gandhā (seeds smell like *Piper nigrum*, Maricha).³⁰
Muraṅgi.³⁸

HABITAT

Found wild in sub-Himalayan tract, commonly cultivated throughout India.

REGIONAL LANGUAGE NAMES

Eng: Horse radish tree, Drum stick tree;
Beng: Sajina, Sajna, Sajne;

Guj: Sargavo, Sekato, Saragavo parna;
Hindi: Shajoma, Mungna;
Kan: Neegge, Nugge ele;
Mal: Murinna, Tishnagandha, Muringa, Muringa elai;
Mar: Sevaga, Segata, Segata pana, Shewgachi pane;
Ori: Sajana, Munga, Munika;
Punj: SOhanjana;
Tam: Murungai, Murungai ilai;
Tel: Munaga aku;
Urdu: Sehjan.

Eng: Drumstick tree.¹³ True horseradish is equated with *Cochlearia armoracia* Linn.⁷

CONSTITUENTS

Carbohydrate, Protein, Carotene and Ascorbic acid.

Leaves yielded a number of amino acids; minerals and vitamins; calcium 440 mg per 100 g, phosphorus 70 mg per 100 g, iron 7.0 mg per 100 g, thiamine 0.06 mg per 100 g, riboflavin 0.05 mg per 100 g, niacin 0.8 mg per 100 g and vitamin C 220 mg per 100 g of the edible portion; carotene 6780 µg/100 g.^{2(a),15(2)}

Leaves contain two nitrile glycosides, niazirin, and niazirinin, and three mustard oil glycosides, 4-[(4'-O-acetyl-alpha-L-rhamnosyloxy) benzyl] isothiocyanate and niaziminin A and B, in addition to beta-sitosterol, glycerol-1-(9-octadecanoate), 3-O-(6'-O-oleoyl-beta-D-glucopyranosyl)-beta-sitosterol, and beta-sitosterol-3-O-beta-D-glucopyranoside.^{2(c),163}

M

THERAPEUTIC AND OTHER ATTRIBUTES

Śopha, Kṛmīroga, Medoroga, Plihāroga, Vidradhi, Gulma, Galagaṇḍa

Used for edema, worm infestations, hyperliposis, abscesses, abdominal lumps, and goiters (therapeutic uses based on texts from 1000 BC to sixteenth century).

Leaves are used in scurvy and catarrhal afflictions. Also used as an emetic. A paste of leaves is applied on wounds.^{2(a)}

Leaves showed hypotensive properties, bradycardiac effects and anti-spasmodic activities. Leaves included in an isocarbohydrate diet fed to diabetics resulted in significant reductions in blood glucose levels, although the plasma insulin level did not alter much.^{2(c)} Several leaf constituents have anti-cancer effects.¹³

IMPORTANT FORMULATION/ APPLICATIONS

Vishatinduka Taila (Bhaishajya Ratnāvali, seventeenth century). Śigru leaf juice is among 10 main plant drugs. Used as a massage oil for rheumatism, gout and inflammatory conditions. Ekāṅgavira Rasa (Rasarāja Sunder, period not known) and Ratnāgiri Rasa (Bhaishajya Ratnāvali) are multimineral drugs. Śigru leaf juice is used as a vehicle during trituration.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 ml of the fresh drug in juice form.

The leaf extract may have anti-thyroid effects. A study in animal models reported reduced T₃ levels and increased T₄ levels.¹³

Moringa oleifera Lam.

Root bark

Śigru

M

BOTANICAL SOURCE(S)

Moringa oleifera Lam.
Syn. *Moringa pterygosperma* Gaertn.
(Fam. Moringaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Śigru (Root bark).

Śigru (Seed).

Śigru (Stem bark).

API, Part I, Vol. IV.

Three varieties of Śigru are mentioned in the texts, Shyamā, Shveta and Rakta. *Moringa oleifera* is the white-flowered variety; *M. concanensis* Nimmo is identified as the pinkish-yellow- or red-flowered variety. Shyamā, the blue-black-flowered variety is still unidentified.

The white variety is known as Harita-chhada; the red variety has been identified as Madhu shigru.⁴ Seeds are called Shveta maricha.⁴

AYURVEDIC SYNONYMS

Śobhāñjana, Bahala, Tikṣṇagandhā, Akṣīva, Mocaka.

Krishna-gandhā (seeds small like *Piper nigrum*, Maricha).³⁰
Muraṅgi.³⁸

HABITAT

Found wild in sub-Himalayan tract, commonly cultivated throughout India.

REGIONAL LANGUAGE NAMES

Eng: Horse radish tree, Drumstick tree;
Assam: Saijna, Sohjna;
Beng: Sajina, Sajna;
Guj: Saragavo;
Hindi: Sahajan;
Kan: Neege, Nugge kand chakke;
Mal: Muringa;
Mar: Sevaga, Segat sala;
Ori: Sajina;
Punj: Sohanjana;
Tam: Murungai;

Tel: Munaga, Mulaga;
Urdu: Sohanjana, Sahajan.

Eng: Drumstick tree,¹³ True horseradish is equated with *Cochlearia armoracia* Linn.⁷

CONSTITUENTS

Śigru root bark: Alkaloids and essential oil.

Alkaloids 0.1%,^{2(a)} moringine, moringinine, and spirochin; pterygospermin from roots is found to be effective against both Gram-positive and Gram-negative bacteria.

Moringinine inhibits the tone and movements of involuntary muscles and relaxes bronchioles. Spirochin paralyzes the vagus nerve and can cause fatal paralysis.^{2(a),13,25} It shows cardiac-stimulant, hypertensive and other sympathomimetic effects.¹³

THERAPEUTIC AND OTHER ATTRIBUTES

Sopha, Krmiroga, Medoroga, Pliha roga, Vidradhi, Gulma, Galaganda, Mukhajadya, Grathi, Visarpa, Asmari vana vikara, Mutra sarkara, Kustha, Ksata, Karnasula, Antarvidradhi

Used for edema, worm infestations, hyperliposis, diseases of the spleen, abscesses, abdominal lumps/obstructive jaundice, goiters, restricted movement of the jaw, cysts, erysipelas, calculus, ulcerative diseases, glycosuria, obstinate skin diseases, wounds, earache, and internal abscesses (therapeutic uses based on texts from 1000 BC to sixteenth century).

Root extract exhibited significant anti-inflammatory activity in rats. Crushed root, as a liniment, is used for rheumatism.^{2(c)}

The root and bark exhibited significant antifertility activity in experimental animals.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Prabhanjana Vimardana Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica); Śigru stem bark (not root bark, AFI) is among the 15 main plant drugs, in equal proportions. Used for massage in rheumatic affections.

Sāraswata Ghrita (Ashtāngahridaya, seventh century); Śigru root bark is among the eight plant drugs, in equal proportions. Used as a digestive and brain tonic.

Vastyāmayantaka Ghrita (Sahasrayoga) is a Gokshura-based compound with 23 plant drugs including Śigru root bark, 6 plant juices and 27 supporting constituents. Used for dysuria.

Kshāra Taila (Shārangadhara Samhita, thirteenth century); used as ear drops for diseases of the ear. Also contains alkaline ashes.

Mānikya Rasa (Bhaishajya Ratnāvali, seventeenth century) is a mercury-based multimineral compound. The root bark is used for triturating the drug.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

25–50 g of the drug in powder form.

Extracts of both roots and root bark are abortifacient and can cause intense uterine contractions.^{13,15}

The root exhibited diuretic activity and may help dissolve and prevent the formation of kidney stones; high doses can cause kidney and liver dysfunction.¹³

Seed

CONSTITUENTS

Śigru seed:
Fixed oil.

Fixed oil 38.00%–42.00%; contains high levels of oleic acid (up to 78.59%), followed by palmitic 7.00%, stearic 7.50%, behenic 5.99%, and arachidic acids 4.21%; tocopherols (alpha, gamma, and delta) in oil were up to

123.50–161.30 mg/kg, 84.07–104.00 mg/kg and 41.00–56 mg/kg, respectively.¹⁶⁷

Seeds contain vitamins A, C, and E and beta-carotene. Sterols present are campesterol, stigmasterol, beta-sitosterol, delta-5-avenasterol, and clerosterol.¹³

A new glycoside, moringyne,²⁵ and a cardiac steroidal glycoside, strophantidin, is reported.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Krmiroga, Netraroga, Sotha, Vidradhi, Apaci, Medoroga, Gulma, Pliharoga, Galaganda, Vrana, Mukhajadya, Siroroga, Vataroga, Atinidra

Used for worm infestations, diseases of the eye, inflammation, abscesses, scrofula hyperliposis/obesity, abdominal lumps, splenic diseases, goiters, ulcers, restricted movement of the jaw, diseases of the head, diseases of the nervous system, and insomnia (therapeutic uses based on texts from 1000 BC to sixteenth century).

Hot aqueous infusion of seeds exhibited anti-inflammatory, anti-spasmodic and diuretic activities in experimental rats. Seeds are used in many parts of India as a diuretic for treating edema and as a febrifuge. Seeds crushed and boiled with salt are taken with honey as a vermifuge; decoction of raw seeds and leaves is used as a purgative and anthelmintic. A paste of seeds is applied on warts.^{2(c)}

Anti-oxidants of seeds prevent oxidative damage.³

IMPORTANT FORMULATION/ APPLICATIONS

Sudarshana Churna (Bhaishajya Ratnāvali, seventeenth century). Sigrū seed is among 44 plant drugs, all in equal proportion. For intermittent fever, diseases of liver and spleen.

Sarvajvarahara Lauha (Bhaishajya Ratnavali); a herbo-mineral compound with calcined iron as the main drug with 20 supporting herbs. Used for chronic fevers and diseases of the liver and spleen.

Shothaghna lepa (Sharangadhara Samhita, thirteenth century) contains the paste of Sigrū seeds among five plant drugs. Used for external application in all types of swellings.

Sarsapadi Pralepa (Bhaishajya Ratnavali) contains the paste of Sigrū seeds among six plant drugs. Used externally for goiters, cysts and cervical lymphadenitis.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g of the drug in powder form.

Residue of the seed after oil extraction and the seeds' kernels are able to remove contaminations including lead, iron and cadmium from drinking water. There is preliminary evidence that the seeds can prevent and reverse the effects of arsenic exposure in animals.¹³

It is indigenous to the plains of Andhra Pradesh and Maharashtra and throughout the drier parts of India up to 900 m.^{2(b)}

M

Stem bark

CONSTITUENTS

Śigrū stem bark:

Sterols and Terpenes.

Stem bark gave a triterpene bauerenol. Stems of a hybrid variety yielded 4-hydroxymellein, along with vanillin, beta-sitostenone, octacosanoic acid and beta-sitosterol.²⁵ Two new phytoconstituents, *n*-heptacosanyl *n*-octadec-9,12,15 trieneoate (moringyl linolenate) and *n*-docas-4-en-1-one-1-yl *n*-decanoate (oleiferyl capriate), along with known compounds beta-sitosterol, epilupol, glyceropalmityl phosphate and glycerol-oleiostearyl phosphate, have been isolated.¹⁶⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Krmi, Vidradhi, Pliha roga, Gulma, Hrdaya roga, Aksi roga, Medoroga, Apaci, Galaganda, Vrana sotha, Arsa, Bhagandara, Drsti roga, Sarvapida nivarani

Used for worm infestations, abscesses, splenic diseases, obstructive jaundice, heart diseases, eye diseases, hyperliposis, scrofula, goiters, inflamed ulcers, piles, fistula-in-ano, vision problems and all types of pain (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) used powdered bark root and dried sap in prescriptions or in steaming mixtures (internally and externally) for anosmia (loss of smell), fainting, chronic skin eruptions and painful piles.²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Kārpārasāsthyādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains Śigru stem bark as one of the supporting herbs.

Used for paralysis and other nerve disorders.
Kshāra Taila (see root bark).
Sāraswata Ghrita (see root bark).

Sarṣapādi Pralepa (see seed).

Vastyāmayāntaka Ghrita (see root bark).

Vishatinduka Taila (Bhaishajya Ratnāvali, seventeenth century) contains Śigru leaf juice, not stem bark (AFI) as one of the main plant drugs. Used for rheumatism, gout and inflammatory conditions.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Stem bark juice 10–20 mL, Stem bark powder 2–5 g.

Extracts of both root and root bark are abortifacient and can cause intense uterine contractions.^{13, 15}

Mucuna prurita Hook.

Root

Ātmaguptā

BOTANICAL SOURCE(S)

Mucuna prurita Hook.

Syn. *M. pruriens* (L.) DC.
(Fam. Fabaceae)

M. pruriens (L.) DC.

Syn. *Dolichos pruriens* Linn.

Stizolobium pruriens (L.) Medic.²⁰⁽²⁾

M. pruriens (L.) DC. var. *pruriens*.

M. pruriens (L.) DC. var. *utilis* (Wall. ex Wight)

Baker ex Burk (*M. pruriens* Utilis Group)

(Bengal Velvet-bean).¹⁹

PHARMACOPOEIAL AYURVEDIC DRUG

Ātmaguptā (Root).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Kapikacchu, Markaṭi, Kaṇḍura, Sukasimbi, Kapiprabhā.

Ajadāphala, Ādhyandā, Ātmaguptā, Svaguptā,

Kandūkari, Kushimbivalli, Guptabhalā.³⁰

Svayamguptā, Kandalā,

Duravagrahā, Chandā, Harshani.⁴

Lāngūli.³⁰

Adhigandhā, Ajadā, Kacchurā, Rshyaprokta,²⁷

Rshbhi.^{28,30,API, Vol. IV}

Lāngali,³⁰ Lānguii,²⁷ Lāngooli.⁴ (Not to be confused with Langula, a variety of rice,¹³⁰ or with Lāngali, now equated with *Gloriosa superba* Linn.) Correct synonym is Langooli (Langoor baby) in line with the other synonyms, Vānari and Markati.

HABITAT

Found wild almost all over India and in Andaman and Nicobar Islands.

Distribution: Africa, Indian Subcontinent, Indo-China, Malesia, and Australia, where it is widely cultivated and naturalized.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Cowhage, Cowitch;

Beng: Aalkushee, Alkusa;

Guj: Kaucha, Kavach;

Hindi: Kevanch, Kaunch, Khujanee;

Kan: Nasukunnee, Nasuganni, Nayisonanguballi;

Mal: Shoriyanam, Naykkorana, Naykkuran;

Mar: Khajkuhilee;

Ori: Baikhujnee;
 Punj: Aalkushee, Kavanch;
 Tam: Punaik-kalee, Punaikkalee,
 Punaippidukkam;
 Tel: Piliyadugu, Pillée adugu;
 Urdu: Kaunch.

CONSTITUENTS

Choline.

Choline has been obtained from all parts of the plant.^{15,20(2)}

Indole-3-alkylamines viz. N, N-dimethyltryptamine and its Nb-oxide, bufotenine; 5-methoxy-N, N-dimethyltryptamine, and beta-carboline were isolated and characterized from the roots, stem, leaves, pods, and seeds.^{25,32,20(2)}

In addition to the seeds, L-dopa is also found in the stem, leaves, and roots.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dusta vrana, Pakwatisara, Raktapitta, Kustha, Krsata, Sitapitta, Vatavyadhi, Yoni sithilata

Used in non-healing ulcers, chronic diarrhea, bleeding disorders, obstinate skin diseases, emaciation, urticaria, neurological disorders,

and vaginal laxity (therapeutic uses of seeds based on texts from 1000 BC to eleventh century; uses of the root not quoted).

Root: diuretic, emmenagogue, purgative, anti-dropsical, anti-cholerin, febrifuge, used in kidney troubles, and an ointment in elephantiasis.³²

Nervine tonic, beneficial in fever with delirium.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

No formulation quoted.

Experimental findings: neuromuscular blocking activity was observed by 5-methoxy-N, N-dimethyltryptamine and 5-oxy-indole-3-alkylamine, whereas beta-carboline only potentiated the acetylcholine response on frog rectus abdominis.

Indole alkylamines produced marked behavioral changes; antagonized pentobarbitone-induced hypnosis, inhibited reserpine-induced ptosis and showed hypothermia and sedation in aggregated rats.¹⁵⁽²⁾

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in the powder form for decoction.

M

Mucuna prurita Hook.

Seed

Ātmaguptā

BOTANICAL SOURCE(S)

Mucuna prurita Hook.

Syn. *M. pruriens* Baker.
 (Fam. Fabaceae)

M. pruriens (L.) DC.

Syn. *Dolichos pruriens* Linn.

Stizolobium pruriens (L.) Medic.²⁰⁽²⁾

M. pruriens (L.) DC. var. *pruriens*.

M. pruriens (L.) DC. var. *utilis* (Wall. ex Wight)
 Baker ex Burk (*M. pruriens* Utilis Group)
 (Bengal Velvet-bean).¹⁹

Seeds of *M. utilis* Wall. and *M. cochinchinensis*
 Chavel are often sold as substitutes.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Ātmaguptā (Seed).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Kapikacchu, Markaṭi,

Kaṇḍura.

Kapiprabhā.

Ajadāphala, Adhyanda, Ātmaguptā, Svaguptā,
 Kandūkari, Kushimbivalli, Guptabhalā.³⁰

Svayamguptā, Kandalā, Duravagrahā, Chanda, Harshaṇi.⁴ Lāngūli.³⁰

Adhigandhā, Ajadā, Kacchurā, Rshyaprokta,²⁷

Rshbhi.^{28,30,AP1,Vol IV} Lāngali,³⁰ Lānguii,²⁷

Lāngooli.⁴ (Not to be confused with Lāngula, a variety of rice,¹³⁰ or with Langali, now equated with *Gloriosa superba* Linn.) Correct synonym is Langooli (Langoor baby) in line with the other synonyms, Vānari and Markati.

HABITAT

Found wild almost all over India and in Andaman and Nicobar Islands.

Distribution: Africa, Indian Subcontinent, Indo-China, Malesia, and Australia, where it is widely cultivated and naturalized.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Cowhage, Cowitch;

Beng: Aalkushee, Alkusa;

Guj: Kaucha, Kavach;

Hindi: Kevanch, Kaunch, Khujanee;

Kan: Nasukunnee, Nasuganni, Nayisonanguballi;

Mal: Shoriyanam, Naykkorana, Naykkuran;

Mar: Khajkuhilee;

Ori: Baikhujnee;

Punj: Aalkushee, Kavanch;

Tam: Punaik-kalee, Punaikkalee,

Punaippidukkam;

Tel: Piliyadugu, Pillee adugu;

Urdu: Kaunch.

CONSTITUENTS

Fixed oil, Alkaloid and 3, 4-Dihydroxy phenylalanine.

Seeds contain L-dopa (1.5%) and other amino acids, glutathione, lecithin, gallic acid, and beta-sitosterol.

Seed oil gave stearic, palmitic, myristic, arachidic, oleic, linoleic acids, and a sterol and two epoxy acids, cis-12, 13-epoxyoctadec-trans-9-enoic acid and cis-12, 13-epoxy-octadec-cis-9-enoic (vernolic) acid. Alkaloids include mucunine, mucunodine, prurienine, and prurieninine and five indolic compounds.

Choline was reported from all parts of plant.^{15,20(2),32}

Serotonin was present only in the pods.³²

The whole bean contains about 3%–6% L-dopa.

The endocarp of the pericarp contains about 5.3% L-dopa.¹³

THERAPEUTIC AND OTHER ATTRIBUTES

Vātavayādhī, Kampavāta, Kṛāivya, Raktapitta, Duṣṭāvrana, Daurbalya

Used in neurological disorders, Parkinsonism, impotency, bleeding disorders, non-healing ulcers, and emaciation (therapeutic uses based on texts from the fifteenth to sixteenth centuries).

A decoction of the seeds and roots as ingredients of a medicated *ghee* was prescribed by Charaka (1000 BC) for muscular stiffness, paralysis, and general weakness.²⁷

Vānari Vatikā (Bhāvaprakāsha, sixteenth century), a pill prepared from the powdered decorticated seeds after boiling in cow's milk, fried in butter fat, mixed with sugar, and steeped in honey, was considered a good aphrodisiac of Ayurvedic medicine.¹⁵

Powdered seeds of *Mucuna* and *Asteracantha longifolia* with sugar, taken with milk, was considered a potent aphrodisiac (Bhaishajya Ratnāvali, seventeenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Gudūchyādi Modaka (Yogarātnākara, sixteenth century) was used for dysuria, venereal diseases, and bleeding disorders.

Amritaprāsha Ghrita (Ashtāngahridaya, seventh century) was a restorative tonic. (For detoxification, seeds are boiled in milk.)

Bṛhat Māsha Taila (Bhaishajya Ratnāvali, seventeenth century) contains Māsha (Blackgram) seeds, Balā (*Sida cordifolia*) root and Rāsanā as the main plant drugs with goat's meat; there are 13 supporting and 22 supplementary herbs, including Ātmaguptā seeds. Used as a massage

oil in Parkinsonism and other neurological disorders.

No formulation is quoted for impotency.

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g.

For Parkinson’s disease, powdered Cowhage extract (HP-200, Zandopa of Zandu), standardized to contain 3.3% L-dopa, has

been used (22.5–67.5 g divided into two to five doses per day).¹³

Standardized powdered Cowhage seed preparations, containing L-dopa, seem to lessen symptoms of Parkinson’s disease at a relative low dose, compared to conventional L-dopa products. Constituents other than levodopa might have anti-Parkinson activity. (See Reference 13 for contraindications.)

In a clinical study, *M. pruriens* increased sperm concentrations in all infertile study groups, but sperm motility was not restored in asthenozoospermic men.¹⁷¹

Murraya koenigii (L.) Spreng

Saurabhanimba

BOTANICAL SOURCE(S)

Murraya koenigii (L.) Spreng
Syn. *M. koenigii* Spreng
(Fam. Rutaceae)

In Kerala, *M. koenigii* is used as Kaidarya.³

PHARMACOPEIAL AYURVEDIC DRUG

Saurabhanimba (Leaf).

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Saurabhanimba is a Sanskritized non-classical name, while the valid name is Kaidarya. Due to its scented leaves, it was addressed as Surabhi- (not Saurabha-) chhadah or Surabhinimba.

AYURVEDIC SYNONYMS

Surabhinimba, Kaiṭarya, Kaidarya.

Kaiṭarya and Kaidarya were the plant drugs of Charaka Samhita and Sushruta Samhitā (1000 BC).³⁰ Katphala (*Myrica esculenta* Buch.-Ham.) was its substitute during the period of Bhāvaprakāsha (sixteenth century).³

HABITAT

Found and cultivated almost throughout India and the Andaman Islands up to an altitude of 1,500 m, for its culinary uses as a flavouring spice.

REGIONAL LANGUAGE NAMES

Eng: Curry leaf;
Assam: Narasingha;
Ben: Bansang, Kariaphulli;
Guj: Gornimb, Kadhilimdo;
Hindi: Mitha neem, Kadhi patta, Kadi patta;
Kan: Karibaevu;
Mal: Kariveppu;
Mar: Kadhinim, Poospala, Godnimb;
Ori: Bhursunga; Pun: Kadhi patta;
Tam: Karivempu, Karuveppilei;
Tel: Karivepaku, Karivemu.

CONSTITUENTS

Alkaloids like koenidine, koenigine, koenimbine, mahanimbine, muconine murrayacine and volatile oils

All parts of the plant, especially the leaves, are rich in carbazole alkaloids. These include members with a C₁₃-skeleton, a C₁₈-skeleton, and a C₂₃-skeleton.³² The leaves also gave a coumarin glucoside, scopolin.

Essential oil from leaves contained beta-caryophyllene, beta-gurjunene, beta-elemene, beta-phellandrene, and beta-thujene as major constituents.³² The essential oil showed strong fungitoxic activity.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa (piles), Atisāra (diarrhoea), Chardi (emesis), Dāha (burning sensation), Duṣṭa vṛṇa (non-healing ulcer), Jvara (fever), Kaṇḍū (itching), Kṛmi (helminthiasis), Kuṣṭha (leprosy/diseases of skin), Prameha (metabolic disorder), Pravāhikā (dysentery), Śūla (pain/colic), Śoṣa (emaciation), Śopha (oedema), Śvitra (leucoderma/vitiligo).

Used as a single drug.

Therapeutic uses of Kaiḍārya are based on Rāja Nighantu (eleventh century).

IMPORTANT FORMULATION/ APPLICATIONS

Curry leaves (10%) when given along with mustard seeds (10%) showed significant hypoglycemic activity in experimental rats.^{2(d)} The leaf does not produce any insulin response.^{2(c)}

Beneficial effects of the leaf supplements on lipid profile and glycated protein and amino acids in non-insulin-dependent diabetic patients have been reported.^{2(d)}

The steam distillate of the leaves is reported to exhibit anti-fungal and insecticidal activities.^{2(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 3 to 6 g.

Svarasa (juice): 10–20 mL.

In Japan, a toothpaste containing active principles mahanin, isomahanin, and murrayanol from the leaves has been prepared. It is found to be effective against *Streptococcus mutans* and *Porphyromonas gingivalis* and protects teeth from caries and periodontal diseases.

A food preparation containing mahanin, isomahanin, and murrayanol has been patented (Chemical Abstr., 1996, 125, 284422; 327035).^{2(d)}

M

<i>Musa paradisiaca</i> Linn.	Rhizome	Kadalī
BOTANICAL SOURCE(S)	HABITAT	
<i>Musa paradisiaca</i> Linn. (Fam. Musaceae)	Cultivated throughout India, up to 1,200 m.	
<i>M. × paradisiaca</i> Linn. syn. <i>M. × sapientum</i> Linn. ("×" denotes its hybrid origin). ¹⁹ A larger number of edible clones are cultivated in India than in any other country. ^{2(a)}	REGIONAL LANGUAGE NAMES	
PHARMACOPOEIAL AYURVEDIC DRUG	Eng: Banana; Assam: Kal, Talha; Beng: Kela, Kala, Kanch kala; Guj: Kela; Hindi: Kela; Kan: Bale gadde, Kadubale, Kattebale, Kadali; Mal: Kadali, Ksetrak; Mar: Kel, Kela; Ori: Kadali, Kadila; Punj: Kela; Tam: Vazhai pazham; Tel: Arati chettu; Urdu: Kela (Mouz).	
Kadalī (Rhizome). API, Part I, Vol. III.		
AYURVEDIC SYNONYMS		
Vāraṇā, Ambusārā, Rambhā. Mochā, Virā, Granthini, Yatchhadā. ⁴ Sakṛtphala. ²⁷		

CONSTITUENTS

Fixed oil and 4 α -Methyl Sterol Ketone.

The benzene extract of the root exhibited significant activity against several Gram-positive and Gram-negative bacteria and fungicidal activity against some phytopathogenic fungi.^{2(c)}

Methanolic extract and powder of the root showed post-coital contraceptive activity in rats.^{2(c)}

Ash of the root is anthelmintic.^{2(a)} Root is used for blood disorders and in venereal diseases.¹⁶⁹

Methanolic extract of the root showed anti-hyperglycemic and anti-hyperlipidemic effects in diabetic rats.¹⁷⁰

THERAPEUTIC AND OTHER ATTRIBUTES

Kṛmī, Kuṣṭha, Kārṇa śūla, Somaroga, Amlapitta, Daha, Raktavikāra, Rajadoṣa, Mutṛrakrcchra

Used in worm infestations, obstinate skin diseases, earache, polyuria in females, hyperacidity, burning sensation, diseases due to vitiated blood, menstrual disorders, and dysuria (therapeutic uses based on texts from the seventh to sixteenth centuries).

Kanda (rhizome): Shitala (cooling), balya (strength-promoting) and keshya (promotes hair growth); cures vitiated pitta, kapha, and blood.⁴

The pith, bulb and roots were used internally for dermatosis, leucoderma, piles, urinary diseases, abdominal diseases, and blood vomiting (Charaka Samhita, 1000 BC).²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Abhraka Bhasma Shatputi (Rasatarāṅgi). For preparing calcined mica, specific classical procedure is followed. Kadali root decoction is used for triturating the drug. Prescribed as a restorative, antidiabetic, hematinic, vitalizer, and immuno-stimulant.

Kshāra Taila (Shārangadhara Samhitā, thirteenth century) contains eight alkaline ashes and salts and ten plant parts, all in equal proportions, with two plant juices, including that of Kadali root. Prescribed as an eardrop for diseases of the ear.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g in powder form. 10-20 mL in juice form.

M

Musa paradisiaca Linn. Flower Kadalī

BOTANICAL SOURCE(S)

Musa paradisiaca Linn.
(Fam. Musaceae)

M. \times paradisiaca Linn. syn. M. \times sapientum Linn.
“ \times ” denotes its hybrid origin.

A larger number of edible clones are cultivated in India than in any other country.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kadalī (Flower).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Mouca, Varana, Ambusārā.
Rambhā, Sakrtphala.²⁷
Granthini, Virā, yatchhadā.⁴

HABITAT

Cultivated throughout India, up to 1,200 m.

REGIONAL LANGUAGE NAMES

Eng: Banana;
Assam: Kal, Talha;
Beng: Kela, Kala, Kanch kala;
Guj: Kela;

Hindi: Kela;
Kan: Bale gadde, Kadubale, Kattebale, Kadali;
Mal: Kadali, Ksetrak;
Mar: Kel, Kela;
Ori: Kadali, Kadila;
Punj: Kela;
Tam: Vazhai pazham;
Tel: Arati chettu;
Urdu: Kela (Mouz).

CONSTITUENTS

Saponins, Tannins, reducing and non-reducing Sugars, Sterols and Triterpenes.

Flowers contain caffeic, cinnamic, *p*-coumaric, ferulic, gallic, nicotinic and protocatechuic acids; campesterol, cyclomusalenol, cyclomusalenone, beta-sitosterol, and stigmasterol. Brown-red bracts gave diglycosides of cyanidin and delphinidin.¹⁵

Dried flowers yielded the triterpene alcohol, 9, 19-cyclotetracyclic triterpene, along with cycloeculanol, 24-methylene cycloartanol, 31-nor-cyclolandenol, beta-sitosterol, and stigmasterol.^{2(d)}

From floral buds, the enzyme polyphenol oxidase has been extracted.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Krmi, Swasa roga, Raktapitta, Pradara

Used for worm infestations, dyspnea, bleeding disorders, and excessive vaginal discharge (therapeutic uses based on texts from 1000 BC to sixteenth century).

Flowers were incorporated in prescriptions for bronchial asthma (Bhavaprakasha, sixteenth century).

Flower extract showed hypoglycemic effects in rabbits. It also produced hypotensive effects in mongrel dogs and revealed a depressant action on the isolated hearts of frogs.²⁰⁽²⁾

Flower extract showed anti-bacterial activity against *Micrococcus pyogenes* var. *aureus*.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Hemantha Rasa (Bhaishajya Ratnāvali, seventeenth century), a mercury-based mineral drug. Kadali flower juice is used for triturating the drug. Used for polyuria and other urinary disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g.

Myrica esculenta Buch.-Ham. ex D. Don

Fruit

Kaṭphala

BOTANICAL SOURCE(S)

Myrica esculenta Buch.-Ham. ex D. Don
Syn. *M. nagi* Hook. f.
(Fam. Myricaceae)

M. nagi Auct. non-Thunb.

M. farquahariana Wall.

M. sapida Wall.

M. integrifolia Roxb.³²

Careya arborea Roxb. (Kumbhi) is used in place of Kaṭphala in some parts of India.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Kaṭphala (Fruit).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Mahāvalkala.

Kāphala.³

Kumbhi, Mahākumbhi, Shriparnī.

Soma-pādapa, Soma-valka.

Bhadra, Bhadrāvati.⁴

(Kumbhi, is now equated with *Careya arborea* Roxb., Shriparni with *Clerodendrum phlomidis* Linn. f., Soma-valka with *Acacia catechu* (Linn. f.) Willd. and Bhadra with *Cyperus rotundus* Linn.)

HABITAT

Sub-tropical Himalayas from Ravi eastwards to Assam, and in Khasi, Jaintia, Naga and Lushai hills at elevation of 900-2100 m.

Myrica: only one species occurs in India.^{2(a)}

M. rubra (Lour.) Siebold & Zucc. (Chinese arbutus) is distributed in East Asia and China; *M. gole* L. in East Asia; *M. javanica* Blume in Malesia; and *M. cordifolia* L. in South Africa.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Box myrtle, Bay berry;
Assam: Ajooree, Vdubark;
Beng: Kaychhal, Katphal, Kayphal;
Guj: Kayphal;
Hindi: Kayphajl;
Kan: Kadujai kai, Katphala, Kirisivari, Kirishivane;
Mal: Marut;
Mar: Kaayphal;
Punj: Kanphal, Kayphal;
Tam: Marudam, Marudampatai;
Tel: Kaidaryamu;
Urdu: Kaiphal.

CONSTITUENTS

Waxy material.

Fruits are covered with a crust of white waxy material, a vegetable tallow composed largely of glycerides.^{2(a)}

M. cerifera Linn. of America and *M. cordifolia* Linn. of Africa are richer sources of wax.

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Meha, Jwara, Arśa, Grahaṇī, Pāṇḍu roga, Hrllasa, Mukha roga, Kāsa, Swāsa

Used for abdominal lumps/obstructive jaundice, excessive flow of urine, fever, piles, malabsorption syndrome, anemia, nausea, diseases of the mouth, cough, and asthma (therapeutic uses of stem bark based on texts from the thirteenth to sixteenth centuries). Properties of the fruit not quoted.

Fruits are considered pectoral, sedative, stomachic and carminative; used in the preparation of a refreshing drink.^{2(a),32}

Fruit wax is used externally for healing ulcers.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

In all quoted compounds, stem bark (not fruit) is among supporting plant drugs. (AFI texts.) The bark is used by the name Kāyaphala in (Ayurvedic) medicine, though the fruit is edible.³ 36 decoctions, powdered drugs and medicinal pastes contain Katphala bark as an ingredient (Bhāvaprakāsha, sixteenth century).³ During the classical period, the fruit was included in *Parūṣakādi gaṇa*, which was used as a cardiac tonic, as well as for morbid thirst, digestive impairment and urinary disorders.⁴

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–5 g.

Myrica esculenta Buch.-Ham. Stem bark Kaṭphala

BOTANICAL SOURCE(S)

Myrica esculenta Buch.-Ham. ex D.Don
Syn. *M. nagi* Hook. f.
(Fam. Myricaceae)

M. nagi Auct. non-Thunb.

M. farquahariana Wall.

M. sapida Wall.

M. integrigolia Roxb.³²

Careya arborea Roxb. (Kumbhi) is used in place of Kaṭphala in some parts of India.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Kaṭphala (Stem bark).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Mahāvalkala.

Kāphala.³

Kumbhi, Mahākumbhi, Shriparnī, Soma-pādapa, Soma-valka, Bhadrā, Bhadrāvati.⁴

(Kumbhi, is now equated with *Careya arborea* Roxb., Shriparni with *Clerodendrum phlomidis* Linn. f., Soma-valka with *Acacia catechu* (Linn. f.) Willd. and Bhadra with *Cyperus rotundus* Linn.)

HABITAT

Sub-tropical Himalayas from Ravi eastwards to Assam, and in Khasi, Jaintia, Naga and Lushai hills a elevation of 900-2100 m.

Myrica: only one species occurs in India.^{2(a)}
M. rubra (Lour.) Siebold & Zucc. (Chinese arbutus) is distributed in East Asia and China, *M. gole* L. in East Asia, *M. javanica* Blume in Malesia and *M. cordifolia* L. in South Africa.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Box myrtle, Bay berry;
Assam: Ajooree, Vdubark;
Beng: Kaychhal, Katphal, Kayphal;
Guj: Kayphal;
Hindi: Kayphajl;
Kan: Kadujai kai, Katphala, Kirisivari, Kirishivane;
Mal: Marut;
Mar: Kaayphal;
Punj: Kanphal, Kayphal;
Tam: Marudam, Marudampatai;
Tel: Kaidaryamu;
Urdu: Kaiphal.

CONSTITUENTS

Tannin and Glycosides.

Stem bark gave myricanol, a proanthocyanidin.
Root bark yielded beta-sitosterol, taraxerol, and myricadiol.^{20(2),32}
Bark gave 32.1% tannins;^{2(a)} also contains gallic acid, myricanol, myricanone, epigallocatechin 3-O-gallate, the prodelphinidin dimers, and the hydrolysable tannin castalagin.^{2(d)}
The plant contains myricanol, proanthocyanidin, beta-sitosterol, friedelin, taraxerol, myricadiol, myricetin, and myricetin-3-rhamnoside.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Meha, Jwara, Arśa, Grahāṇī, Paṇḍu roga, Hṛallāsa, Mukha roga, Kāsa, Swāsa, Agnimāndhya, Aruchi, Kaṇṭharoga.

Used for abdominal lumps/obstructive jaundice, excessive flow of urine, fever, piles, malabsorption syndrome, anemia, nausea, diseases of the mouth, cough, asthma (common to the fruit and stem bark), digestive impairments, tastelessness, and throat diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).
Bark was used in decoctions (internally) for bronchial asthma, cough, and diarrhea;²⁷ in dyspepsia; externally (also internally) in leprosy, malignant ulcers, and other virulent skin diseases²⁸ (Charaka Samhita, Sushruta Samhita, 1000 BC).

IMPORTANT FORMULATION/ APPLICATIONS

In all the quoted compounds stem bark is among supporting plant drugs.
During the classical period, Kaṭphala (bark) was included among Rodhrādi gāṇa, Sursādi gāṇa and Lākshādi gāṇa. Drugs of all of these groups were used in toxemia, diseases of the female genital tract, parasitic infections, rhinitis, asthma, cough, for cleansing ulcers, and in skin diseases including leprosy.⁴

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–5 g.

Myristica fragrans Houtt.

Jātīphala

BOTANICAL SOURCE(S)

Myristica fragrans Houtt.
(Fam. Myristicaceae)

East Indian nutmeg is available in three grades:

(i) Banda nutmeg, considered to be the finest, contains up to 8% essential oil; (ii) Siaruw nutmeg, as good as Banda, contains about 6.5% essential oil; (iii) Penang nutmeg is usually wormy and moldy, derived from *M. argentea* Warb., and is suitable only for distillation purposes.

Bombay nutmeg, an adulterant of true nutmeg, is obtained from *M. malabarica* Lam., known as False nutmeg.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Jātīphala (Endosperm of dried seeds, kernels of fruits).

API, Part I, Vol. I.

International Pharmacopoeial name: Myristicae semen.

AYURVEDIC SYNONYMS

Jātīśasya.

Jātikosh.³

Jātisutam, Shalūka,

Mālati-suta.⁴

Mālatīphala.⁷

HABITAT

Tamil Nadu and to some extent in Kerala, Andhra Pradesh and Assam.

Myristica: distributed from India to Southeast Asia to North Australia and the Pacific islands.^{2(a)}

Also cultivated in Malesia and the West Indies.¹

About five species occur in India.^{2(a)}

A native to Moluccas and cultivated in many tropical countries of both hemispheres. In India, it is (mainly) in Tamil Nadu (Nilgiris, Coimbatore, Salem, Ramanathapuram,

Tirunelveli, Kanyakumari and Madurai districts). A few trees are found in Kerala, Assam, and other places.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Nutmeg;

Assam: Jaiphal, Kanivish;

Beng: Jaiphala, Jaitri;

Guj: Jaiphala, Jayfar;

Hindi: Jaiphal;

Kan: Jadikai, Jaykai, Jaidikai;

Kash: Jafal;

Mal: Jatika;

Mar: Jaiphal;

Ori: Jaiphal;

Punj: Jaiphal;

Tam: Sathikkai, Jathikkai, Jatikkai, Jadhikai, Jadhikkai;

Tel: Jatikaya;

Urdu: Jauzbuwa, Jaiphal.

CONSTITUENTS

Essential oil and fixed oil.

Volatile oil varies from 6% to 16%. Major constituents are *d*-pinene and *d*-camphene (together 80% of the oil); eugenol, *iso*-eugenol, cymene, alpha-thujene, gamma-terpinene, linalool, terpineol and myristicin; myristic acid and esters of myristic and other fatty acids; and safrole. Lignans and neolignans, diarylpropanoids, and diterpenes are also present.³¹

Fixed oil contains myristic, palmitic, and other acids.³¹

(Therapeutic actions are due to the volatile oil.)

Myristicin is toxic in large amounts.^{2(a),31}

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra, Grahani, Chardi, Mukharoga, Pināsa, Kāsa, Śvāsa, Śukrameha.

Used for diarrhea, malabsorption syndrome, emesis, diseases of the mouth, sinusitis, cough, asthma, and spermatorrhea (therapeutic uses

based on texts from the twelfth to thirteenth centuries).

The fruits were used in medicinal oils, externally for cutaneous eruptions and pruritus.²⁷

The fruit powder, with dried ginger, was a common remedy for treating diarrhea.^{16(a)}

Extracts of nutmeg showed anti-secretory activity against the *E. coli* enterotoxin.^{2(c)}

Paste of the fruit was applied on cracks in the feet. A paste of aril of the fruit was used for removing freckles.^{16(a)}

**IMPORTANT FORMULATION/
APPLICATIONS**

Jātiphalādi Churna (Shārangadhara Samhitā, thirteenth century), contains 20 plant drugs including Jātiphala, in equal proportion, with *Cannabis sativa* leaves equal to all the 20 plant drugs.

Used for diarrhea and dysentery with mucus.

Not quoted in API:

Karpurādi Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains both nutmeg and mace with camphor; *Trikatu* (the “Three

Pungents”) and four supporting herbs. Used for cough, bronchitis, and phthisis (AFI).

Nutmeg and mace are ingredients in a number of tonics for sexual debility: Chandrodaya Makaradhwaja, Makradhwaja, Nāgavallyādyā Churna, and Arjakādi Vatikā (Bhaishajya Ratnāvali, seventeenth century).¹⁸

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

0.5–1.0 g of the drug in powder form

ED₅₀ of the water extract of the seeds in rats for castor oil-induced diarrhea was found to be 1000 mg/kg.^{2(d)}

Mace is found to be non-toxic, whereas nutmeg has an LD₅₀ of 1320 mg/kg i.p.^{2(c)}

All polyherbal and herbo-mineral compounds promoted for sexual debility and spermatorrhea need scientific validation.

Ingestion of 5–10 g of nutmeg powder (one to three whole seed) can cause significant side effects.¹³

(For mechanism of action, see Reference 13.)

BOTANICAL SOURCE(S)

Nardostachys jatamansi DC.
(Fam. Valerianaceae).

Rhizomes of *Selinum vaginatum* C.B. Cl. and *S. tenuifolium* Wall. are sold as cheap substitutes of Jatamamsi.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Jatāmāṃsi (Rhizome).

API, Part I, Vol. I.
International Pharmacopoeial name:
Nardostachys radix seu rhizome.

AYURVEDIC SYNONYMS

Māṃsī, Jaṭā, Jaṭilā.

Nalada,^{4,30} Marhsyahvya.³⁰
Bhūtakeshi.^{3,4}
(Other alpine species of *Selinum* or *Corydalis govaniana* Wall. are also used as Bhūtakeshi.)
Jaṭā has been mentioned alongside Māṃsi. It is considered to be another variety of Māṃsi, known as Gandhamāṃsi,^{30,4} Pūtanā, Keśī, Pishāchikā.⁴

HABITAT

Sub-alpine Himalayan tracts, at an altitude of 3000-5000 m.

Found from Punjab to Sikkim and Bhutan.^{2(a)}
Native to India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Nardus root;
Assam: Jatamansi, Jatamangshi;
Beng: Jatamamsi;
Guj: Baalchad, Kalichad;
Hindi: Balchara;
Kan: Bhootajata, Ganagila maste;
Kash: Bhutijata;
Mal: Manchi, Jatamanchi;
Mar: Jatamansi;

Ori: Jatamansi;
Punj: Billilotan, Balchhar, Chharguddi;
Tam: Jatamanji;
Tel: Jatamamsi
Urdu: Sumbul-ut-teeb.

Eng: Indian spikenard, Indian valerian.

CONSTITUENTS

Essential oil and resinuous matter.

Jatāmāṃsi yields up to 1.9%–2.5% essential oil. Indian oil is *d*-rotatory, while the oil from Japan is reported to be *l*-rotatory.^{2(a)}
The oil contains *d*-nardostachone, valeranone, and jatamansone as major ketonic sesquiterpenes.^{2(c)}

Rhizomes yielded jatamanshic acid, jatamansone, patchouli alcohol, *nor*-seychelanone, seychellen and alpha- and beta-patchoulene, as well as valeranone, valeranal, nardol, calarenol, nardostachone, *n*-hexacosanyl arachidate, and isovalerate; beta-sitosterol; terpenic coumarins, oroselol, jatamansin, and sclinidin. Alkaloid actinidin is obtained from the plant.^{32,15}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Dāha, Visarpa, Mānasaroga, Anidrā

Used for obstinate skin diseases, burning sensation, erysipelas, mental diseases, and insomnia (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Smoking pillet containing Māṃsi was prescribed by Charaka and Sushruta (1000 BC) in cough and asthma.

Māṃsi was used in fumigation for treating fear psychosis. Charaka and Sushruta incorporated Māṃsi in medicinal oils for edema, arthritis, gout, fractures, and skin diseases; for external application.

Māṃsi was also included in hair oils for promoting hair growth.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Jatāmānyārka (Arka Prakāsha, Rāvana, period not known), is a distillate of Jatāmānsi rhizome in water.

Used for impaired digestion, anorexia, foul breath, insanity, and epilepsy.

Not quoted in the API:

Mahāpaishāchika Ghrita (Charaka Samhitā, Bhaishajya Ratnāvali, Sahasrayoga); in all the three texts, Jatilā, Pūtanā and Keshi are among main plant drugs. Used for insanity and epilepsy, and also as a brain tonic.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–3 g of the drug in powder form. 5–10 g of the drug for decoction.

Research potential: alcoholic extract of the roots of Indian nard caused an overall increase in the levels of central monoamines, 5-hydroxy indole acetic acid, and the inhibitory amino acids, gamma-aminobutyric acid, nor-epinephrine, dopamine, and serotonin in the rat brain.^{2(c)}

Nelumbo nucifera Gaertn.

Kamala

BOTANICAL SOURCE(S)

Nelumbo nucifera Gaertn.

Syn. *Nelumbium speciosum* Willd.

(Fam. Nymphaeaceae)

Lily (Kumuda group) has different species, *Nymphaea alba* (white), *N. nouchali* (red and white) and *N. stellata* (blue or violet).

PHARMACOPOEIAL AYURVEDIC DRUG

Kamala (Flower).

API, Part I, Vol. II.

Flowers range from white to deep rose.

Pundarika (whitish), Kokanada (red) and Indivara (blue-tinged).

AYURVEDIC SYNONYMS

Abja, Aravinda, Padma, Kalhāra, Sitotpala, Pankaja.

Sāluka, Ambhoruha.

Jalaja, Rājiva, Pushkara, Ambuja, Abja.⁷

HABITAT

In lakes and ponds throughout the warmer parts of India, ascending up to 1000 m.

REGIONAL LANGUAGE NAMES

Eng: Lotus;

Assam: Podum;

Beng: Padma phool, Salaphool;

Guj: Kamal;

Hindi: Kamal, Kanwal;

Kan: Kamal, Tavare, Naidile, Tavaregedd;

Mal: Tamara, Venthamara, Chenthamara, Senthamara;

Mar: Komala;

Ori: Padma;

Punj: Kanwal, Pamposh;

Tam: Tamarai, Thamaraipoo, Aravindan,

Paduman, Kamalam, Sarojam;

Tel: Kaluva, Tamarapuvow;

Urdu: Kamal.

CONSTITUENTS

Alkaloid (Nelumbine).

Kaempferol-3-galactorhamnoglucoside (robinin) is present in the flower; receptacle of the flower shows the presence of quercetin and luteolin. The petals and stamens contain isoquercitrin and glucoluteolin.^{15,20(2)}

Flowers are reported to contain alpha-amyrin, lupeol, beta-sitosterol, *n*-triacontanol, D-glucose and free amino acids, lysine,

hydroxyproline, proline, beta-phenylalanine, and arginine.^{2(d),25}

THERAPEUTIC AND OTHER ATTRIBUTES

Trṣṇā, Dāha, Raktapitta, Visarpa, Viṣavikāra

Used for morbid thirst, burning sensation, bleeding disorders, erysipelas and toxemia (therapeutic uses based on texts from 1000 BC to sixteenth century).

A paste of petals was used as an ingredient of an unguent or their cold aqueous extract was used as a drink for nasal hemorrhage and dysuria (Charaka, 1000 BC).

Lotus stamens, mixed with butter and sugar, were given for bleeding piles (Ashtāngahridaya, seventh century), as well as to check hemoptysis (Harita Samhita, sixth century).

Stamens of the while lotus, pounded with rice water and mixed with sugar candy, were given to check dysentery (Bangasena, eighteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Aravindāsava (Bhaishajya Ratnāvali, seventeenth century), contains 23 plant drugs in equal

proportion, including Kamal and Nilotpala flowers.

Used as a carminative and restorative general tonic for children.

Chatura Kaval Ghrita (not in the AFI, Sahasrayoga, Bhaishajya Ratnāvali).

In ethnomedicine, flowers and filaments are considered to be cooling and astringent. Flowers are used in diarrhea, gastroenteritis, fever, and diseases of the liver and heart. Filaments are used for burning sensation of the body, bleeding piles, and menorrhagia.

Aqueous and alcoholic extracts of sun-dried flowers produced significant hypoglycemia in fasting normal rats.^{2(c)} Diuretic activity was also reported.^{2(d)}

Saline extracts of the flowers, stem, and leaves exhibited bacteriostatic action against Gram-positive and Gram-negative bacteria.^{2(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

12–24 g of the drug decoction.

Lotus is traditionally used in China as an antidote for mushroom poisoning.¹²

N

Nelumbo nucifera Gaertn.

Rhizomes

Kamala

BOTANICAL SOURCE(S)

Nelumbo nucifera Gaertn.

Syn. *Nelumbium nelumbo* Druce, *N. speciosum* Willd. (Fam. Nymphaeaceae)

Lily (Kumuda group) has different species, *Nymphaea alba* (white), *N. nouchali* (red and white) and *N. stellata* (blue or violet).

PHARMACOPEIAL AYURVEDIC DRUG

Kamala (Rhizome).

API, Part I, Vol. III.

Two types of rhizomes, white and red, are generally met with. They measure 60–120 cm in length and 6–9 cm in diameter and are white to buff orange in color; in cross-section, there are a few large cavities surrounded by several small ones.^{2(a)}

AYURVEDIC SYNONYMS

Padnakanda, Sāluka, Ambhoruha.

Abja, Aravinda, Padma, Kalhāra, Sitotpala, Pankaja.

Jalaja, Rajīva, Pushkara, Ambuja, Abja, Pundarika (whitish), Kokanada (red), Indivara (blue tinged).⁷

HABITAT

In lakes and ponds throughout the warmer parts of India, ascending up to 1000 m.

REGIONAL LANGUAGE NAMES

Eng: Sacred lotus;
Assam: Kamal kakdi;
Guj: Loda;
Hindi: Kamal kand, Kamal kakdi;
Kan: Tavare kanda;
Mal: Tamara kizangu;
Mar: Kamal kand;
Ori: Padma;
Punj: Kaul, Bhein;
Tam: Tamardi kizangu;
Tel: Tamara gadda;
Urdu: Kanwal kakdi.

Common name of rhizome: Kamal-kakaḍi (sold as a vegetable).

CONSTITUENTS

Starch and reducing sugars.

Fresh rhizomes (from Mysore) gave the following values: water 83.80%; crude protein 2.70%; fat 0.11%; reducing sugars 1.56%; sucrose 0.41%; starch 9.25%; fiber 0.80%; ash 1.10%; and calcium 0.06%; vitamins (in mg/100 g): thiamine 0.22; riboflavin 0.06; niacin 2.1; and ascorbic acid 15. Rhizomes also contain asparagine 2%.^{2(a)}

Catechol, (+)-gallo catechol, neochlorogenic acid, leucocyanidin, and leucodelphinidin were reported from the roots.²⁵

Arsenic content below 2 µg/g.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Tṛṣṇa, Chardi, Raktapitta, Murchā, Kāsa, Vātagulma, Visarpa, Visphota, Muṭrakṛchra, Dansodbhava, Jwara, Bhrama, Soṣa, Hṛdroga

Used for burning sensation, morbid thirst, emesis, bleeding disorders, syncope, cough, rheumatic lumps, erysipelas, pustular eruptions, dysuria, poisonous bites, fever, vertigo, cachexia, and

heart disease (therapeutic uses based on texts from 1000 BC to sixteenth century).

Arrowroot, prepared from fleshy rhizomes, is given to children with diarrhea, dysentery, and dyspepsia. A paste of the rhizome is applied to ringworm and cutaneous afflictions. Rhizomes are used for their mucilaginous, diuretic, demulcent, astringent, cholagogue and hypoglycemic properties, and in fever, diarrhea, diseases of the liver and as a cardiac tonic.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Guduchyādi Modaka (Yogarātnākara, sixteenth century), a Guduchi (*Tinospora cordifolia*)-based (62 parts) confection with 31 (each 1 part) herbomineral supporting drugs including root tuber of Padma. Used for urinary disorders, including dysuria.

The root, cooked in oil and mixed with cow's urine, was given in retention of urine with severe pain (Hārta Samhitā, sixth century).^{16(a)}

Rhizome extracts showed anti-bacterial activity comparable to that of chloramphenicol; dose-dependent hypoglycemic activity; anti-inflammatory activity (attributed to betulinic acid); diuretic activity (300 mg/kg); anti-pyretic activity (400 mg/kg) comparable with paracetamol; anti-fungal activity comparable with Griseofulvin and anti-yeast activity.^{2(d)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 mL of the drug in juice form. 5–10 g of the drug in powder form.

For further research: in a study in Japan, polyphenolic extracts of lotus root alleviated hepatic steatosis in obese diabetic mice. After 3 weeks of feeding, the hepatomegaly and hepatic triglyceride accumulations were markedly alleviated in the lotus root polyphenol diet-fed mice compared to the control mice.

A chromatographic study revealed the presence of B-type proanthocyanidin polymers with a polymerization degree of up to 9 in the polyphenolic root extract.¹⁷²

Nerium indicum Mill.

Root

Karavīra

BOTANICAL SOURCE(S)

Nerium indicum Mill.
Syn. *N. odorum* Soland
(Fam. Apocynaceae)

N. indicum differs from *N. oleander* Linn. (Oleander, Rose Bay) only in bearing fragrant flowers. *The Wealth of India* treated them separately.

N. indicum bears white and red flowers. In some Ayurvedic compounds, only the white-flowered variety was used.³⁰

The yellow-flowered species is equated with *Thevetia nerifolia* Juss. ex Steud.³

PHARMACOPOEIAL AYURVEDIC DRUG

Karavīra (Root).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Divyapuṣpa, Śatakumbha, Aśvamara, Aśvamāraka, Hayamāra.

Hayamāraka, Harapriya.

Virā, Viraka.²⁷

Ashvahā, Shat-kumbhaka.⁴

Red-flowered variety: Chanda, Laguda, Karviraka.⁴

HABITAT

Upper Gangetic plains, Himalayas from Nepal to Kashmir up to 2000 m, Central and Southern India; also cultivated in gardens.

Nerium: distributed in the Mediterranean region and subtropical Asia. Three species are found in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Indian oleander, Sweet-scented oleander;
Assam: Diflee, Sammulhimar;

Beng: Karbbe, Karbee;

Guj: Kaner;

Hindi: Kaner;

Kan: Kanagilu, Kharjahar, Kanigale, kanagile;

Mal: Kanaveeram;

Mar: Kanher;

Punj: Kanir;

Tam: Sevvarali, Arali;

Tel: Kastoorigatte, Errugumeru;

Urdu: Kaner.

CONSTITUENTS

Glycosides-Cardiac Glycosides and Resinous Matter.

Root yielded plumericin, neroside (plumeride and beta-D-glucoside of plumericin) and lupeol acetate.²⁵

Odorosides A, B, D-H, K-M, odorobioside K, pregnenolone, beta-D-glucopyranoside, diglucoside and triglucoside of pregnenolone, and cardenolide pigments neriumosides A-1, A-2, B-1, B-2 and C-1 have been isolated from the root.¹⁵

Cardioactive glycosides A-H were obtained from the root bark.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Vraṇa, Upadanśa, Kuṣṭha, Jalodara, Kaṇḍu

Used for ulcer, syphilis/soft chancres, obstinate skin diseases, ascites, and pruritus (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Oil cooked with the root of Karavira and aconite along with cow's urine was used for psoriasis, pityriasis versicolor and tumors (Vṛndamādhava, eighth century).

Root and root bark: powerful resolvent and attenuant; paste applied to ulcerations, hemorrhoids, chancres, leprosy, and other obstinate skin diseases.^{2(a),15}

Root extract is given as a vermicide to cattle.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Bṛhnmārichādyā Taila (Yogarātnākara, sixteenth century), contains Indian *Napellus* (aconite) in double quantity than each of 31 other plant drugs including *Karavira* root.

Used externally for pustular eruptions and obstinate skin diseases.

Karavīrādyā Tailam (Bhaishajya Ratnāvali, seventeenth century, not in the AFI) contains white-flowered *Karavira* root with *Plumbago zeylanica*, *Embelia ribes* and cow's urine. Used for external application in obstinate skin diseases.

One more variant, in Bhaishajya Ratnāvali, is for fistula-in-ano.

Shvetakaravīrādyā Taila (Charaka Samhitā) was used externally for chronic skin diseases.

Mālatyādi Tailam (Bhaishajya Ratnāvali) was used for alopecia.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

30-125 mg of the drug in powder form.

(Only oil compounds have been quoted. For external application only.)

Insufficient reliable information is available about the safety of the topical use of oleander.¹³

The annual incidence of oleander poisoning in Sri Lanka exceeds 150 per 1,000,000. Approximately 10% of these ingestions are fatal.¹³ Abbott TDx Digoxin II assay can be used for rapid confirmation of the ingestion of oleander.¹³

Nerium indicum Mill.

Leaf

Karavīra

N

BOTANICAL SOURCE(S)

Nerium indicum Mill. Syn. *Nerium odorum* Soland (Fam. Apocynaceae)

N. indicum differs from *N. oleander* Linn. (Oleander, Rose Bay) only in bearing fragrant flowers. *The Wealth of India* treated them separately.

N. indicum bears white and red flowers. In some Ayurvedic compounds, only the white-flowered variety was used.³⁰

The yellow-flowered species is equated with *Thevetia neriifolia* Juss. ex Steud.³

PHARMACOPOEIAL AYURVEDIC DRUG

Karavīra (Leaf).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Aśvamara, Aśvamāraka, Hayamāra, Hayamāraka, Harapriya.

Virā, Viraka,²⁷ Ashvahā, Shat-kumbhaka.⁴

Red-flowered variety: Chaṇḍa, Laguḍa, Karviraka.⁴

HABITAT

Upper Gangetic plains, Himalayas, from Nepal to Kashmir up to 2000 m, Central and Southern India; also cultivated in gardens.

Nerium: distributed in the Mediterranean region and subtropical Asia. Three species are found in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Indian Oleander, Sweet-scented oleander;
Assam: Karbira, Karavi, Karvir;
Beng: Karavi, Kalkephul;
Guj: Kanera, Karena, Karen;
Hindi: Kaner;
Kan: Kanagalu, Kanagile;
Kash: Gandeela, Gandula;
Mal: Kanave eram, Arali, Kattalari;
Mar: Kanher;

Ori: Kankara, Kaniar;
 Punj: Kaner;
 Tam: Arali, Alari, Aatrulari;
 Tel: Ganneru;
 Urdu: Kaner.

CONSTITUENTS

Cardiac glucoside (oleandrin).

Main glycosides from leaves: gentiobiosyloleandrin, odoroside A and oleandrin.

Cardiac glycosides include kaneroside, neri-umoside, digitoxigenin- α -L-oleandroside, 5- α -adynenin and several oleasides,³² as well as the beta-D-digitaloside of 16-dehydroadynenigenin, glycosyl nerigoside, and gentiobiosyl oleandrin.²⁵

Oleandrin on hydrolysis gave the aglycone, acetylglitoxigenin, and sugar oleandrose.

Leaves also contain ursolic acid, oleanolic acid, and rutin.^{2(a),15}

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Vraṇa, Kuṣṭha, Kaṇḍū, Krmiroga, Netraroga, Tamakaśvāsa, Hṛdroga

Used fever, ulcers, obstinate skin diseases, pruritus, worm infestations, diseases of the eye, bronchial asthma and cardiac diseases (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Halini (*Gloriosa superba* Linn.) and Karavira were used for non-healing ulcers.⁴

A powder of leaves of the white-flowered variety of Karavira was used as a snuff in epilepsy (Siddha-bheshaja-manimala, eighteenth century).^{16(a)}

Leaf juice is applied to syphilitic ulcers, and a paste of leaves is applied in ringworm and other skin diseases.¹⁵

Leaves, boiled in *Pongamia pinnata* oil, are used in scabies.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Kāsisādi Taila (Bhaishajya Ratnāvali, seventeenth century), contains 15 plant drugs including Ashvamāra root/leaf, all in equal proportion, with green viterol (mineral) and rock salt; processed with cow's urine. Externally for piles.

(In Homeopathy, a tincture of *Nerium oleander* (Red laurel) leaves is used, which is prescribed for diseases of the nervous system, hemiplegia and paralytic conditions, under medical supervision.)¹⁸

DOSAGE/USAGE/CAUTIONS/ COMMENTS

30–125 mg of the drug in powder form. (Not to exceed higher limit.).

Toxicity studies are required to validate the claim that "*N. indicum* is more potent than *Digitalis* with a margin of safety similar to that strophanthin."²⁰⁽²⁾

N

Nigella sativa Linn.

Upakuñcikā

BOTANICAL SOURCE(S)

Nigella sativa Linn.
 (Fam. Ranunculaceae)

Ajāji is equated with Upakuñcikā (*Nigella sativa*) in Kerala.³ In Tamil Nadu, *Nigella sativa* is used as Kṛṣṇa jiraka.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Upakuñcikā (Seed).

API, Part I, Vol. I.

International Pharmacopoeial name: Nigellae semen.

AYURVEDIC SYNONYMS

Sthūlajīraka, Upakuñcī, Suṣavī.

Kālājāji.^{16(c)}

Kālikā, Vāpikā, Kuñchī, Kāravī,

Prithivikā, Prithivi, Sthūlajāji,

Upakālikā.⁴

(Sushavi was also mentioned as a variety of Karavellaka.)³⁰

HABITAT

Cultivated in Punjab, Himachal Pradesh, Bihar and Assam.

Two species are found in India: *N. sativa* and *N. damascena* (Love-in-a Mist).^{2(a)}

Indigenous to Southern Europe and Western Asia, chiefly in the Mediterranean region.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Small fennel, Nigella seed;

Beng: Mota kalajira, Kalajira;

Guj: Kalonji jeeru, Kalounji;

Hindi: Kalaunji, Mangaraila;

Kan: Karijirige;

Mal: Karinjirakam;

Mar: Malaunji jire, Kalejire;

Punj: Kalvanji;

Tam: Karunjeerakam, Karunjiragam;

Tel: Peddajila karra;

Urdu: Kalongi.

Common name: Kalonji.

CONSTITUENTS

Essential oil, fixed oil, resin, saponin and tannin.

Essential oil 0.5%–1.6%, fixed oil 35.6%–41.6%.^{2(a)}

Essential oil is rich in thymoquinone (the main ingredient), *p*-cymene and thymol. Seeds also contain alpha-hederin (a triterpene saponin) and nigellone (polythymoquinone), together with triglycosides of quercetin and kaempferol and nigelline (an alkaloid). Thymoquinone and nigellone have shown anti-inflammatory, hypoglycemic, liver-protecting, cytotoxic,

anti-thrombotic, bronchodilatory, and analgesic activities in animal studies. Alpha-hederin showed anti-tumor properties.^{12,13}

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Ādhmāna, Atisāra, Kṛmiroga

Used for chronic obstructive jaundice/chlorosis/abdominal lumps, flatulence, acute diarrhea and worm infestations (therapeutic uses based on texts from 1000 BC to sixteenth century).

Upakunchikā seeds were used as a carminative, diuretic, emmenagogue, galactagogue, anthelmintic, and in the treatment of mild puerperal fever. Used externally in skin eruptions.

Seeds were given as a corrective of purgatives. A decoction of seeds was given for expelling the placenta and stimulating uterine contractions. Seeds with jaggery were prescribed for irregular fever, and with double the quantity of sugar in internal hemorrhage.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Nārāyana Churna (Ashtāngahridaya, seventh century), contains 4 purgative drugs, 5 salts and 24 supporting plant drugs including Upkunchikā seed, in equal proportion.

Used for chronic constipation and malabsorption syndrome.

Kankayana Gutikā (Bhaishajya Ratnāvali, seventeenth century) contains *Ferula foetida* oleo-gum-resin as the main drug. Upakunchika seeds are among 16 supporting herbs. Used for tympanites, hemorrhagic diseases and piles.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

The galactagogue principle was found in the ether extract of the seed, which, at a concentration of 1.8%, showed more powerful galactagogue effects than those induced by 0.5 μg of estrogen injection given daily to lactating rats.²⁰⁽²⁾

Nymphaea alba Linn.

Kumuda

BOTANICAL SOURCE(S)

Nymphaea alba Linn.
(Fam. Nymphaeaceae)

Three species are used in Ayurvedic medicine, *N. alba* (white flowered), *N. nouchali* (red and white flowered) and *N. stellata* (blue or violet flowered): Shvetotpala, Raktotpala and Nilotpala, respectively.

PHARMACOPOEIAL AYURVEDIC DRUG

Kumuda (Flower).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Kumudam, Sitolpalam, Śaśikāntā, Śyāmaṇṛtā.

Shvetotpala,³⁰ Kairava, Kuraut.⁴

HABITAT

Common in ponds, streams and fresh water lakes and up to 1800 m.

REGIONAL LANGUAGE NAMES

Eng: Indian blue water lily;
Beng: Kumuda, Shandh shaluka;
Guj: Piyanu;
Hindi: Kui, Kanval, Kokka;
Kan: Bilenaydile, Biletavare;
Mal: Ampal;
Mar: Kamod;
Tam: Nalla kalav, Vellampal, Allittamarai;
Tel: Allikada, Tellakaluva;
Urdu: Kamal.

Eng: Indian blue water-lily is a wrong synonym.
European white water-lily is more accurate.^{2(a)}

CONSTITUENTS

Alkaloids and Glycosides.

Flowers contain the cardiac glucoside nymphalin. Stigmasterol, beta-sitosterol, and beta-sitosterol-beta-D-glucopyranoside have been isolated.²⁵

Flavonoids include quercetin, kaempferol, isokaempferol and apigenin.

In addition to phenolic acid, ellagic, and gallic acids and their methyl and ethyl esters were isolated from the flowers. Flowers also gave *p*-hydroxybenzoic, *p*-coumaric, vanillic, and ferulic acids.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktadoṣa, Dāha, Hṛdroga, Raktapitta

Used for disorders due to vitiated blood, burning sensation, cardiac disorders, and bleeding disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

A decoction of flowers is valued as a cardiac tonic in palpitation, fainting, vomiting and internal hemorrhage.¹⁵

Flowers and seeds were taken raw in urinary diseases, alcoholism and as an intestinal astringent (Charaka, 1000 BC). Used internally in blood poisoning, heart diseases and syncope (Sushruta, 1000 BC).

IMPORTANT FORMULATION/ APPLICATIONS

Triphalādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains 11 main plant drugs; the Three Myrobalans with 24 supplementary herbs including 5 species of lotus and lily flowers, in equal proportion. For application on head in alopecia, graying of hair, loss of hair, and coryza.

Balā Ashvagandhā Lakshādi Taila (Sahasrayoga); the main drugs are Balā, Ashvagandhā and Lākshā, with 17 supplementary herbs including lily rhizomes (not flowers). Used as a massage oil for neuritis, fever, tuberculous emaciation, and psychic disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Plant contains the cardiac glycoside, nymphalin.¹⁵

N

Nymphaea stellata Willd.

Utpala

BOTANICAL SOURCE(S)

Nymphaea stellata Willd.
(Fam. Nymphaeaceae)

Often confused with *N. caerulea* Sav. (Egyptian blue lotus) and *N. capensis* Thunb. (Cape blue water-lily).^{2(a)}

In Kerala, *Monochoria vaginalis* Presl. is used as Indivara.³

PHARMAKOPEIAL AYURVEDIC DRUG

Utpala (Flower).

API, Part I, Vol. III.
(Nilotpal is more appropriate.)

AYURVEDIC SYNONYMS

Kumuda, Nilotpala.

Kuvalaya, Bhadra, Indivara.⁴
(Indivari is a synonym of *Asparagus racemosus* Willd.)

HABITAT

Tanks and ponds throughout the warmer parts of India.

REGIONAL LANGUAGE NAMES

Eng: Indian blue water fily;
Beng: Kumud, Sundi;
Guj: Poyanu;
Hindi: Neel kamal, Kumudinee;
Kan: Neeltare;
Mal: Ambal poovu;
Mar: Kamoda, Neel kamal;
Punj: Neela kamal, Kamalini;
Tam: Alii, Ambal;
Tel: Allitamara, Kaluvapoovu;
Urdu: Neelofar.

CONSTITUENTS

Tannins.

Sitosterol, free sulfur and, for the first time, ethyl gallate have been isolated from the flowers.²⁵

Pretreated flowers with hot water afforded a polysaccharide containing D-xylose (64.5%) and L-arabinose (35.5%).^{2(c)}

Astragalín, corilagin, gallic acid, gallic acid methyl ester, iso-kaempferol, kaempferol, quercetin-3-methyl ether, quercetin 2-4, 6-tetra O-galloyl dextroglucose, and 3-O-methyl quercetin-3'-O-beta-dextroxylopyranoside have been identified in the flowers.^{173,174}

THERAPEUTIC AND OTHER ATTRIBUTES

Pipāsā dāha, Raktapitta, Chardi, Mūrcchā, Hṛdroga, Mūtrakecchra, Jwarātisāra

Used for thirst due to heat, bleeding disorder, emesis, syncope, cardiac disorders, dysuria, and diarrhea with fever (therapeutic uses based on texts from 1000 BC to sixteenth century).

Flowers do not exhibit hypoglycemic activity in normoglycemic rats, but have an anti-hyperglycemic activity in alloxan-induced diabetic rats.¹⁷⁵

Oral administration of the flower extract showed good hepatoprotection against carbon tetrachloride-induced hepatic damage in albino rats.¹⁷⁶

A decoction of flowers is considered narcotic.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Nilotpala flowers are used as a supporting herb in all the quoted formulations, except in Tungadrumādi Taila (Sahasrayoga,

a non-Samhitā, Kerala Materia Medica) where plant of Utpala is an ingredient.

In ethnomedicine, powdered rhizomes are given in dyspepsia, diarrhea, and piles. An infusion is considered emollient and diuretic. Used in blennorrhagia and diseases of the urinary system.^{2(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Dose: 3–6 g of the drug.

In Western herbalism, dried or fresh rhizomes of pond lilies are used in chronic diarrhea, externally in the treatment of vaginal conditions and as a gargle in diseases of the mouth and throat.¹⁴

BOTANICAL SOURCE(S)

Ocimum sanctum Linn.

(Fam. Lamiaceae)

Syn. *O. tenuiflorum* Linn.

Other *Ocimum* species: *Ocimum basilicum*

Linn. (Barbari, Ban-tulasi); *Ocimum canum*

Sims., syn. *O. americanum* Linn. (Bana-tulasi,

Kṛṣṇa tulasi); *Ocimum gratissimum* Linn.

(Rāma tulasi); *Ocimum kilimandscharicum*

Guerke (Karpura tulasi);²⁹ *Ocimum viride*

Willd. (Fever plant of Sierra Leone).^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Tulasī (Leaf)

API, Part I, Vol. II.

Tulasi (Seed)

API, Part I, Vol. IV.

Tulasi (Whole plant)

API, Part I, Vol. II.

Leaves should be collected during

October–January.^{2(a)}

Tulasi nomenclature is confusing and complicated. It should be used on the basis of its chemical marker, rather than by its geographical origin.^{2(a)}

International Pharmacopoeial name: Folium Ocimi Sancti.¹⁰

AYURVEDIC SYNONYMS

Surasā, Kṛṣṇatulasī, Bana tulasī, Bahumanjari, Bhūtaghni.

Surasā, Gaurī, Apeta-rākshasī, Sulalā, Deva-dumdubhi.^{4,16(c)}

HABITAT

Throughout India, and it is also cultivated.

Two types of *O. sanctum* are met in cultivation.

The green type, known as Sri Tulasī, is most common. The second type is known as Kṛṣṇa Tulasī, which bears purple leaves.^{2(a)}

Krishna Tulasī is preferred in Ayurvedic medicine.⁵

REGIONAL LANGUAGE NAMES

Eng: Holi basil, Sacred basil;

Assam: Tulasī;

Beng: Tulasī;

Guj: Tulasī, Tulsī;

Hindi: Tulasī;

Kan: Tulasī, Sritulasī;

Mal: Tulasī;

Mar: Tulasī;

Punj: Tulasī;

Tam: Tulasī, Thulasi, Thiruthazai;

Tel: Tulasī, Manchi tulasī, Nalla tuasi;

Urdu: Tulsī.

CONSTITUENTS

Ocimum sanctum leaf:

Essential oil (Carvacrol, Caryophyllene, Nerol and Camphene etc.).

Leaves contain ascorbic acid, beta-carotene, apigenin and its 7-O-glucuronide, luteolin and its 7-O-glucuronide, molludistin, oreantin and ursolic acid;¹⁵ an essential oil with eugenol, eugenol methyl ether, carvacrol, methyl chavicol, cineole and linalool; caryophyllene, ursolic acid, apigenin, luteolin, orientin, apigenin-7-O-glucuronide, luteolin-7-O-glucuronide, molludistin, oreantin, and ursolic acid.^{2(a),25}

THERAPEUTIC AND OTHER ATTRIBUTES

Śvāsa, Kāsa, Pratiśyāya, Pārśvasula, Aruci, Hikkā, Kṛmiroga, Kuṣṭha

Used for dyspnea, cough, coryza, intercostal neuralgia, tastelessness, hiccup, worm infestations, and obstinate skin diseases (therapeutic uses based on texts from 1000 BC to sixteenth century; all quotations are common to the leaf and whole plant).

In experimental animals, leaf extracts showed hepatoprotective, hypoglycemic, anti-asthmatic (fresh leaves, volatile oil from fresh leaves and fixed oil from

seeds), anti-histaminic (ursolic acid), anti-inflammatory, and (essential oil from leaves) anti-pyretic activities.^{2(c)} Leaf extract also exhibited chemoprotective, cytoprotective, anti-ulcerogenic, and adaptogenic activities. Leaf extract could prove to be a potent anti-mycotic drug.^{2(c,d)}

IMPORTANT FORMULATION/ APPLICATIONS

Mānasmitra Vataka (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), a herbomineral compound, contains 62 ingredients including Tulasi leaf, in equal proportion; decoction of 9 plant drugs, processed in cow's and female breast milk. For insanity, epilepsy, and psychic disorders. Tribhuvanakirti Rasa (Rasamrta), Mukta-panchāmṛta (Rasāmṛta) and

Mahā-jivānankusha Rasa (Bhasavarājiyam) are mineral compounds. Tulsi leaf, along with other herbs, is used as a processing vehicle. Prescribed for high fever, chronic fever, and fever due to tuberculosis.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–3 g of the drug in powder form.

O. sanctum leaves have been reported to show abortifacient and anti-fertility activities.²⁰⁽²⁾ The use of Tulasi for fertility regulation may prove futile, since it depresses the mating response of treated animals.^{2(d)} There are conflicting reports on embryotoxicity of *Ocimum sanctum* leaf.¹⁰ One study has shown that eugenol may be hepatotoxic.¹⁰

Seed

CONSTITUENTS

Ocimum sanctum seed:

Fixed oil and mucilage.

Seeds gave a fixed oil 17.8%; palmitic 6.9%, stearic 2.1%, oleic 9.0%, linoleic 66.1% and linolenic acids 15.7%.^{2(a)}

Essential oil contains nerol, terpinene-4-ol, decylaldehyde, gamma-selinene, alpha- and beta-pinenes and camphor.²⁵ Seed mucilage (hexouronic acid 27.2%, pentoses 38.9% and ash 0.2%) on hydrolysis yields xylose and an acid polysaccharide, possibly composed of xylose and glucuronic acid in a 2:1 molar ratio.^{2(a)} Antistaphylocoagulase can be extracted with water and alcohol from the seeds.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śwāsa, Kāsa, Hikkā, Pārśvasula, Kuṣṭha, Mūtarakṣhṛa, Pratiśyāya, Aruci, Puthigandha, Gara viṣa, Śopha, Kṛmi, Rakta vikāra, Jantuvīṣa, Bhūta roga

Used for dyspnea, cough, hiccup, intercostal neuralgia, obstinate skin diseases, dysuria, coryza, tastelessness, foul odor, accumulated

toxins, edema, worm infestations, disorder due to vitiated blood, poisonous bites and ghost syndrome/fear psychosis (therapeutic uses based on texts from 1000 BC to sixteenth century; all quotations, except one, are common to the leaf and whole plant).

Seed oil exhibited anti-inflammatory and anti-pyretic activities; no toxic effects were observed when used for a longer period. Fixed oil from seeds also showed significant effects against experimentally induced arthritis and joint edema in experimental studies.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Muktādi-mahānjana (Bhaishajya Ratnāvali, seventeenth century). 31 herbomineral drugs, including Tulasi seeds and flowers of Abhinava Tulasi, are used for preparing a collyrium, which was applied to eyelids, mixed with honey, for treating diseases of the eye.

In ethnomedicine, the seeds are given in disorders of the genitourinary system.^{15,18} A mixture of seeds, leaves, and black pepper is given in malarial fever.^{2(c)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–2 g of the seed in powder form.

Linolenic acid, contained in the seed oil, can be converted to EPA.

EPA can inhibit thromboxane A₂, which results in decreased platelet aggregation (seed oil seems to prolong bleeding time).¹³

Anti-coagulant and anti-platelet drugs that interact with the seed oil include aspirin and warfarin.¹³

Whole plant

CONSTITUENTS

Ocimum sanctum whole plant:
Essential oil.

The plant yielded ascorbic acid, carotene 33.8 mg/100 g and beta-carotene 8.15 mg/100 g;^{2(d)} alkaloids, glucosides, saponins and tannins.²⁵

Chemical constituents of the leaves, flowers and seeds contribute to the overall therapeutic effect of the whole plant.

For essential oil constituents, see leaf.

THERAPEUTIC AND OTHER ATTRIBUTES

Śvāsa, Kāsa, Hikkā, Chardi, Kṛmiroga, Pārśvaśūla, Kuṣṭha, Aśmari, Netraroga

Used for dyspnea, cough, hiccup, emesis, worm infestations, intercostal neuralgia, obstinate skin diseases, calculus, and diseases of the eye (therapeutic uses based on texts from 1000 BC to sixteenth century; all quotations are common to the leaf and whole plant).

The plant showed hepatoprotective activity in a clinical trial of patients with viral hepatitis.^{2(c)}
A decoction of the whole plant is reported to lower blood sugar levels.

The ethanolic extract (50%) of the fresh leaves, volatile oil from the fresh leaves and fixed oil from the seeds showed anti-asthmatic activity in guinea pigs and anti-inflammatory activity in rats. Essential oil from the plant is anti-fungal, anti-bacterial and nemicial.^{2(c)}

Adaptogenic activity of the dried powder of the plant in rats and mice has been reported.²⁰⁽²⁾

IMPORTANT FORMULATION/APPLICATIONS

Mānasmitra Vataka, Tribhuvanakirti Rasa, Mukta-panchāmṛta Rasa do not contain Tulasi whole plant.

Muktādi Mahānjana (Bhaishajya Ratnāvali, seventeenth century); 31 herbo-mineral drugs, including Tulasi seeds and the flowers of Abhinava Tulasi, are used for preparing a collyrium, which was applied to eyelids, mixed with honey, for treating diseases of the eye.

For classical uses, see Reference 18.

For a mechanism of action, see Reference 13.

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–3 mL of the drug in juice form. 1–2 g of the drug in powder form (seed).

Onosma bracteatum Wall.

Gojihvā

BOTANICAL SOURCE(S)

Onosma bracteatum Wall.
(Fam. Boraginaceae)

Unani drug Gaozabān is not derived from *O. bracteatum* in India. Market drug is dried leaves and nutlets of *Anchusa strigosa* Labill. and flowers of *Echium amoenum* (Gul-e-gaozabān).^{2(b)}

Kashmiri Gaozaban is derived from *Macrotomia benthamii*.^{2(a)}

Borago officianlis Linn. is equated with Gaozabān in the National Formulary of Unani Medicine.³⁷

Elephantopus scaber Linn. is the source of Gojihvā in Kerala.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Gojihvā (Dried leaf and stem).

API, Part I, Vol. III.

Gaozabān of Unani medicine and Gojihvā (syn.

Goji, Gojihvikā) of classical Ayurvedic texts are different herbs.

Gojihvā was a dietary article during fever;³ Goji was used for the retention of urine;³ and Gojihvikā was used for sinusitis.³

In most of the formulations of Unani medicine, both leaves and flowers are used together as an anti-tussive, anti-catarrhal and spasmolytic.

AYURVEDIC SYNONYMS

Darvīpatra, Vṛṣahjihvā, Kharaparninī.

Gojihvā, Gobhi, Dirghikā and Kharaparnini were synonyms of Matsyākshi.⁴

In practice, the Unani drug Gaozaban is used as a substitute of Gojihvā.

HABITAT

Sparsely distributed in North Western Himalayas from Kashmir to Kumaon at altitudes of 3,500–1,500 m.

REGIONAL LANGUAGE NAMES

Beng: Gojika sak, Dadisha;

Guj: Bhonpathari, Galajibhi;

Hindi: Gaujaban, Gojiya;

Kan: Shankha huli, Aakalanalige, Gojaba;

Mal: Kozhuppu;

Mar: Govjaban, Paatharee;

Ori: Kharsan, Kharaptra;

Punj: Kazban;

Tam: Kharaptra, Dharvipatra, Kozha;

Tel: Yeddunaluka;

Urdu: Gaozaban.

CONSTITUENTS

Tannin and sugars.

The hydroalcoholic extract showed the presence of carbohydrates (52%), glycosides (13%), flavonoids (15%), and phenolic compounds (20%).¹⁷⁷

Antioxidant activity of *Borago officinalis* (Gaozaban of the Unani formulary) is attributed to rosmarinic acid found in leaves.¹⁷ The herb contains ascorbic acid 38 mg/100 g and mucilage 11%.

Flowers contain choline, glucose, fructose, amino acids, saponins and tannins (about 3%). (Both dried leaves and flowers are used together in Unani medicine.)

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Kuṣṭha, Jwara, Śwāsa, Kāsa, Aruci, Prameha, Raktavikāra, Vraṇa, Danta roga

Used in bleeding disorders, obstinate skin diseases, fever, asthma, cough, tastelessness, urinary disorders/polyuria, diseases due to vitiated blood, ulcers, and dental diseases (therapeutic uses based on Kaiyadeva Nighantu, fifteenth century).

In a study, *O. bracteatum* extract (21.2% w/w of dried plant material) showed protective effects against stress-induced impaired immune functions, cognitive functions and circulating blood glucose levels.¹⁷⁷

Sedge is traditionally used in the Middle East as a tonic for building the body's immune resistance and regulating urine output. It stabilizes mast cell activity and reduces bronchial hyper-responsiveness. It is used as an anti-catarrhal, anti-tussive demulcent, diuretic, spasmolytic, and alterative refrigerant.¹⁷⁷

IMPORTANT FORMULATION/ APPLICATIONS

Gojihvādi Kvāth Churna (Formulation introduced by Yadavaj Trikrāmji, a contemporary Ayurvedic scholar), is a combination of 16 Ayurvedic and Unani antitussive, anticatarrhal drugs, for coryza, cough, dyspnea, and fever due to bronchitis. "Go-javāna Gojihvā" (a unique nomenclature, a mixture of Unani and Ayurvedic names) is used in equal proportion to 16 other plant drugs in the compound.

This is neither a time-tested formulation, nor has it been validated by proper clinical trials.

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g of the drug in powder form.

Toxic pyrrolizidine alkaloids occur in members of the Boraginaceae family. The unsaturated, toxic alkaloids lycopsamine and amabiline are found in *Borago officinalis* leaves, stems, and roots. The seeds and flowers contain the saturated pyrrolizidine alkaloid thesinine. Total alkaloid content of the plant is estimated less than 0.001%.¹⁷

Operculina turpethum (Linn.) Silva Manso Trivrt

BOTANICAL SOURCE(S)

Operculina turpethum (Linn.) Silva Manso
Syn. Ipomoea turpethum R. Br.
(Fam. Convolvulaceae)

Syn. Merremia turpethum (L.) Shaw & Bhat.⁵
Convolvulus turpethum Linn.¹⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Trivrt (Root).

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Charaka (1000 BC) used two varieties of Trivrt, red and black; during later periods, the varieties were recorded as white and black. *O. turpethum* roots are blackish in color. The white variety sold in the market is the root of *Marsdenia tenacissima*.⁵
(It is also reported that the root of *O. turpethum* dried under the sun becomes white, while under shadow remains blackish.)³

AYURVEDIC SYNONYMS

Śyāmā, Tribhaṇḍī.

Kumbhā (AFI).

Shyama nishotha: Trivṛta, Kālā, Kālameshi, Kāla-
parṇi, Ardha-chandrikā, Sushenā, Mālavikā,
Masūrā, Vidālā.

Sveta nishotha: Trivṛta, Kumbha, Arunā, Trysrā,
Bhaṇḍī, Kātaravāhīni, Sarvānubhūti, Trivṛtā,
Triputā, Saralāsītā.⁴

HABITAT

Wild nearly throughout India, ascending to 900 m, also grown in gardens.

REGIONAL LANGUAGE NAMES

Eng: Terpeth root, Indian jalap;
Beng: Teudi, Tvuri, Dhdhakalami;
Guj: Kala nasottara;
Hindi: Nishothra;
Kan: Vili tigade;
Mal: Trikolpokanna;
Mar: Nisottar;
Ori: Dudholomo;
Punj: Nisoṭh;
Tam: Karum sivadaṇi;
Tel: Telia, Tegada;
Urdu: Turbud, Nishoth.

CONSTITUENTS

Resinous Glycosides.

Resins in varying amounts: 9%–10%, 10%–12% and 12%–13%;²⁰⁽²⁾ contains the glycosides turpethin and alpha- and beta-tyrpeth-ein. Hydrolysate of resin gave glucose, fructose, rhamnose, scopoletin and turpethinic acids.¹⁵
Turpethin constitutes about half of the resin; alpha- and beta-turpethins constitute 8% and 6%, respectively.⁷



THERAPEUTIC AND OTHER ATTRIBUTES

Malabandha, Gulma, Udara roga, Jwara, Śopha, Pāṇḍu, Plihā, Vraṇa, Kṛmi, Kuṣṭha, Kaṇḍu

Used in constipation, abdominal lumps/obstructive jaundice, diseases of the abdomen, fever, edema, anemia, splenic disorders, ulcers, worm infestations, obstinate skin diseases, and pruritus (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

White root is commonly used since the black root is more drastic in action and may cause giddiness, vomiting, and even fainting.¹⁵

Alcoholic extract of fresh roots show antibacterial activity against *Micrococcus pyogenes* var. *auerus* and *E. coli*.^{2(a)}

The aqueous extract of the roots was found to be most potent against models of experimental inflammation.²⁰⁽²⁾

IMPORTANT FORMULATION/ APPLICATIONS

Hṛdya Virechana Leha (Ashtāṅgahridaya, seventh century); Avipattikara Churna (Bhaishajya Ratnāvali, seventeenth century); Manibhadra Guda (Ashtangahridaya): Trivṛta is the main plant drug.

Ashvagandhārishta (Bhaishajya Ratnāvali) contains Trivṛta root as one of the ten supporting herbs. It is used in Ayurvedic formulations for dyspepsia followed by constipation and flatulence, in skin diseases as an anthelmintic, in gout and rheumatism as a colon cleanser and as an anti-inflammatory agent.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

White turpeth is preferred to black turpeth as a cathartic.^{2(a)}

Oroxylum indicum Vent.

Śyonāka

BOTANICAL SOURCE(S)

Oroxylum indicum Vent.
(Fam. Bignoniaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Śyonāka (Root).

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AYURVEDIC SYNONYMS

Dīrghavṛnta, Pṛthuosimba, Kaṭvanga.

Bhalluka, Tuntuka.³

Dirghavṛnta and Kaṭvanga are also synonyms of Aralu, which has been identified as a different drug, *Ailanthus excelsa* Roxb.³

HABITAT

Throughout India, chiefly in evergreen forests up to 600 m.

REGIONAL LANGUAGE NAMES

Assam: Kering;
Beng: Sonagachh;
Guj: Tentoo;
Hindi: Sonapatha, Shyonak, Tentoo;
Kan: Tigudu;
Mal: Palagripayanni;
Mar: Tentoo;
Ori: Pamponiya;
Punj: Tatpaling, Talvarphali;
Tam: Peruvagai;
Tel: Dundilumu, Gumpena, Pampini;
Urdu: Sonapatha.

CONSTITUENTS

Flavonoids and Tannins.

Roots yielded 3-methoxy-6,7-dihydroxy flavone and its potassium salt, dimethyl terephthalate, and beta-sitosterol. Several naphthalene and

prenyl-naphthalene derivatives have been isolated from the root bark.^{2(d)}

Śyonāka root is one of the ingredient of *Dashmūla*, the Ten Roots of Ayurvedic medicine. Now, the AFI has provided an option to use the stem bark instead of the root. The stem bark contains oroxylium-A, baicalein, scutellarein and *p*-coumaric acid.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Vātātisāra, Kāsa, Aruci, Basti roga, Āmavāta, Udara roga, Urustambha, Vātavyadhi, Kārṇa roga, Śoṭha

Used in diarrhea due to nervous breakdown, cough, tastelessness, diseases of the urinary bladder, rheumatism, diseases of the abdomen, loss of movement of the leg, neurological disorders, diseases of the ear, and inflammation (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Bark: bitter tonic, diuretic, powder or infusion diaphoretic. Root bark: astringent, used in diarrhea and dysentery. Stem bark: anti-inflammatory, used in rheumatism. Root: decoction prescribed in dropsy.¹⁵

In a clinical study of 21 patients with confirmed intestinal amebiasis, oral administration of root bark extract powder led to symptomatic improvement as well as the absence of *E. histolytica* cysts in the stool of 19 patients.²⁰⁽²⁾

IMPORTANT FORMULATION/ APPLICATIONS

Amṛtārishta (Bhaishajya Ratnāvali, seventeenth century); Dantyaḍya-arishta (Ashtāṅgahridaya, seventh century); Dashamūlārishta (Shārangadhara Samhitā, thirteenth century); Brahma Rasāyana (Ashtāṅgahridaya); Chyavanprāsha Avaleha (Charaka Samhitā, 1000 BC); Dhanvantara Ghrita (Ashtāṅgahridaya) and Dashamūla Kvāth Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica): all compounds contain Śyonāka root/stem bark as a part of *Dashmūla* of Ayurvedic medicine. Nārāyana Taila (Bhaishajya Ratnāvali) contains Śyonaka as a part of *Mahat Panchamula*. Due to changes in plant parts, classical uses of all *Dashamūla* formulations need revalidation.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g in powder form. 25–50 g in decoction.



Oryza sativa Linn.
Root
Śālī

BOTANICAL SOURCE(S)

Oryza sativa Linn. (Fam. Poaceae)

Njavara is the medicinal rice of Kerala (syn. Shashtika, Garbhapāki, Snigdh tandula, Kaklakam. Seed color: red). Njavara root is used in prescriptions in Kerala.

PHARMACOPOEIAL AYURVEDIC DRUG

Śālī (Root).

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AYURVEDIC SYNONYMS

Dhānya, Vrihi, Nivara. Different types of rice used in classical Ayurvedic medicine: Rakta Śālī (red variety), Gaur Shashtika (white variety), Mahā Śālī, Kalama, Vrihi, Patala.⁴

HABITAT

Cultivated throughout India.

REGIONAL LANGUAGE NAMES

Eng: Rice, Paddy; Beng: Chaval, Dhana, Cala, Chawl, Sali, Dhan;

Guj: Bhata, Corava, Damgara, Coke, Shalichokha;
Hindi: Chaval, Dhana;
Kan: Bhatto, Nellu, Bhatta, Akki;
Mai: Ari, Nellu;
Mar: Tandulamul, Dhanarmul, Bhata chamul;
Punj: Dhan, Jhona;
Tam: Arishi, Nelter;
Tel: Dhanyamu, Odalu, Biyyamu;
Urdu: Chaval, Biranj.

CONSTITUENTS

Sugars.

Root yielded 5-(12-heptadecybl)-resorcinol with four other alkylresorcinols.^{2(c),15}
Oryzaran A, B, C, and D, glutathione and asparagine have also been recorded.
Seeding root gave chrysanthemin and paeonidin-3-O-beta-D-glucoside.¹⁷⁸⁽³⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Stanyaksaya, Mutrakrcchra

Used in lactal disorders and dysuria (therapeutic uses based on texts from 1000 BC to sixteenth century). In quoted text, plant parts not mentioned; specific uses of the root should have been quoted for further research.

In South India, Śāli root is an herb of the *Pancha Trnamūla* (the “Root of five grasses”), a group of diuretic drugs. In most of the formulations, all five roots are included as one composite drug.

Decoction of roots and rhizomes of Śāli is prescribed for anuria. In Kerala, a decoction of Njavara roots is used in urinary complaints of children. Njavara roots are also used in preparations for rheumatic complaints, neuromuscular disorders and as a supplementary diet to underweight children.

IMPORTANT FORMULATION/ APPLICATIONS

Stanyajana Kashāya (Charaka Samhitā, 1000 BC), contains “the ten grass roots”, including Śāli as well as Shashtikā roots, all in equal proportion. For lactal disorders.

Brahma Rasāyana (Ashtāngahridaya, seventh century), Śāli root is among the 25 supporting herbs, all in equal proportions.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50 g of the drug for decoction.

Oryza sativa Linn.

Fruit

Śāli

BOTANICAL SOURCE(S)

Oryza sativa Linn.
(Fam. Poaceae)

Njavara is the medicinal rice of Kerala (syn. Shashtika, Garbhapāki, Snigdh tandula, Kaklakam. Seed color: red).

PHARMACOPOEIAL AYURVEDIC DRUG

Śāli (Fruit).

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Among Śāli, the red variety was considered best in Ayurvedic medicine.³

Brown rice (unpolished white rice with a yellowish–brown outer layer) is also used.

AYURVEDIC SYNONYMS

Taṇḍulama, Dhānya, Vrihiī, Nivara.

Different types of rice used in classical Ayurvedic medicine: Rakta Śāli (red variety), Gaur Shashtika (white variety), Maha Śāli, Kalama, Vrihi, Patala.⁴

HABITAT

Cultivated throughout India.

REGIONAL LANGUAGE NAMES

Eng: Rice, Paddy;
 Beng: Chaval, Dhana, Cala, Chawl, Sali, Dhan;
 Guj: Bhata, Corava, Damgara, Coke, Shalichokha;
 Hindi: Chaval, Dhana;
 Kan: Bhatto, Nellu, Bhatta, Akki;
 Mal: Ari, Nellu;
 Mar: Tandulamul, Dhanarmul, Bhata chamul;
 Punj: Dhan, Jhona;
 Tam: Arishi, Nelver;
 Tel: Dhanyamu, Odalu, Biyyamu;
 Urdu: Chaval, Biranj.

CONSTITUENTS

Carbohydrate–Starch.

Starch (70%); proteins include prolamines, glutelins, globulins and albumins; fatty oil 1.0%–1.8% in entire fruit, 7%–12% in the germ and linoleic acid 45%; soluble polysaccharides include galactoarabinoxylan; monosaccharides and oligosaccharides include glucose, fructose and saccharose; flavonoids include tricine, tricine-7-O-glucoside and tricinine; steroids including beta-sitosterol, gamma-sitosterol and campesterol; diterpenes; trigonelline; trypsin inhibitors; lectins; vitamins of the B group.¹⁴ (See References 15 and 18 for details.)

Colored rice contains cyanidin and delphinidin.^{15,18}

THERAPEUTIC AND OTHER ATTRIBUTES

Jwara, Tr̥ṣṇa, Vraṇa, Atisāra, Bālātisāra, Pradara

Used in fever, excessive thirst, ulcers, infantile diarrhea, and excessive vaginal discharge (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Rice powder is dusted over burns and scalds, erysipelas, measles, pox, prickly heat, and other inflammatory affections; as a poultice, it is applied to abscesses, boils, buboes, piles and ulcers, as well as to the chest in chronic bronchitis and cough; rice gruel is used in impaired digestion, diarrhea and dysentery; cooked rice with milk is used in peptic ulcers; “rice water” is used in febrile and intestinal disorders as a demulcent, for nourishment, as a refrigerant and for soothing.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

Laśunadi Ghrita (Ashtāṅgahridaya, seventh century). Dhanyāmla (fermented decoction of rice) is used as a processing vehicle. Dadhika Ghrita (Ashtāṅgahridaya) also contains Dhānyāmla as a processing vehicle.

Tandulodaka: 50 g of cleaned rice to be added to 400 mL of water in a vessel and macerated for 3 hours with the fingers; strained and used as “rice water.”

(For classical uses, see References 16(a) and 18.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

100 mL Tandulodaka.

Polished rice contains toxic lysolecithin.¹⁵

Preliminary research suggests that unpolished rice might prevent elevation of blood glucose, reduce oxidative stress, and prevent vascular complications.

Germinated unpolished rice contains higher levels of GABA, might lower blood pressure and be useful in the treatment of alcoholism.¹³

Unpolished rice increases calcium absorption. It also promotes bowel health by increasing the presence of short-chain fatty acids in the large bowel.¹³

Ougeinia oojeinensis (Roxb.) Hochr.

Tiniśah

BOTANICAL SOURCE(S)

Ougeinia oojeinensis (Roxb.) Hochr.
Syn. *O. dalbergioides* Benth.
(Fam. Fabaceae)

In Kerala, *Melastoma malabathricum* Linn. and *Osbeckia wightiana* (L.) Blume are the main sources of Tiniśa.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Tiniśah (Wood).

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AYURVEDIC SYNONYMS

Tinih, Syandanah, Rathadru.

Nemi, Sarva-sārā, Ashma-garbhaka.⁴

Chitrakrt, Śakaṭa.²⁷

Rathadru.^{16(c)}

Vajjal.⁷

Atimuktaka has been quoted as a synonym of Tiniśa.²⁸

Atimuktaka is equated with *Hiptage benghalensis* Kurz.³

HABITAT

Outer Himalayas and sub-Himalayan tract from Jammu to Bhutan up to an altitude of 1,500 m and extending through the whole of northern and central India into greater part of Deccan Peninsula.

Punjab, Bundelkhand, Maharashtra, Odisha, Madhya Pradesh, Rajasthan, and Tamil Nadu.³²

REGIONAL LANGUAGE NAMES

Eng: Sandan;

Beng: Tanish;

Guj: Tanacha;

Hindi: Sandan, Saanana, Tiniśaa;

Kan: Karimutale, Kalabangaa;

Mal: Totukara, Malavenna;

Mar: Timas, Syandan;

Ori: Vanjan;

Tam: Narivengai, Naiponai;

Tel: Tellamotuku, Dargu.

Eng: Chariot Tree, Punjab Kino.³²

CONSTITUENTS

Flavonoids mainly homoferreirin and ougeinin.

Heartwood yielded three isoflavones, homoferreirin (5,7-dihydroxy-2',4-dimethoxy isoflavone), dalbergioidin (5,7,2',4'-tetrahydroxy isoflavone) and ougenin (5,2',4'-trihydroxy-7-methoxy-6-methyl isoflavone).²⁰⁽²⁾

The bark contains 7% tannins.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śoṭha, Kuṣṭha, Atisāra, Raktātisāra, Pravahikā, Raktavikāra, Raktapitta, Prameha, Śvitra, Vraṇa, Kṛmi, Pānduroga, Medoroga, Dāha

Used in edema, obstinate skin diseases, diarrhea, diarrhea with blood, dysentery, blood disorders, bleeding disorders, urinary disorders, leucoderma, ulcers, worm infestations, anemia, obesity, and burning sensation (therapeutic uses based on texts from 1000 BC to sixteenth century).

Bark is used as a febrifuge and for urinary discharges.^{2(c,d)} It is prescribed when the urine is highly colored.¹⁵ Stem bark: antiviral, CVS and CNS active and spasmolytic.^{32,20(2)} The ethanolic extract of the whole plant showed anti-inflammatory and analgesic effects against carrageenin-induced paw edema in rats.²⁰⁽²⁾

IMPORTANT FORMULATION/ APPLICATIONS

Ayaskṛti (Ashtāngahridaya, seventh century), contains Tiniśa heartwood among 23 main plant

drugs. The compound contains 24 supplementary herbs and iron filings. For anemia, diabetes, chronic dysentery, worms infestation, skin diseases. A hematinic tonic.

DOSAGE/USAGE/CAUTIONS/COMMENTS

50–100 mL kvātha.

Oxalis corniculata Linn.

Cāṅgerī

BOTANICAL SOURCE(S)

Oxalis corniculata Linn.
(Fam. Oxalidaceae)

Oxalis martiana Zucc. (native to America, naturalized in moist and shady places in temperate parts of India) is equated with Wood-sorrel.⁷

PHARMACOPOEIAL AYURVEDIC DRUG

Cāṅgerī (Whole plant).

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AYURVEDIC SYNONYMS

Amlapatrikā.

Chukrikā, Amlalonikā.⁵
Chukrā, Amlikā, Chhtrāmlikā,
Chatuh-chhadā.⁴

HABITAT

Throughout warmer part of India and also in all tropical and temperate climate, growing up to an elevation of 3,000 m in North-west Himalayas.

Common on the banks of ponds and fields throughout warmer parts of India.⁵

REGIONAL LANGUAGE NAMES

Eng: Indian sorrel;
Assam: Chengeritenga;
Beng: Amrul;
Guj: Ambole, Changeri, Teen panaki, Rukhadi;
Hindi: Tinpatiya, Changeri, Ambilosa;
Kan: Pullamouradi, Sivargee, Purachi soppu;
Mal: Pulliparel;

Mar: Ambutee, Ambatee, Ambti, Bhui sarpati;
Punj: Khatkal, Khattibootee, Khatmittha;
Tam: Puliyarai;
Tel: Pulichinta;
Urdu: Changeri, Teen patiya.

CONSTITUENTS

Vitamin C, Carotene, Tartaric acid, Citric acid and Malic acid.

Leaves contain vitamin C (125 mg/100 g); carotene (3.6 mg/100 g) and calcium (5.6% dry material). Leaves and stem contain tartaric and citric acid and stem contains malic acid. Oxalates are 12% of the dry material.^{2(a)}

Leaves gave the flavonoids vitexin, isovitexin and vitexin 2''-O-beta-D-glucopyranoside. Leaves contain lipids at 1.47% (dry weight), a rich source of essential fatty acids and alpha-tocopherol (1.58 mg/g) and beta-tocopherol (6.18 mg/g dry basis).^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Grahaṇī, Arśa, Kuṣṭha, Atisāra

Used in malabsorption syndrome, piles, obstinate skin diseases, and diarrhea (therapeutic uses based on texts from the fifteenth to sixteenth centuries).

Sushruta (1000 BC) prescribed Cāṅgeri as a potherb for piles and mesenteric disorders;²⁸ clarified butter cooked with cāṅgeri juice and paste of *Piperaceae* drugs and curd for chronic diarrhea.

Cāṅgeri juice, sour gruel and jaggery in equal quantities, churned together, was prescribed for insanity (Bangasena, eighteenth century).^{16(a)}

In ethnomedicine, the fresh juice of the plant is given in dyspepsia and tympanites, fevers with biliousness, dysentery, scurvy, piles and anemia; it is also used as a vermifuge and emmenagogue. It is used topically for warts, corns, and skin diseases.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Chāngeri Ghrita (Bhaishajya Ratnāvali, seventeenth century), contains plant juice of Chāngeri as the main drug with 9 supporting herbs.

Used for malabsorption syndrome, dysentery, rectal prolapse, piles, and dysuria.

Sunishannaka-chāngeri Ghrita and Nāgarādi Ghrita (Charaka Samhitā, 1000 BC) were prescribed for piles.^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 mL (Svarasa). It is also used externally.

A crystalline principle that produced fatal hypoglycemic convulsions in rabbits has been isolated from the plant.^{2(a)} In Australia, the plant is suspected of causing sheep mortalities with symptoms of staggering and trembling. The plant, if eaten by cows, affects the composition of milk and its consistency.^{2(a)}

BOTANICAL SOURCE(S)

Paederia foetida Linn.
(Fam. Rubiaceae)

Also *P. foetida* auct. non-Linn.
Gandhaprasāriṇī is equated with *P. scandens* (Lour.) Merrill, syn. *P. tomentosa* Blume,⁷ *P. foetida* auct. non-Linn.¹⁵
In North India, *P. foetida* is used as Prasāriṇī.
In Kerala, the source of the drug is *Merremia tridentata* (L.) Hall. f. subspp. *tridentata* and subspp. *hastata*.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Prasāriṇī (Whole plant).

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AYURVEDIC SYNONYMS

Sāraṇī, Prasāraṇī,

Gandhapatra.

Talini, Gandhaprasāriṇī.

Prasāriṇī was also a synonym of Rāja balā, now equated with *Sida veronicaefolia* Lam.⁷
Rāja balā is odorless.

HABITAT

Throughout the most of the parts of India.

In the Himalayas from Dehradun eastward up to an altitude of about 1800 m; also in Bihar, Odisha, Bengal and Assam.
Sold as a fresh vegetable in Bengal.

REGIONAL LANGUAGE NAMES

Assam: Bhedilata;

Guj: Prasarini;

Hindi: Gandha prasarini;

Kan: Hesarani, Prasarini bail;

Mal: Tala nili;

Mar: Hiranvel, Haranvel;

Punj: Prasarini;

Tam: Mudiya kundal;

Tel: Gontima goru-teega.

CONSTITUENTS

Alkaloids, Volatile oil.

P. foetida auct. non-Linn.: aerial parts yielded friedelan-3-one, epifriedelinol and beta-sitosterol. Leaves and stem gave iridoid glycosides, sitosterol, stigmasterol, campesterol, ursolic acid, hentriacontane, hentriacontanol, ceryl alcohol, palmitic acid, and methyl mercaptan.³²

P. foetida Linn.: whole plant yielded epifriedelinol acetate, sitosterol and friedelin.²⁰⁽²⁾

Leaves contain fatty acids: arachidic 65.1%, palmitic 13.8%, capric 2.4%, myristic 1.7%, lauric 1.2% and pelargonic 0.3%.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vātaroga, Vātarakta

Used in rheumatic afflictions and gout (therapeutic uses based on texts from 1000 BC to sixteenth century).

Almost all parts of the plant are used for rheumatic afflictions. A decoction of the leaves is reported to possess diuretic properties and is also found to dissolve vesical calculi. Juice of the root is prescribed in piles, inflammation of the spleen and pain in the chest and liver. The root and bark are employed as emetics.

The species shows promise for eliminating toxic substances collected in the system due to tobacco, alcohol or defective metabolism.^{2(a)}

The butanol fraction of the leaves exhibited significant anti-inflammatory activity; the methanol extract showed moderate hepatoprotective activity.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Prasāriṇi Taila (Shārangadhara Samhitā, thirteenth century), contains Prasāriṇi plant as the main drug with 12 supporting herbs.

Used as a massage oil for paraplegia and other rheumatic and neurological disorders.

Dashamularishta, was originally a nervine tonic, used for wide range of CNS and CVS diseases.

Needs revalidation due to important changes in plant parts.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–4 g of drug in powder form.

An extensively foetid climber. Fetid smell (due to a volatile principle methyl mercaptan) is removed to a great extent during cooking.^{2(a)}

Pandanus odoratissimus Roxb.

Ketaki

BOTANICAL SOURCE(S)

Pandanus odoratissimus Roxb.

Syn. *P. fascicularis* Lamk. *P. tectorius* Soland. ex Parkinson

(Fam. Pandanaceae).

P. laevis Kunth, *P. variegatus* Miq., *P. latifolius* Hassk., *P. amaryllifolius* Roxb.¹⁵

In Kerala, there are four species of *Pandanus*.

Linn., considered conspecific, all are assigned to *P. odoratissimus*.⁵

HABITAT

Along the coasts of India and in Andaman Islands, also cultivated in gardens.

Grows abundantly in the coastal region of the Ganjam district, Odisha. (About 90% of the India's total production of *Kewda* perfume is from Odisha.)^{2(d)}

Pandanus: More than 520 species in Old World tropics: about 450 in Malesia, about 85 in Madagascar, 26 in Africa¹ and about 36 species in India.^{2(a)}

P

PHARMACOPOEIAL AYURVEDIC DRUG

Ketaki (Stilt root).

API, Part I, Vol. VI.

Ketaki (Root).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Ketaka, Rajahpuṣpa, Sūcipuṣpa, Tṛṇaśūnya.

Jambuka, Karkasha-chhada.⁴

Golden-yellow-flowered var. of *Bhāvaprakāsha* (sixteenth century): Suvarna ketaki, Laghu pushpā, Sugandhini.⁴

REGIONAL LANGUAGE NAMES

Eng: Fragrant screwpine, Screwpine, Caldera bush;

Ben: Keya, Keori;

Guj: Kewado;

Hindi: Keora, Kevadaa, Kewda;

Kan: Thaale hou, Kedage, Mundige, Kiyarige;

Mal: Tazha, Taalampu;

Mar: Kevdaa;

Ori: Ketoki, Kia;

Pun: Kevda;

Tam: Tazampu, Tazhai, Talai;

Tel: Mogali, Mogili;

Urdu: Kewdaa.

CONSTITUENTS

Stilt root:

Physcion, *p* -hydroxybenzoic acid, cirsilineol, *n* -tri-acontanol, (β -sitosterol, stigmasterol, campesterol, daucosterol, stigmast-4-en-3, 6-dione, andamarine, piperidine.

Root: Essential oil.

Phenolic compounds, pinoresinol and 3,4-*bis* (4-hydroxy-3-methoxybenzyl), tetrahydrofuran.

Cycloartane-type triterpenoids, beta-stigmasterol, beta-sitosterol, and palmitic acid were isolated from the root of *P. tectorius*.¹⁷⁹

Essential oil is not obtained from the root.

THERAPEUTIC AND OTHER ATTRIBUTES

API, Vol. VI: Gulma (abdominal lump), Jvara (fever), Mutrakṛcchra (dysuria); Pradara (excessive vaginal discharge), Raktapitta (bleeding disorder), Tvakroga (skin diseases). (Therapeutic uses based on a fourteenth century text.)

During the sixteenth century, Ketaki was an ingredient in compound preparations for osteoarthritis, abdominal masses, and toxic conditions.

Root juice was given in gynecological disorders. Root, bounded with milk, was given in threatened abortion. Mashed roots were prescribed with water and sugar in excessive vaginal discharges.^{16(a),18} Root paste was

administered to induce vomiting and diarrhea in poisoning.^{2(d)}

Root extract was included in hair oils for arresting premature graying.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Bālaketakyādi kashāya (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains Bāla, Ketaki root, asafoetida and rock salt. Used for deworming.

Triphalādi Taila (Sahasrayoga; quoted in API, Vol. I) contains Ketaki root among the ten main herbal drugs, with 24 supporting herbs. Used for diseases of the head, alopecia, and graying of hair.

Compounds not quoted in API:

Ketaki kshāra yoga (Bhaishajya Ratnāvali, seventeenth century) contains ash of the Ketaki root as a single drug. To be taken with castor oil. Used for abdominal lumps.

Ketakyādi Tailam (Sahasrayoga) contains Ketaki root, Balā and Atibalā root juices. Used as a massage oil for arthritis and rheumatic affections.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 1 to 2 g.

Kvatha (decoction): 30–50 mL. (API, Vol. VI.)

Root: 20–30 g of the drug for decoction. (API, Vol. I.)

Paste: 2.5–5 g.^{16(a)}

P

Papaver somniferum Linn.

Khakhasa

BOTANICAL SOURCE(S)

Papaver somniferum Linn.
(Fam. Papaveraceae)

Papaver somniferum var. *album* is the source of white seeds. In Europe, var. *nigrum* bears slate-colored or blue-colored seeds, known as Maw seeds.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Khaskhasa (Seed).

(Plant: Khākhasa; seed: Khaskhasa.)

API, Part I, Vol. V.

Introduced into Ayurvedic medicine during the twelfth to thirteenth centuries by Unani physicians. First references are in Madhava

Dravyaguna and Dhavantari Nighantu. The plant was designated as Khākhasa, the seed as Khasatila as well as Khaskhas (as in Unani medicine), the fruit as Dodiya and the extrudate as Ahiphena, Āphū and Āphūka (opium). Detailed description in Bhavaprakasha (sixteenth century).^{16(b)}

Khaskhasa was known as a variety of Tila (*Tilabhedā*).⁴

AYURVEDIC SYNONYMS

Khasatilah, Āphūkam, Khākhasatilah, Khākhasah.

Khasakhāsa, Khashakhasa.

HABITAT

Cultivated under State control in certain areas of Rajasthan, Madhya Pradesh and Uttar Pradesh.

In India, the cultivation of the poppy was established by the early sixteenth century; it is now confined to Uttar Pradesh, Madhya Pradesh and Rajasthan. It is also grown in Jammu and Kashmir. Cultivation in Himachal Pradesh has been banned since 1954–1955.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Opium, Poppy seeds;
Beng: Aaphim, Postadaanaa, Postabeej;
Guj: Khaskhas;
Hindi: Apheem, Postadaanaa, Khaskhas, Khasabija;
Kan: Gasgase, Aapheen, Aphini;
Mal: Avin, Karappu, Kashkash, Aalan;
Mar: Khaskhas;
Ori: Aapu;
Tam: Kasakash, Posttakkaai, Avinee;
Tel: Gasgashaalu, Nallamandu;
Urdu: Apheem.

Urdu: Khaskhas (seed); Apheem is a wrong synonym.

CONSTITUENTS

Fixed oil containing esters of linoleic, palmitic, oleic acids.

Seeds yield a fatty oil (45%) containing palmitic 14.2%, stearic 5.1%, oleic 26.4%, linoleic 51.6% and linolenic acids 2.1%. Vitamins: thiamin

420, riboflavin 49, folic acid 30, pantothenic acid 2667 and niacin 1877 µg/100 g.

Amino acids: higher amounts of cysteine, glutamic acid and arginine; lower amounts of aspartic acid, leucine, isoleucine, valine, histidine, tryptophan, and phenylalanine.^{2(c)}

Seeds and oil are devoid of narcotic properties.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kāsa, Atisāra

Used in cough and diarrhea (therapeutic uses based on texts from the fourteenth to sixteenth centuries).

Seeds are demulcent and used in the form of emulsions as an emollient (in cough and asthma)¹⁵ and as a specific aid against obstinate constipation and in catarrh of the bladder.^{2,31} Seed oil is used against diarrhea, dysentery and scalds.^{2(a),15} Seeds are anti-protozoal and spasmolytic.³²

The extract of seeds showed highly significant anti-secretory (anti-diarrheal) activity against *E. coli* enterotoxin-induced secretory responses in experimental animals.^{2(c)}

Seed extract showed marked hypoglycemic activity and increased the activity of the carcinogen detoxifying enzyme glutathione-S-transferase by more than 78%.^{2(c),7}

IMPORTANT FORMULATION/ APPLICATIONS

Abhayādi Gutikā, Abhṛakādi Vati, Ashvani
Kumar Rasa: not in AFI; could not be traced.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g.

Poppy seeds also find use in the production of lecithin.^{2(a)}

Iodized poppy seed oil (Lipiodol) is used in imaging techniques in vascular hepatocellular cancer, because of preferential accumulation of the oil in hepatocellular cancer cells. It is also used as an adjuvant or vehicle to deliver chemotherapeutic agents.¹⁷

For computerized tomography scans of fistulae, 250 g poppy seeds are given orally.¹⁷

Parmelia perlata (Huds.) Ach.

Śaileya

BOTANICAL SOURCE(S)

Parmelia perlata (Huds.) Ach.
(Fam. Parmeliaceae).

Market samples consist of a number of other species of *Parmelia* having a thallose form:

P. perforata Asch.

P. kamtschadalis Eschew syn. *P. cirrhata* Fr. and *P. nepalensis*.³⁶

Lichen of Unani medicine is Ushnah, *Usnea longissima* Asch.³⁷

PHARMACOPOEIAL AYURVEDIC DRUG

Śaileya (Lichen).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Śitaśiva, Śilāpuṣpa.

Shaileyaka,³⁰ Sthavira,^{4,30} Vṛddha, Śīodbava.⁴
Chharelā has been equated with *P. perlata*.

HABITAT

Lichen found on rocks or dead wood in temperate Himalayas.

In India, the genus *Parmelia* and members of Usneaceae (the lichen of Unani medicine and a Western herb) are widely distributed in the Himalayas, Nepal, Sikkim, Coorg, Nilgiri hills, Kodaikanal, and Andhra Pradesh. (See Reference 2a for a distribution.)

REGIONAL LANGUAGE NAMES

Eng: Stone flower, Rock moss;

Beng: Shailaj;

Guj: Patthar phool, Chhadilo;

Hindi: Charela, Chharila, Chhadila;

Kan: Shilapushpa, Kalluhoo;

Mal: Sheleyam, Kalppuvu;

Mar: Dagad phool;

Punj: Ausneh, Chhadila;

Tam: Kalpashee;

Tel: Ratipuvvu;

Urdu: Chhadila.

Common name: Chharelā.

CONSTITUENTS

Lichen acids, Atranorin and Lecanoric acid.

Chemical composition of lichen varies markedly. A sample from Coorg contained lecanoric acid 5%, atranorin 0.8% and norstictic acid 1.0%. A sample from Kumaun hills and Mysore contained salazinic acid, in addition to atranorin and lecanoric acid. Some samples of the lichen contain as high as 20%–25% lecanoric acid, though the bulk of Indian specimens contain about 5.0%.^{2(a)}

Dibenzofurans and usnic acid of Parmeliaceae and Usneaceae are active against Gram-positive bacteria and *Pneumococcus* spp.

Usnea spp. contain 3.4% usnic and salazinic acid.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kaṇḍu, Kuṣṭha, Aśmari, Dāha, Visa, Hṛllāsa, Tṛṣṇā, Vrana, Hridayaroga, Rakta vikāra, Swāsa, Jwara, Mutrakṛchra, Mutraghāta, Śirah śula

Used in pruritus, obstinate skin diseases, calculus, burning sensation, toxicosis, nausea, thirst, ulcers, cardiac disorders, blood disorders, dyspnea, fever, dysuria, urinary obstruction, and headache (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Charaka Samhitā (1000 BC) prescribed Shaileya for toxicosis and fevers and included it in *Agada* compounds and for edema and arthritis in oil compounds. Sushruta included Shaileya in a compound of herbal dusting powder for soft chancre, and also used it as one of the drugs for unctuous smoking for treating diseases of the mouth. (*Usnea* lozenges are used in Western herbalism.)

**IMPORTANT FORMULATION/
APPLICATIONS**

In all quoted compounds, Shaileya thallus is included due to its astringent, resolvent, aperient, diuretic, and antibacterial activities. Shaileya entered into a number of medicinal oils for edema, arthritis, hemiplegia, and wasting diseases during the sixteenth century.¹⁸ Gandha Taila (Ashtangahridaya, seventh century) was applied on fractures.^{16(a)} Shaileya was an ingredient in Shiroroga Yoga (Sharangadhara Samhita, thirteenth century) and in Jvarghni Vatika and Sthaulya Yoga (Bhavaprakasha, sixteenth century) for fever and cough and for obesity, respectively.^{3,34}

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

1–3 g.
Atranorin is often used in cosmetic products, perfumes, shaving lotions, deodorants and body lotions. In animal studies, it showed moderate allergenic activity (grade III). The lichen is reported to be used in China as an expectorant and in the treatment of ulcers.¹⁸ In Western herbalism, lozenges (equivalent to 100 mg of *Usnea*; one lozenge three to six times) are used due to the drug's anti-microbial activity in inflammation of the mouth and pharynx.¹⁸

Paspalum scrobiculatum Linn. **Kodravaḥ**

BOTANICAL SOURCE(S)

Paspalum scrobiculatum Linn.
(Fam. Poaceae).

Syn. *P. commersonii* Lam., *P. scrobiculatum* var. *commersonii* Staph., *P. scrobiculatum* var. *frumentaceum* Staph.^{2(a)}

A minor grain crop to a greater extent in Deccan, South India, Andhra Pradesh, Gujarat, and Maharashtra than in North India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Kodo millet;
Beng: Kodo aadhaan;
Guj: Kodro, Kodaraa;
Hindi: Kodon, Kodava, Kododhaam;
Kan: Harak, Harike;
Mal: Varaku;
Mar: Kodra, Harik, Kodru;
Ori: Kodua;
Punj: Kodon, Kodra;
Tam: Varagu;
Tel: Arikelu, Kiraruga;
Urdu: Kodon.

P

PHARMACOPEIAL AYURVEDIC DRUG

Kodravaḥ (Dehusked and well-matured grain).
API, Part I, Vol. V.
The fat from the poisonous variety gives a red color on addition of concentrated sulfuric acid, whereas the innocuous grains yield a fat that does not respond to the color test.^{2(a)}

AYURVEDIC SYNONYMS

Koradūṣaḥ, Koradūṣakah.
Uddala.³
Madana kodrava (with narcotic property).³⁰

HABITAT

Cultivated in the plains of India for its grains. Newly gathered grains with husk are poisonous; husks are removed prior to use.

CONSTITUENTS

Hydrocarcons hentriacontanol, hentriacontanone; sterols such as β -sitosterol, campesterol. (Quoted from Reference 25.)
The whole husked grain is reported to contain protein 10.6%; carbohydrates 59.2%; minerals 4.4%; calcium 49.5 mg/100 g; phosphorus 284.0 mg/100 g; iron 6.0 mg/100 g, and

thiamine 400 mg/100 g; starch consists of 32.1% of amylose and 67.9% of amylopectin; essential amino acids in the protein: arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine.^{2(a),25}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Vraṇa, Atisthauḷay, Annadravaśūla, Prameha, Medovrddhi, Nādivṛṇa, Jalodara

Used for bleeding disorders, ulcers, obesity, gastric ulcers/acute gastritis, urinary disorders/polyuria, hyperliposis, sinusitis, and ascites (therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Nādivṛṇahara āturyadi lepa, Nādivṛṇahara āturādi taila (not in AFI).

One medicinal oil formulation of Sushruta (1000 BC), prescribed for sinusitis, contained Kodrava.²⁸

A diet of Kodrava with buffalo's curd was prescribed for regular use as the treatment of sinusitis (Nādivṛṇa) (Rājamārṭanda, eleventh century).^{16(a)}

Alkaline water of Kodrava was used for washing hair for removing dandruff (Vrindamādhava, eighth century).^{16(a)}

For ascites, Kodrava with milk, as a salt-free diet, was prescribed.^{16(a)} Also used as a cereal food for piles, cough and obesity²⁷ (Charaka Samhitā, 1000 BC).

Root powder of Indian millet, mixed with buffalo's curd and cooked Kodrava, was used as a poultice in sinusitis (Bhaishajya Ratnāvali, seventeenth century).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50–100 g.

Dried ethanol extract of the husk (the toxic component of the seed) gave encouraging results in schizophrenic and psychotic patients in four clinical trials.²⁰⁽²⁾

Pavetta indica var. *tomentosa* Hook.

Pāpaṭaḥ

P

BOTANICAL SOURCE(S)

Pavetta indica var. *tomentosa* Hook.

Syn. *P. tomentosa* Roxb.

(Fam. Rubiaceae).

Syn. *P. commersonii* Lam., *P. scrobiculatum* var. *commersonii* Staph., *P. scrobiculatum* var. *frumentaceum* Staph.^{2(a)}

P. tomentosa Roxb. ex Sm.

According to some authors, *P. indica* is confined only to South India. The plants of other regions are *P. carassicalas* Bremek,^{2(a)} and *P. indica* sensu Hook, f.¹⁵

A market survey reveals that *Morinda pubescens* Smith and *Stylocoryne lucens* Gamble (both Rubiaceae) are also accepted as the drug source.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Pāpaṭaḥ (Root).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Pāpaḍī.

Katha-champā.^{2(a)}

HABITAT

Throughout the deciduous forests of India, as an under growth.

Ascending to an altitude of about 1500 m in the Himalayas. Also recorded from the Andamans.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: White pavetta;
Assam: Gobor sitha;
Ben: Kukurchuda, Jui;
Guj: Papat;
Hindi: Kankra, Papari, Kathachmpa;
Kan: Pavati, Pappadi, Paavatlegida;
Mal: Pavetta;
Mar: Papadi, Kakra;
Ori: Katha pengu;
Pun: Papadi;
Tam: Pavattai;
Tel: Konda papata, Duyi papata, Papata kammi.
Mal: Paphanah.⁵

CONSTITUENTS

Fixed oil.

Chemical constituents of roots have not been recorded.

Root bark contains D-mannitol; presence of a bitter glucoside related to salicin was reported by earlier workers. The stem is reported to contain an essential oil (0.55%), a resin (1.9%), an alkaloid (1.4%) and a peptic substance (7.8%). Leaves contain D-mannitol, beta-sitosterol, alpha-amyrin, quercetin and caffeic, chlorogenic, and 3-*epi*-ursolic acids.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kāmalā (Jaundice), Kaṇḍū (itching), Mūtraroga (urinary diseases), Śoṭha (inflammation), Udararoga

(diseases of abdomen), Vibandha (constipation), Visphoṭa (blister) Attributes not based on classical Ayurvedic texts.

Roots possess purgative, aperient, diuretic, and tonic properties. Prescribed in visceral obstructions, jaundice, headache, urinary diseases, and dropsical afflictions.^{33(a)}

Pulverized root, mixed with ginger and rice water, is given in dropsy.^{33(a)}

Leaves and roots are employed in the preparation of poultices for boils and itches.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Paphanādi Tailam and Paphanādi Ghritam are available in Kerala.⁵ Not included in AFI.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

Used in Siddha medicine of Tamil Nadu as Pavattan and Pavetai.

Roots are sweetish and aromatic and are cooked in shapes varying from 6 to 25 mm in diameter.

P

***Pavonia odorata* Willd.**

Gandhaśiphā

BOTANICAL SOURCE(S)

Pavonia odorata Willd.
(Fam. Malvaceae).

In Kerala and Tamil Nadu, the main source of Bālaka and Hriversa was never *P. odorata*. *Coleus vettiveroides* Jacob and *C. zeylanicus* (Benth.) Cramer were used.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Gandhaśiphā (Whole plant).

API, Part I, Vol. VI.

(A non-classical Sanskritized identification.)

No plant was known as Gandhaśiphā during the classical period.

Hriversa is suggested as a better option.

AYURVEDIC SYNONYMS

Picchila lomaśaḥ. (A non-classical Sanskritized synonym.)

Hrivera,^{30(a)} Vālaka, Bālaka,²⁹

Sugandha-bālā.^{29,2(a)}

Most of the authors equate Hrivera with

P. odorata.⁵

P. odorata is cultivated in Indian gardens for its fragrant flowers; its synonym, Sugandha-bālā, should not be confused with the same synonym of *Valeriana hardwickii* Wall.

HABITAT

Indian plains.

Pavonia is distributed in the warmer parts of the world, chiefly in America.

P. odorata is found in open woods and waste places in the Deccan peninsula, parts of Bengal, Bihar, Odisha, Uttar Pradesh, and Rajasthan. It is cultivated in gardens.^{2(a)}

REGIONAL LANGUAGE NAMES

Ben: Sugandha-bala;

Guj: Kalowalo;

Hindi: Sugandha-bala;

Kan: Balarakkasi-gida;

Mal: Kuruntotti;

Mar: Kaalaavaalaa;

Tam: Peramutti;

Tel: Chitti benda.

Mal: Hriveram;

Tam: Kurver (equated with *Coleus vettiveroides*, known as Black Vetiver).⁶

Eng: Fragrant sticky mallow.³²

CONSTITUENTS

β-sitosterol; palmitic, stearic, oleic, linoleic, isovaleric and *N*-caproic acids, α-pinene and methyl eptenone, isovalaraldehyde, aromaden-drin, azulene, parvonene, pavonenol.

Root gave essential oil containing isovaleric acid, isovalaraldehyde, aromadendrene,

parvonene, alpha-terpinene, azulene, and pavonenol.³²

Dried roots yield (0.5%) essential oil. Root possess musk-like odor while the odor of essential oil is offensive. Removal of isovaleric acid gives an oil that possesses a pleasant aroma.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Aruci (tastelessness), Atisāra (diarrhoea), Chardi (emesis), Dāha (burning sensation), Hṛdroga (heart disease), Hṛllasa (nausea), Jvara (fever), Kuṣṭha (Leprosy/diseases of skin), Raktapitta (bleeding disorder), Svitra (leucoderma/vitiligo), Tṛṣṇā (thirst), Visarpa (Erysepales), Vraṇa (ulcer). Used as single drug. (Not based on any classical text.)

Plant: anti-rheumatic, anti-protozoal, and spasmolytic.³²

Root: astringent, anti-pyretic, demulcent, stomachic, diaphoretic, and diuretic.¹⁵ Anti-dysenteric, and used in hemorrhage from the intestines.³²

Bruised well with *ghee*, applied to erysipelas as a poultice. The plant's paste with rice water acts as an anti-emetic.¹⁵

The plant exhibits anti-parasitic activity against *Entamoeba histolytica*.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

HrIVERādi Kashāya (Not quoted in API; Sahasrayoga, a non-Samhitā, Kerala Materia Medica). Three compounds; for diarrhea with blood and fever; for bleeding disorder; and for puerparial hemorrhage and fever. (CCRAS text.)

In Bhāvaprakāsha (sixteenth century), nine compounds with Hrivera have been incorporated.³

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

Pennisetum typhoides (Burm.) Stapf & C.E. Hubb.

Vajrāna

BOTANICAL SOURCE(S)

Pennisetum typhoides (Burm.) Stapf & C.E. Hubb.
Syn. *P. typhoideum* Rich.
P. spicatum Roem and Schult
(Fam. Poaceae/Graminae).

Spiked millet: *P. glaucum* (L.) R. Br.
syn. *P. americanum* (L.) Leeke.¹
P. spicatum (L.) Kohn.; *P. typhoides* (Burm f.)
Stapf & C.E. Hubb.; *P. typhoideum* Rich.;
Setaria glauca (L.) Beauv.¹⁹

PHARMACOPOEIAL AYURVEDIC DRUG

Vajrāna (Leaf Bases).

API, Part I, Vol. VI.
Chināka.²⁶²

AYURVEDIC SYNONYMS

Not quoted.

Chinā, Kāka kangu, Sush-lakshṇa, Shlakshnaka.²⁶²
(Bhāvaprakāsha)

HABITAT

Cultivated in the arid and semi- arid regions of central and peninsular India for its fruit used as cereal.

None of the Pearl millets are reported in the wild.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Spiked millet, Pearl millet, Bullrush millet;
Ben: Bajar, Lahra;
Guj: Bajni;
Hindi: Bajra;
Kan: Sajjai;
Mal: Mattari;
Mar: Bajri, Bjr;
Ori: Gantia, Bajri;

Pun: Bajra;
Tam: Kambu, Kampu;
Tel: Gantelu, Sajjalu, Sajja;
Urdu: Bajra.

CONSTITUENTS

Flavonoid, alkaloids, tannins, phenols and saponin.

Bajra plant (from Punjab) just before flowering, at the maximum flowering stage and at the milk stage, respectively, contains crude protein 16.25%, 12.56% and 10.56%, calcium 0.75%, 0.59% and 0.52%, phosphorus 0.18%, 0.21% and 0.22%, magnesium 0.38%, 0.29% and 0.25%, sodium 0.34%, 0.044% and 0.14% and potassium 5.18%, 3.98% and 2.80% (moisture-free basis).^{2(a)}

Bajra grain contains calcium 29–50 mg/100 g, phosphorus 269–391 mg/100 g and iron 8.5–10.5 mg/100 g. Average protein: 11.6%.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Prameha (metabolic disorder), Saitya (coldness), Santarpanajanya roga (disorders due to obesity), Sthaulya (obesity). Used as single drug.

Therapeutic uses are based on a Sanskrit *shloka* composed by a contemporary scholar. Obesity, disorders due to obesity and metabolic disorders have been added.

(The grains are given for fattening cattle and lambs and to growing animals. The growth-promoting value of a diet supplemented by Bajra is stated to be somewhat higher than a diet based on wheat).^{2(a)}

In the quoted *shloka*, *durjara* (difficult to digest) and *agni-pradipam* (digestion stimulant) are contradictory. *Pumsatvahara* (anti-spermatogenic or anti-aphrodisiac) activity, mentioned in the *shloka*, is based on a reference from Nighantu Ratnākara (1837 AD).⁶³

IMPORTANT FORMULATION/
APPLICATIONS

Bajra serves as a staple food grain in many parts of India. Leaves, leaf sheath and ears are used as a green fodder. Their medicinal uses have not been recorded in ethnomedicine.

DOSAGE/USAGE/CAUTIONS/
COMMENTS

Svarasa (juice): 10 to 20 mL.

Pergularia daemia (Forsk) Chiov.

Viṣāṇikā

BOTANICAL SOURCE(S)

Pergularia daemia (Forsk) Chiov.
Syn. *Daemia extensa* (Jacq.) R.Br.
(Fam. Asclepiadaceae)

PHARMACOPOEIAL AYURVEDIC
DRUG

Viṣāṇikā (Whole Plant).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Uttamarāṇī, Yugmaphala.

Uttarvārūṇī.^{2(a), 30, 32}
Phalakantaka.^{2(a)}

HABITAT

Found in the plains throughout the hotter parts of India.

Ascending to an altitude of 1000 m in the Himalayas. A foetid, laticiferous twiner.

REGIONAL LANGUAGE NAMES

Ben: Chhagal bete;
Guj: Amaradudheli, Nagaladudhi;
Hindi: Utaran;
Kan: Juttuveballi;

Mal: Veliparuthi;
Mar: Mendhadhdhi, Utarana;
Ori: Utruli, Juktiruhi;
Pun: Karial, Siali;
Tam: Uttamani, Velipparuthi;
Tel: Gittapakau, Dustapuchettu, Dustuputige.

Eng: Hairknot plant, Whitlow plant.³²

CONSTITUENTS

Several cardenolides such as calotropin, calactin, calotropagenin, uzarigenin, coroglaucigenin and triterpenoids, β-amyrin and lupeol.

Sugar residues of the hydrolysates of the cardiac glycoside occurring in the plant afforded D-cymarose, D-glucose, L-oleandrose, and D-sermentose.¹⁵

Leaves contain 3-beta-hydroxy friedelan-7-one, lupeol and its acetate, oleanolic acid, putranjivadione and beta-sitosterol.

THERAPEUTIC AND OTHER
ATTRIBUTES

Mahākuṣṭha (group of major skin diseases), Agnimāndya (digestive impairment), Vibandha (constipation), Yonidoṣa (disorder of female genital tract), Śvāsa (asthma), Śoṭha (inflammation), Mūtrakṛcchra (dysuria). Used as single drug.

Therapeutic uses based on classical texts of the fifteenth century.

IMPORTANT FORMULATION/ APPLICATIONS

A decoction of leaves is given to children for asthma and their juice is used for catarrhal affections. Combined with lime, leaf juice is applied to rheumatic swellings. Leaf juice is also used in a purgative medicinal oil given in rheumatism, amenorrhea, and dysmenorrhea.

The plant extract is used for uterine and menstrual troubles and to facilitate parturition.

It exerts a stimulating action on uterine and other involuntary muscles. The extract causes an increase in movement and tone of the urinary bladder.

The musculotropic activity of the plant extract is due to the presence of a polypeptide in combination with betaine.^{2(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Svarasa (juice): 10 to 20 mL.

Peristrophe bicalyculata Nees

Kākajanghā

BOTANICAL SOURCE(S)

Peristrophe bicalyculata Nees
(Fam. Acanthaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Kākajanghā (Root.)

API, Part I, Vol. III.
Kākajanghā (seed).
API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Nadikāntā, Kākatiktā, Prācibalā, Sulomaśā, Vāyasajanghā.

Pārāvarta-pādi, also a synonym of *Leea aequata* L.,⁷ is known as Kākajanghā in Nepal.
Kākā, Madhyamā-karmanī.⁴

HABITAT

In forest undergrowth, hedges and waste lands almost throughout India.

REGIONAL LANGUAGE NAMES

Beng: Naaskaaga;
Guj: Kaaliaghedi, Kariaghedi, Aghedi;
Hindi: Atrilal, Masi, Kaakjanghaa;

Kan: Cibigid, Cibirsoppu;
Mar: Ghaatipittaapapadaa, Raankiraayat;
Tam: Chebira;
Tel: Chebira

(API, Vol. V.)

CONSTITUENTS

Root:
Volatile oil.
Seed:
Constituents not available.

Root is reported to contain alkaloids 0.43%; free coumarins 0.82%; glycosides 0.98%; coumarins 0.88%; free sugars and potassium chloride was present in the stem but not in the root.¹⁸⁰

Volatile oil, obtained from the plant, contains beta-caryophyllene 33.9%, alpha-zingiberene 10.4%, germacrene D, and globulol 5.0%.
Chemical constituents of seeds: not available.

THERAPEUTIC AND OTHER ATTRIBUTES

Root: Vraṇa, Jwara, Raktapitta, Kaṇḍu, Kṛmi, Kuṣṭha, Raktavikāra, Viṣa vikāra, Śiddhma, Ślipada, Balagraha, Aikāhikjvara, Bādhirya, Anidrā, Rājajaksma, Pradara, Dantkṛimi, Sarpviṣa

Used for ulcers, fever, bleeding disorders, pruritus, worm infestations, obstinate skin diseases, blood disorders, toxicosis, pityriasis versicolor, filariasis, non-specific disorders of children, morbid fever, deafness, insomnia, tuberculosis, urinary disorders/polyuria, dental caries, and snake bites.

Seeds: used for intermittent fever, deafness, bleeding disorders, emaciation, urinary disorders/polyuria, fever, pruritus, debility due to chest injury, threadworms, malabsorption syndrome, non-healing ulcers, filariasis, pityriasis versicolor, snake bites, weapon injury, goiters, scrofula, non-specific disorders of children, and coryza (therapeutic uses of the root and seed based on texts from the thirteenth to sixteenth centuries).

IMPORTANT FORMULATION/APPLICATIONS

Ārgavadhādi Kvātha Churna (Ashtāngahridaya, seventh century), contains Kākatikta

root among 20 plant drugs, all in equal proportion.

For toxemia, urinary, and skin diseases.

Mahāvishagarbha Taila (Bhaishajya Ratnāvali, seventeenth century) contains the Kākajāṅghā seed among 46 plant drugs, all in equal proportions. Used as a massage oil for neurological disorders.

Kākajāṅghā of Ayurvedic Shākavarga (vegetable group) cured poisoning, bleeding disorders, giddiness, and fever.⁴

In Nepal, the plant juice is used to treat fever; a paste of the plant is used to treat cuts and wounds.^{2(d)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

Root: 1–5 g in powder form.

Seed: 1–3 g.

Phaseolus radiatus Linn.

Mudga

BOTANICAL SOURCE(S)

Phaseolus radiatus Linn.
(Fam. Fabaceae)

Syn. *Vigna radiata* (L.) Wilczek.⁷ *Phaseolus aureus* Roxb.^{2(d)}

Phaseolus radiatus Linn, non-Roxb. & Auct. is equated with Mudga (green gram).

Phaseolus radiatus Roxb. non-Linn. is equated with Māsh (black gram).

PHARMACOPOEIAL AYURVEDIC DRUG

Mudga (Seed).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Mungalya.

HABITAT

Cultivated all over India, as a pulse crop.

REGIONAL LANGUAGE NAMES

Eng: Greem gram;

Beng: Moong;

Guj: Mug, Mag;

Hindi: Munga;

Kan: Hesara, Hesoruballi;

Mal: Cherupayar;

Mar: Mung;

Ori: Muga, Jaimuga;

Punj: Munga, Mungi;

Tam: Pattchai payaru, Pasi payaru, Siru murg;

Tel: Pesalu, Peachha peralu;

Urdu: Moong.

CONSTITUENTS

Saponin, Starch, Albuminoids and oil.

A saponin (yield from dehulled, defatted seeds, 0.53%) gave a sapogenin, soyasapogenol C and sugars as glucose, rhamnose, arabinose and glucuronic acid.

A sample of oil contained palmitic 28.1%, stearic 7.8%, archidic 0.9%, behenic 2.4%, cerotic 6.3%, oleic 6.4%, linoleic 32.6%, and linolenic acids 14.4%.

Starch contains approximately 28.8% amylose and 71.2% amylopectin. A small quantity of albumin and water-soluble phosphoproteins are present. The principal proteins are globulins.

Two starch-metabolizing enzymes, phosphorylase and Q-enzyme, have been isolated from the seeds.^{2(a,c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jwara, Netra roga, Amlapitta

Used for fever, diseases of the eye and hyperacidity (therapeutic uses based on texts from the seventh to sixteenth centuries).

According to Mādhava Dravyagūṇa (prior to twelfth century), Mudga *yusha* (soup) is very wholesome. It alleviates all humoral imbalances, stimulates digestion and tones up cardiac functions. The Kṛta variant was fried with *ghee*; akṛta was not fried with *ghee*.

When added to pomegranate and raisins, known as Rāga Shāḍvāh, Mudga was used as an

aphrodisiac, for digestion, as a digestive stimulant and as a cardiac tonic. *Yusha* prepared with Mudga, Masūra, Godhūma (wheat) and Kulattha (horsegram) and salt was used as a diet in rheumatic disorders.⁴

IMPORTANT FORMULATION/ APPLICATIONS

Balāhathādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica). Mudga is among 5 main plant drugs with 3 supporting herbs. Used for headache.

Marma Gutikā (Sahasrayoga) contains 45 (4 still unidentified) plant drugs. Mudga is among three plant drugs used in the third and final stage of processing. Used for trauma.

Kāyasthyādi Vati (not in the AFI).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50–100 g for yusa.

In an experimental study, a herbal extract containing the Munga bean was able to bring down triglyceride levels elevated by ethanol consumption in rats and also to lower blood ethanol concentrations in a dose-dependent manner.^{2(d)}

P

Phoenix dactylifera Linn.

Kharjura

BOTANICAL SOURCE(S)

Phoenix dactylifera Linn.
(Fam. Araceae)

Kharjura and Kharjuri have been mentioned in classical texts. Kharjura is equated with *P. dactylifera*; Karjūri is possibly equated with *P. sylvestris* Roxb.^{2(a)}

Kharjuri was imported from some other country; it was called Sākharikā in Western parts of India.

The saccharine liquid overflowing from the cut top is also known as Kharjūri.³⁰

Kharjūri is also a synonym of *Curculigo orchioides* Gaertn.⁴

PHARMACOPOEIAL AYURVEDIC DRUG

Kharjura (Dried fruit).

API, Part I, Vol. IV.

Kharjua (fresh fruit).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Pinda kharjura, Aharjura (misprint of Kharjura).

Text quoted in the API (in support of therapeutic uses) include Kharjura, Kharjurikā and Kharjūri as synonyms.

Botanical sources of Kharjūrikā and Kharjūri are to be reviewed.

Synonyms of Kharjūrikā: Bṛhat kharjūrikā, Shreṇi, Saphala and Dvīpa sambhavā.⁴

Synonyms of Piṇḍa kharjūrikā: Kharju, Duh-praharshā and Kantaki.⁴

Silemāni kharjūra was also used in Ayurvedic medicine.⁴

HABITAT

Cultivated, also self-sown in arid parts of the country.

Found wild or cultivated mostly in dry districts of Gujarat, Rajasthan, Punjab, Uttar Pradesh, Andhra Pradesh, and Mysore.^{2(a)}

P. sylvestris (Wild date palm, Date sugar palm) is found throughout India up to an altitude of 1500 m. About 29 million palms are reported.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Dried dates, Dates;

Assam: Tamar;

Beng: Sohara;

Guj: Kharek, Kharika;

Hindi: Chuhara, Chohara, Pinda khajur;

Kan: Karinchula, Khajura;

Mal: Intappazham, Inthappana;

Mar: Kharika, Kharik phala, Khajur, Kharik;

Ori: Kharjjuri, Khajur;

Punj: Khajur;

Tam: Pericham, Karchuram, Perichehantay;

Tel: Kharjura, Kharjuramu;

Urdu: Khurma (Khajoor).

Eng: Date palm.

CONSTITUENTS

Dried fruit:

Sugars, Tannins and Vitamins.

Fresh fruit:

Sugars, Proteins and Vitamins.

The edible portion of dried hard dates contains moisture 11.9%, protein 2.9%, fat 0.5%, carbohydrates 82.9%, ash 1.8%; calcium 35.9 mg/100 g, phosphorus 129.3 mg/100 g, and iron 3.4 mg/100 g. Sucrose is the predominant sugar. Rhamnose, xylose, arbinose, ribose,

galactose, and galacturonic acid have also been identified.

In ripe fresh dates, sugars constitute up to 85% of the total solids. Invert sugars predominate. The tannin content ranges from 0.02% to 1.8%. Vitamins: carotene, thiamine, riboflavin, nicotinic acid, ascorbic acid.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dried fruit: Ksaya, Ksata ksaya, Daha, Raktapitta, Murccha, Trsna, Madatyaya, Abhighata, Kasa, Svasa, Srama, Gulma, Jvara, Mukha vairasya, Hikka, Prameha, Pittasula

Used for phthisis, emaciation due to injury, burning sensation, bleeding disorders, syncope, thirst, alcoholic over-intoxication, swelling due to injury, cough, dyspnea, fatigue, abdominal lumps/obstructive jaundice, fever, tastelessness, hiccup, urinary disorders/polyuria, and biliary colic.

Fresh fruit: used for emaciation due to injury, bleeding disorders, diarrhea with blood, thirst, cough, dyspnea, syncope, alcoholic over-intoxication, burning sensation, and swelling due to injury (therapeutic uses based on classical texts from 1000 BC to sixteenth century).

Kharjūra pulp, linctus, decoctions and compounds were used for cough, vomiting, and alcohol abuse.

IMPORTANT FORMULATION/ APPLICATIONS

Drākshādi Churna (Vaidyayoga Ratnāvali), contains 24 plant drugs including Kharjūra pericarp (outer skin); all in equal proportion. A restorative tonic used for wasting diseases, cough, phthisis.

Elādi Modaka (Bhaishajya Ratnāvali, seventeenth century) contains 17 plant drugs, including the pericarp of Kharjūra, all in equal proportions. Used for alcoholism, vomiting, and digestive impairments.

Elādi Gutikā (Bhaishajya Ratnāvali) contains eight plant drugs, including the Kharjūra pericarp. Used for alcoholic intoxication, vomiting, vertigo, and dyspnea.

Shiva Gutikā, laghu, Yogaranākara (sixteenth century), a herbo-mineral compound, contains the Kharjūra pericarp as a supporting drug. Used for anemia, phthisis, and wasting diseases.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

Dried fruit: 10–15 g.

Fresh fruit: 10–50 g.

Phyla nodiflora Greene

Jalapippalī

BOTANICAL SOURCE(S)

Phyla nodiflora Greene
Syn. *Lippia nodiflora* Rich.*
(Fam. Verbenaceae)

Verbena nodiflora Linn.

The National Academy of Ayurveda did not equate *Phyla nodiflora* with any classical Ayurvedic drug. Only Siddha Poduthalai is mentioned as a synonym. *The Wealth of India*, the Indian Council of Medical Research, the Medicinal Plant Unit, and the Central Institute of Medical and Aromatic Plants^{20,29,32} did not equate *P. nodiflora* with any classical Ayurvedic drug. The Indian National Science Academy scientists equated Jalapippali with *Ranunculus aculeata* Pers. (Poison but-tercup).²⁷ This created doubt about the proper identification of the classical drug.

Phyla nodiflora is a pot herb, and the leaves are reported to be eaten in Sri Lanka,^{2(a)} while Jalapippli was bitter and astringent.

HABITAT

In sandy wet, grassy places along bunds of irrigation chennels, canal edges and river banks, throughout greater part of India and up to 900 m on the hills.

Common in rice fields.¹⁵

REGIONAL LANGUAGE NAMES

Eng: Purple lippia
Beng: Bukkana, Kaanchadaa;
Guj: Rataveliyo;
Hindi: Jalpipali, Panisigaa, Bhuio karaa;
Kan: Nelahippali;
Mal: Nirtippali, Podutalai (Siddha);
Mar: Jalpippali, Ratavel;
Tam: Potuttali;
Tel: Bokkena.

**PHARMACOPOEIAL AYURVEDIC
DRUG**

Jalapippalī (Whole plant).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Jalapippalikā, Toyavallārī, Śaradī, Matsyādani, Matsyagandhā.

Jalakarna (not Jalapippali) is equated with *Lippia nodiflora** in AFI, Part I, page 314. (Jalakarna is not recorded as a synonym of Jalapippalikā.)

A number of Ayurvedic pharmacopoeial names/ botanical species need further review.

CONSTITUENTS

Flavonoids namely nodiflorin A and nodiflorin B, nodifloretin, lippiflorins A and B.

Nodifloretin has been characterized as 5, 6, 7, 4'-tetrahydroxy-3'-methoxyflavone; lippiflorin A as 3', 4', 5, 6-tetrahydroxy-7-O-L-arabinosyl flavone (6-hydroxyluteolin-7-arabinoside), and lippiflorin B as 4'-O-L-rhamnoside of lippiflorin A (6-hydroxyluteolin-4'-L-rhamno-7-L-arabinoside). A few other flavones, 6-hydroxyluteolin, 6-methoxyluteolin

(nepetin), and 6-hydroxy-3'-methylluteolin, have been isolated.²⁰⁽²⁾ (Also see Reference 15.)

THERAPEUTIC AND OTHER ATTRIBUTES

Raktaroga, Dāha, Vrana, Śvāsa, Bhrama, Mūr̥chha, Ṭṛsā, Raktadoṣa, Kṛmi, Jvara, Pittātisāra, Viṣarpa

Used for diseases of the blood, burning sensation, ulcers, dyspnea, vertigo, syncope, morbid thirst, blood disorders, worm infestations, fever, biliary diarrhea, and erysipelas (therapeutic uses based on texts from 1000 BC to sixteenth century).
Whole plant is a demulcent, diuretic and febrifuge; poultice of the fresh plant is applied to boils, erysipelas, indolent ulcers, and to swollen cervical glands.
Infusion of leaves and tender stalks, which is astringent and bitter, is given to women after

delivery and to children for indigestion.¹⁵ Leaf juice showed analgesic, anti-inflammatory, and anti-pyretic properties.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Akīka Piṣṭi and Akika Bhasma: Purified Agate powder is processed in 4 plant juices, including that of Jalapippalikā.
Both are used for neurological diseases, heart diseases, head diseases, cough, and emaciation.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2 to 3 g powder. 0.5 to 2 mL juice.
LD₅₀ of the ethanolic extract of the whole plant in mice was >1000 mg/kg i.p.²⁰⁽²⁾

Phyllanthus acidus (Linn.) Skeels Lavalīphala

BOTANICAL SOURCE(S)

Phyllanthus acidus (Linn.) Skeels
Syn. Cicca acida Linn. Merrill
(Fam. Euphorbiaceae)
Syn. P. distichus (L.) Muell.-Arg.^{2(d)}
One scholar had proposed Luvunga scandens Ham. as the classical Lavalī.¹³⁰

Ghana-skandha, Mahat-prāṁshu, Prapunnāṭa, Samam̐ chhada.⁴

HABITAT

Cultivated in gardens, also as a roadside tree.
Reported to be indigenous to Madagascar.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Lavalīphala (Fruit).
API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Sugandhmūlā, Lavalī, Pāṇḍuh, Komala valkalā.
Jyotsanā, Muktāphala, Shyāmala (Kaiyadeva Nighantu, fifteenth century).

REGIONAL LANGUAGE NAMES

Eng: Star gooseberry, Country gooseberry;
Beng: Noyal, Harphal;
Guj: Khaati aawala, Raay aamali;
Hindi: Harfaarevadi, Lavalī;
Kan: Karinelli;
Mar: Raaya-aawal;
Tam: Arinelli;
Tel: Raachayusarike.

CONSTITUENTS

Triterpenoids (beta-amyrin, Phyllanthol) and Gallic acid.

The fruit is sour and astringent, and is eaten raw, cooked or pickled. Fruits gave moisture 89.63%, protein 0.90%, ether extract 0.76%, crude fiber 0.58%, carbohydrates 7.29%, ash 0.84% and acidity (as acetic acid) 1.70%.

Root bark contains tannin 18%, saponin, gallic acid and a crystalline substance (probably lupeol).^{2(a)}

Bark contains beta-amyrin and phyllanthol.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Asmari, Arsa, Aruci

Used for calculus, piles and tastelessness (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) used the fruits as a single drug as an astringent, cordial and appetizer.²⁷

Sushruta (1000 BC) also prescribed the fruits internally for their appetizing and refreshing properties.²⁸

The fruit was a dietary article during the treatment of piles (Bhāvaprakāsha, sixteenth century).³

IMPORTANT FORMULATION/ APPLICATIONS

Drākshāsava (Yogarātnākara, sixteenth century), contains Lavaliphala as a supporting drug.

For piles, edema, anemia, tastelessness, bleeding disorders.

(Drakshārishta, Shārangadhara Samhitā, AFI, does not contain Lavaliphala.)

In ethnomedicine, the leaves are used in flatulence; fruits and seeds are used in asthma, bronchitis, diarrhea, and constipation.²⁽¹⁾

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g.

LD₅₀ of the ethanolic extract of the plant, excluding the root, was found to be 26 mg/kg i.p. in mice.²⁰⁽²⁾

Only the fruits are used in medicine. The roots and seeds are cathartic. Juice of the root bark is used as a poison; it produces headache and sleepiness, accompanied by severe abdominal pain and death.^{2(a)}

P

Phyllanthus fraternus Webst.

Tāmalakī

BOTANICAL SOURCE(S)

Phyllanthus fraternus Webst.

Syn. *Phyllanthus niruri* Hook. f. non-Linn. (Fam. Euphorbiaceae)

P. niruri sensu Hook. f.

Ayurvedic Formulary of India, Part I, wrongly equated Tāmalakī with *Phyllanthus niruri* Linn. (page 327). The Indian species was identified by Prof. Webster of California University.

Phyllanthus niruri Linn. is an American species.⁵

P. amarus Schum & Thonn. and *P. airy-shawii* Brunal & Roux, syn. *P. debilis* Klein ex Willd. are very common in Kerala and are used as a

source of Tāmalakī.⁵ *P. urinaria* Linn. may also be used.³

PHARMACOPOEIAL AYURVEDIC DRUG

Tāmalakī (Root, stem and leaf).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Mahidhātrikā, Bhūmyāmalakī, Bahuphalā.

Bhūdhātri.⁴

Ajjhaḍā (AFI, Part I, page 46). (Illegible synonym.)

HABITAT

Central and Southern India extending to Ceylon.

Phyllanthus: 750–800 species are found in tropical and warm regions; in Africa there are about 150 species, in Madagascar about 70 and in America about 200.¹ About 24 species occur wild in India.^{2(a)}

Not to be confused with Āmalaki. Āmalaki is a tree, while Tamalaki is a small shrub.

REGIONAL LANGUAGE NAMES

Assam: Bhuin amla;

Beng: Bhumamla, Bhumi amalaki;

Guj: Bhoi amali, Bhony amari, Bhonyamali;

Hindi: Bhui Amala,

Kan: Nelanelli;

Mal: Kizanelli, Keezhanelli, Ajjhada;

Mar: Bhuiawali;

Ori: Bhuin amla;

Tam: Kizhukai nelli, Kizanelli;

Tel: Nela usirika.

CONSTITUENTS

Phyllanthin.

Leaf: lignans include phyllanthin (bitter), hypophyllanthin (non-bitter),²⁰⁽²⁾ niranthin, nirtetralin, phyltetralin, and lintetralin.²⁵

Aerial parts: triterpenoids phyllanthanol, phyllanthone, and phyllanthol; lignan nirphyllin; and neolignan phyllnirurin.^{2(c)}

Root: glycoflavones kaempferol-4'-rhamnopyranoside and eriodictyol-7-rhamnopyranoside; lup-20 (29) en-3-beta-ol and its acetate.²⁵

(For chemical constituents, see References 15 and 25.)

THERAPEUTIC AND OTHER ATTRIBUTES

Tr̥ṣa, Kāsa, Amlapitta, Pāṇḍu, Kṣaya, Kṣata, Kuṣṭha, Prameha, Mutraroga.

Used for excessive thirst, cough, hyperacidity, anemia, phthisis, wounds, obstinate skin diseases, urinary disorders/polyuria, and urinary diseases (therapeutic uses based on texts

from the fourteenth to sixteenth centuries). (Jaundice should have been included.)

Charaka (1000 BC) used a decoction of the plant in prescriptions for jaundice and blood poisoning.²⁷

A paste of the plant prepared with buttermilk was given for jaundice in the thirteenth century (Vaidya-manorama).^{16(a)}

The plant showed anti-viral activity against hepatitis B virus and related hepadna viruses.⁷ The plant is used as a single drug in the treatment of jaundice. It is also as a diuretic, hypotensive, and hypoglycemic.

IMPORTANT FORMULATION/ APPLICATIONS

Chitraka Haritaki (Bhaishajya Ratnāvali, seventeenth century), contains Tāmalaki plant decoction as one of the main plant drugs.

Used for obstructive jaundice/chlorosis, tympanites, cough, asthma, and sinusitis.

Chyavanprāsha (Charaka Samhitā, 1000 BC the “all-in-one” Ayurvedic tonic, contains Tāmalaki as a supporting drug.

Shatāvri Guda (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains the Tāmalaki plant among supporting herbs. Used for emaciating diseases, including jaundice.

Pipplyādi Ghrita (Ashtāngahridaya, seventh century); Tāmalaki plant is among 15 plant drugs, all in equal proportions. Used for the advanced stage of jaundice.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 mL of the drug in juice form. 3–6 of the drug in powder form.

Rependusinic acid A has been extracted from the plant, which shows 50% inhibition of HIV (at a concentration of 0.1 μg/mL). In Japan, an anti-retrovirus pharmaceutical preparation containing rependusinic acid A as the active ingredient has been patented.^{2(c)}

Niruride, isolated from non-Indian spp. *P. niruri* Linn., inhibited specific HIV protein binding activity, but did not protect cells from acute HIV infection.¹³

Physalis alkekengi Linn.

Kākanaja

BOTANICAL SOURCE(S)

Physalis alkekengi Linn.

(Fam. Solanaceae)

In Europe and Britain, the plant that is sold in garden centers as Winter cherry is usually

Solanum pseudocapsicum.³¹

Physalis minima Linn. is used as a substitute of *P. alkekengi*.⁶³

PHARMACOPOEIAL AYURVEDIC DRUG

Kākanaja (Fruit).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Rajaputrika. (Non-classical.)

Synonyms of *Physalis minima* Linn.: Parpoti, Parpota, Chirapotā,^{16(2),130} Tankāri.³

HABITAT

Southern Europe through China to Japan; imported into India.

Physalis minima, distributed throughout India, is a weed of irrigated fields and bunds, while *P. alkekengi* is an ornamental plant.^{2(a)}

Fruits of *P. minima* are also alterative, aperient, diuretic, used for dropsy, urinary diseases, gonorrhea, and gout and an ingredient of a medicated oil applied in enlargement of the liver.¹⁵ Matches well with the properties of the *P. alkekengi* fruit.

REGIONAL LANGUAGE NAMES

Eng: Winter cherry*, Bladder cherry;

Beng: Kakanaja;

Guj: Kakanaja;

Hindi: Kakanaja;

Kan: Kakanaja;

Mal: Kakanaja;

Mar: Kakanaja;

Punj: Kaaknaj;

Tam: Sisayakkaali, Tottakkaali;

Tel: Kupante;

Urdu: Kakanaj.

Eng: Strawberry tomato,^{2(a)} Cape gooseberry, Coqueret.¹⁴

Kākanaj-e-Hindi of Unani medicine is equated with *Withania coagulans* Dunal.

CONSTITUENTS

Auroxanthin, mutatoxanthin, phydalein, zeaxanthin, beta-Cryptoxanthin from the calyx of the fruit†; glycoalkaloids detected in the seeds but alkaloids were absent in the fruit.

Berries gave steroidal triterpenes physalins

A, B, C, D, up to R and various hydro and dehydro derivatives; tropane alkaloids, calystegins A5, B1, B3, C1 and others, cucurbitacin, tropine and tiglodine; flavonoids include luteolin-7-glucoside. Carotenoids include zeaxanthin dipalmitic acid ester (red).^{14,31}

P. minima also yielded physalin B, withaphysalin A, B, and C and physalin D^{20(2),25}

THERAPEUTIC AND OTHER ATTRIBUTES

Pūyameha, Tamakaśvāsa, Vrana, Visarpa, Kandu, Śopha, Kāsa, Svāsa, Jvara

Used for urine with pus cells, bronchial asthma, ulcers, erysipelas, pruritus, cough, dyspnea, and fever (therapeutic uses based on Shodhala Nighantu, twelfth century; Madanpala Nighantu, fourteenth century; and Bhavaprakasha, sixteenth century. Parpoti, Parpota, Chirapota and Tankari, mentioned in the quoted texts, are equated with *Physalis minima* Linn.).

Fruits used as a diuretic, febrifuge, alterative, anthelmintic, and laxative; used in urinary

* *Withania somnifera* (L.) Dunal is also known as Winter cherry.⁷

† See Reference 15.

diseases, strangury, hemoptysis, lithiasis, and rheumatism.¹⁵ Unripe fruit can cause poisoning in animals.¹⁴

Extracts showed estrogen antagonistic activity in female rats.³¹

IMPORTANT FORMULATION/ APPLICATIONS

Lauha Rasāyana (Bhaishajya Ratnāvali, seventeenth century), does not contain Kākanaja fruit or its allied species.

Lauha Rasayāna (Rasayoga Ratnākara) also does not contain Kākanaja or its allied species.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g in the powder form.

In homeopathic medicine, there are a number of products containing *P. alkekengi* for urolithiasis, dysuria, with urinary hesitancy, recurrent urination and urinary retention.

Picrorhiza kurroa Royle ex Benth.

Kaṭukā

BOTANICAL SOURCE(S)

Picrorhiza kurroa Royle ex Benth.
(Fam. Scrophulariaceae)

(Fam. Plantaginaceae).¹

P. kurroa Hook. f. in part non-Royle ex Benth. is equated with *P. scrophulariaeflora* Pennell, found in the eastern Himalayas in Nepal and Sikkim.^{2(a)} Also equated with Kutki. Properties are similar to *P. kurroa* Royle ex Benth.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kaṭukā (Rhizome).

API, Part I, Vol. II.

International Pharmacopoeial name: Rhizoma picrorhizae.¹⁶⁽⁴⁾

AYURVEDIC SYNONYMS

Tiktā, Tiktaroḥiṇī, Katurōḥiṇī, Kaṭvī, Sutiktaka, Kaṭuka, Rohiṇī.

Ullaka, Ashokarohini.³⁰

Chakrāṅgī, Matsyapittā, Vṛshṇa bhadṛā, Kāndaruhā, Dvijāṅgikā.⁴

HABITAT

The north-western Himalayas from Kashmir to Sikkim.

Picrorhiza is distributed in the alpine Himalayas, extending to the mountains of Yunnan in China.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Hellebore;
Assam: Katki, Kutki;
Guj: Kadu, Katu;
Hindi: Kutki;
Kan: Katuka rohini;
Mal: Kaduk rohini, Katuka rohini;
Mar: Kutki, Kalikutki;
Ori: Katuki;
Punj: Karru, Kaur;
Tam: Katuka rohini, Katuku rohini, Kadugurohini;
Tel: Katukarohini;
Urdu: Kutki.

CONSTITUENTS

Glucoside (Picrorhizin).

Kutkin (a stable mixed crystal of two C-9 iridoid glucosides), picroside I, II and III and kutkoside; aucubin; D-mannitol, kutkiol, kutakis-terol, kurrin, and vanillic acid; a phenolic constituent apocynin; and cucurbitacin glycosides B, D, E, F, and R.

For characterized picrosides and cucurbitacin glycosides, see References 15 and 2(c). Also see Reference 25.

Extremely bitter picroside I 0.6%–7.4% and picroside II 3%–5%. Minecoside 0.5%, androsine 0.5%, apocynin 0.1% and cucurbitacins 1.0%–1.5%.¹⁴

THERAPEUTIC AND OTHER ATTRIBUTES

Kāmalā, Śvāsa, Dāha, Jvara, Kuṣṭha, Viṣamajvara, Arocaka.

Used for jaundice, asthma, burning sensation, fever, obstinate skin diseases, intermittent fever, and tastelessness (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) included a decoction of the roots in prescriptions for jaundice, dermatosis, and piles.²⁵

Uses based on current experimental and clinical research.

Used orally to treat fever, immune disorders and skin diseases; clinical studies gave encouraging results in the treatment of bronchial asthma and viral hepatitis.¹⁰⁽⁴⁾ Also used in dysentery and amebiasis.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Ārogyavardhini Gutikā (Rasa-ratna-samuchhaya), a mercury based herbomineral compound with Katukā as a main drug.

Uses for jaundice and other liver disorders, blood disorders, and anemia.

Tikta Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Katuka among five

main plant drugs with six supporting herbs. Used as a blood purifier and hematinic. Used in chronic skin diseases.

Mahātiktaka Ghrita (Bhaishajya Ratnāvali, seventeenth century); 32 plant drugs in equal proportions, including Tikta-rohini. Used for anemia, bleeding disorders, gout, and erysipelas.

Sarvajvarhara Lauha (Bhaishajya Ratnāvali); main drug is calcined iron, equal to 20 herbs in quantity. All herbs are in equal proportions, including Katukā. Used for diseases of the liver and spleen and chronic fever.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Standardization basis marker compound: Kutkin-NLT 5.0% w/w (IP). Total picrosides I and II not less than 9% (WHO).¹⁰⁽⁴⁾

In a double-blind placebo-controlled trial, powder of crude drug (375 mg three times a day) was given to patients with acute viral hepatitis (hepatitis B surface antigen negative) for 2 weeks. Recovery times: 27.4 days in the treatment group. 75.9 days in the placebo group.¹⁰⁽⁴⁾

Crude drug 75 mg twice daily for 2 weeks and crude extract of the drug 300 mg three times daily for 1 year were used in clinical trials for bronchial asthma (WHO).¹⁰⁽⁴⁾

PICROLIV is 55.60% of a mixture of picroside I and kutkoside in a 1:15 ratio.^{2(c)}

P

Pimpinella anisum Linn.

Anisūna

BOTANICAL SOURCE(S)

Pimpinella anisum Linn.
(Fam. Apiaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Anisūna (Dried fruit).

API, Part I, Vol. V.

An Unani drug.³⁷

International Pharmacopoeial name: Fructus Anisi.¹⁰⁽³⁾

AYURVEDIC SYNONYMS

Śvetapuṣpā.

(A confusing, non-classical synonym.)

P. anisum bears white flowers (shveta pushpa).

Pimpinella diversifolia DC., found throughout the Himalayas, and *P. heyneana* Wall. ex Kurz., found in Western Ghats, also bear white flowers.

P. diversifolia seeds yield an essential oil with anethole, *P*-methoxyphenyl acetone and chevicol.^{2(a,c)}

In case, Shvetapushpa is a classical synonym, Himalayan or Western Ghat spp. were used during the classical period as Anisun.

HABITAT

Introduced and cultivated in Odisha, Uttar Pradesh, and Punjab, and cultivated.

Indigenous to the Eastern Mediterranean region, Western Asia, and Europe.¹⁰⁽³⁾

REGIONAL LANGUAGE NAMES

Eng: Anise;

Beng: Muhuri;

Hindi: Badiyan rumee, Sauph, Anisoon;

Mar: Anisuna shopa;

Tam: Shombu.

CONSTITUENTS

Volatile oil, fixed oils and protein.

Volatile oil 1.5%–5%; major constituents include linalool 0.1%–1.5%, methylchavicol (estragole, isoanethole) 0.5%–6.0%, alpha-terpineol 0.1%–1.5%, *cis*-anethole <0.5%, *trans*-anethole 84%–93% and *p*-anisaldehyde 0.1%–3.5%.¹⁰⁽³⁾

Constituents of the whole seed include coumarins, umbelliferone, umbelliprenine, bergapten, and scopoletin.

Lipids (16%) include fatty acids, beta-amyrin, stigmasterol, and its salts.

Flavonoids include rutin, isoorientin, and isovitexin.

Protein 18%, carbohydrates 50%, terpene hydrocarbons 17%, and fixed oil about 15%, of which the predominant fatty acid is petroselinic acid, at about 60%.^{24(b)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śūla, Ādhamāna, Kaphavikāra, Mutraghāta, Bālagraha

Used for colic, flatulence, catarrh of the respiratory tract, retention of urine, and infantile ailments (no references in any Ayurvedic text).

Anise seed infusions are known as carminatives and expectorants. They are used to decrease bloating and settle the digestive tract. In higher doses, they are used as anti-spasmodics for cough, asthma, and bronchitis.¹⁷

IMPORTANT FORMULATION/ APPLICATIONS

Brāhmi Vati (not in AFI).

Hot water extract of the dried fruit is given to infants with nausea, flatulence, and colic. Fluid extract is used as a galactagogue, and in an infusion for coughs and asthma. Seeds, given orally, are used for gastritis, flatulence, abdominal cramps, gastro-intestinal disorders, and dyspepsia. Hot water extract is used as an emmenagogue.¹⁷⁽²⁾

Preliminary research suggests that anise oil has GABA agonist effects and exhibits anti-convulsion activity; eugenol and estragole have anesthetic, hypothermic, muscle-relaxant and anti-convulsion effects. Anethole and other constituents of the oil might have estrogenic effects.¹³

Alcoholic extract of seeds is anti-fungal.^{2(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Dose: 1–3 g.

Sufficient quantity is used for dhupanartha (fumigation).

(Not used for fumigation.)

Crushed fruits 3 g as an infusion or equivalent preparation.

Anise oil 0.3 g in suitable preparations.

Externally, preparations should contain 5%–10% of anise oil.^{24(b)}

Pinus gerardiana Wall.

Nikocaka

BOTANICAL SOURCE(S)

Pinus gerardiana Wall.
(Fam. Coniferae)

Tel: Chilgoja;
Urdu: Chilgozah.

Eng: Neosia pine.³²

PHARMACOPOEIAL AYURVEDIC DRUG

Nikocaka (Kernel of the pine nut).

API, Part I, Vol. VI.

Nikochaka was mentioned in Charaka Samhita, Sushruta Samhitā (1000 BC). It was wrongly equated with *Pistacia vera* Linn.²⁷ Different synonyms for Nikochaka and Pista are found in the texts.

AYURVEDIC SYNONYMS

Cilagozā.

Chilgozā is a Unani synonym³⁷ and trade name. Nikochaka: Dārūphala, Makoshṭha, Jala-gojaka.⁴ Pista: Mukulaka, Dantiphala samākṛiti (resembling Dantiphala).⁴ Akshota (Akharota), Mukulaka (Pistā), and Nikochaka (Chilgozā) are mentioned together as dry fruits in Charaka Samhitā.

HABITAT

North-western Himalayan region between 1900 to 4000 m.

Found from Garhwal westwards, in the inner arid valleys.^{2(a)}

Considerable quantities of the seeds are imported from Afghanistan.

REGIONAL LANGUAGE NAMES

Eng: Chilgoza pine, Edible pine, Neosa pine;
Guj: Chilgojhaa;
Hindi: Chilgozaa, Neoza, Gunobar, Rhee;
Kan: Chilgojha;
Mal: Chilgojha;
Mar: Chilgoza, Galgoja;
Ori: Chilgojha;
Pun: Mirrigalgor, Mirri, Chiri, Chirrigalgor;

CONSTITUENTS

Palmitic, stearic, oleic and linoleic acids; palmito-dilinolein, stearo-dilinolein, palmito-oleolinolein, stearo-oleolinolein, trilinolein, oleodilinolein, dioleolinolein and triolein.

Fatty composition of the oil: palmitic 3.7%, stearic 1.2%, oleic 52.3%, and linoleic acids 42.8%.

Glyceride composition: palmito-dilinolein 2.4%, stearo-dilinolein 0.8%, palmito-oleolinolein 9.9%, stearo-oleolinolein 3.2%, trilinolein 0.4%, oleodilinolein 32.5%, dioleolinolein 47.4%, and triolein 3.4%.^{2(a)}

Seed proteins gave amino acids: leucine, valine, lysine, phenylalanine, tryptophan, and methionine.

Other constituents are sesquiterpenes and sesquiterpene alcohols.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta (rheumatism), Apasmāra (Epilepsy), Ardita (facial palsy), Hikkā (hiccup), Kāsa (cough), Kṣāta (wound), Kṣaya (pthisis), Katisula (lower backache), Pāṇḍu (anaemia), Parśvaśūla (intercostal neuralgia and pleurodynia), Pakṣavadha (paralysis/hemiplegia), Sandhivāta (arthritis due to vata dosa), Śvāsa (Asthma, Vatarakta (Gout).

Used as a single drug.

(Therapeutic uses based on texts from 1000 BC to fourteenth century.)

Dried and shelled nuts of Nikochaka was given as a diet for anemia, wasting diseases and as an anabolic and aphrodisiac.²⁷

Nikochaka was considered heavy, unctuous, aphrodisiac, age-sustaining, hot, sweet, and nourishing. Used as a hematopoietic and strength-promoting agent and a nerve tonic in rheumatic and neurological disorders.⁴

IMPORTANT FORMULATION/
APPLICATIONS

Jivanīya *ghrita*, an age-sustaining tonic, contained Nikochaka. (Charaka Samhitā, 1000 BC)^{16(a)}
Chilgoza is included in a number of Unani confections prescribed for debility.
Kernels are eaten raw or roasted as a dry fruit for their mineral constituents: calcium 90.8 mg/100 g, phosphorus 92.4 mg/100 g and iron 2.4 mg/100 g. Pectin is present to the extent of 1.73%, calculated as calcium pectate.

Seeds are anodyne, carminative, stimulant, and expectorant. Oil from seeds is used as a dressing for wounds and ulcers, and is externally applied in head diseases.³²

DOSAGE/USAGE/CAUTIONS/
COMMENTS

Curna (powder): 10 to 20 g.
Kernels are eaten raw or roasted as a dessert or in confections. Mostly used during winter.

Pinus roxburghii Sargent Heart wood, root Sarala

BOTANICAL SOURCE(S)

Pinus roxburghii Sargent
Syn. P. longifolia Roxb.
(Fam. Pinaceae)

Cedrus deodara (Roxb.) Loud. (In most of the Ayurvedic compounds, the heart wood of both has been included.)

PHARMACOPOEIAL AYURVEDIC
DRUG

Sarala (Heart wood).
API, Part I, Vol. III.
Sarala (Dried root)
API, Part I, Vol. III.

REGIONAL LANGUAGE NAMES

Eng: Long leaved pine;
Beng: Tarper telargaach, Sarala gach;
Guj: Saral;
Hindi: Cheed;
Kan: Saral;
Mal: Saral, Saralam;
Mar: Saral;
Punj: Cheel;
Tam: Saral, Shirsal;
Tel: Saral;
Urdu: Cheer, Sanobar.

Eng: Chir pine.^{2(a)}

AYURVEDIC SYNONYMS

Surabhi-dāruka, Pīta vṛkṣa.
Nandana, Chitrā, Nameru, Dīpa vṛkshaka,
Pūti dāru, Pūti vṛksha, Mahā dirgha, Kīla
druma.⁴

CONSTITUENTS

Heart wood: Oleo-resin and Flavonoids.
Root: Resins—oleo-resin.
Heart wood yielded stilbene derivatives pino-banksin 0.02%, pinocenbrin 0.015%, and pino-sylvin monomethyl ether 0.02%.¹⁸²
Sapwood yields oleorasin on incision.
Friedelin, ceryl alcohol, and beta-sitosterol were isolated from the bark.¹⁸²

HABITAT

North-western Himalayas at an altitude between 460 and 1,500 m.
From Kashmir to Bhutan and in Siwalik hills. In the Himalayas almost exclusively in the outer hills and valleys that receive the bulk of the rainfall during monsoon. Often occurs with

THERAPEUTIC AND OTHER ATTRIBUTES

Heart wood and root: *Karṇaroga*, *Kaṇṭha roga*, *Akṣī roga*, *Dāha*, *Mūrcchā*, *Vrana*, *Kāśa*, *Swarabhramsa*.
Heart wood: *Yukā*.

Used in diseases of ear, throat and eyes, burning sensation, syncope, ulcers, cough, and hoarseness of voice (heart wood and root); and lice (heart wood) (therapeutic uses based on texts from the thirteenth to sixteenth centuries).
A decoction of bark and leaves was included in prescriptions for fever, loss of appetite, and facial paralysis (*Charaka Samhitā*, 1000 BC).
Heart wood contains a longitudinal resin canal and possesses a resinous odor. Wood also contains the resin, and is used in prescriptions for its anti-septic, deodorant, stimulant, diaphoretic, refrigerant, carminative, and externally rubefacient properties.

IMPORTANT FORMULATION/ APPLICATIONS

Karpūrādyarka (*Arkaprakāsha*, *Rāvana*, period not known). Distillate of 50 plant

drugs including *Sarala* heart wood, in equal proportion. Used for digestive impairments.
Sudarshana Churna (*Bhaishajya Ratnāvali*, seventeenth century) contains 44 plant drugs, including *Sarala* heart wood, in equal proportions. Used for intermittent fever and diseases of the liver and spleen.
Rajanyādi Churna (*Ashtāngahridaya*, seventh century) contains eight plant drugs, including *Sarala* heart wood, in equal proportions. Used for diarrhea, dysentery, jaundice, anemia, and fever.
Saralādi Churna (*Sahasrayoga*, *CCRAS* text, not in the *AFI* or *API*) contains powdered heart woods of *Sarala*, *Devdāru*, *Costus* and *Aguru*. Used for cough, cold, and inflammation.
(Heart woods of both *Sarala* and *Devadāru* were used invariably in all compounds.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g in powder form.

P	<i>Pinus roxburghii</i> Sargent	Exudate	Sarala
BOTANICAL SOURCE(S)		AYURVEDIC SYNONYMS	
<i>Pinus roxburghii</i> Sargent Syn. <i>P. longifolia</i> Roxb. (Fam. Pinaceae)		Śriḥ, Śrīveṣṭaka, Śrīvāsah, Śriniketah, Śryāhvah, Vṛkṣadhūpakah.	
PHARMACOPOEIAL AYURVEDIC DRUG		HABITAT	
Sarala (Exudate). API, Part I, Vol. V. (Śrīveṣṭaka is more appropriate as a Pharmacopoeial name.) Śrīveṣṭaka belonged to <i>Elādi gaṇa</i> of the classical period, which was prescribed in toxemia, pruritus, urticarial rashes, pimples, and for promoting complexion. ⁴		North-western Himalayas at an altitude between 460 and 1500 m. From Kashmir to Bhutan and in Siwalik hills. In the Himalayas almost exclusively in the outer hills and valleys, which receive the bulk of the rainfall during monsoon. Often occurs with <i>Cedrus deodara</i> (Roxb.) Loud. (In most of the Ayurvedic compounds, the heart woods of both have been included.)	

REGIONAL LANGUAGE NAMES

Eng: Oleo-resine of pine;
 Beng: Sarala gaachh;
 Guj: Teliyo devdaar, Pilo berajo;
 Hindi: Cheed-ka-gond, Gandhabirojaa;
 Kan: Saral, Sriveshtaka;
 Mal: Charalam, Saralam;
 Mar: Sarala deeka;
 Ori: Sidhaa, Saral;
 Punj: Cheed;
 Tam: Pinaimaaru;
 Tel: Saral;
 Urdu: Cheer.

Eng: Long-leaved pine, Chir pine.^{2(a)}

CONSTITUENTS

1- α -pinene, 1- β -pinene, car-3-ene, longifolene, and other mono and sesquiterpenes.

Turpentine from xylum resin:

The rosin afforded (+) form of longifolene, an important member of the sesquiterpene class of the major mevalonoid group of natural products.¹⁸²

THERAPEUTIC AND OTHER ATTRIBUTES

Jatrūrdhava roga, Sveda-daurgandhya, Vātavyādhi, Agnimāndya, Ādhmāna, Kṛmiroga, Mūrcchā, Kuṣṭha, Tvakroga, Karṇaśula, Kaṇṭharoga, Sotha, Nāḍivrana, Kandū, Kotha, Piḍakā, Urustambha, Yūkaroga, Grahābādhā, Yonidoṣa

Jatrūrdhava roga (could not be identified) used for foul smell due to excessive sweating,

neurological diseases, digestive impairment, flatulence, worm infestations, syncope, leprosy, skin diseases, earache, throat diseases, inflammation, sinusitis, pruritus, urticaria, carbuncle, stiffness of thigh muscles, lice infestations, psychotic syndromes, and disorders of female genital tract (therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Amrtaprasha Churna (not in AFI).

Kuṣṭādi Taila (Bhaishajya Ratnāvali, seventeenth century, not in the AFI) contains eight plant drugs, including the heartwood and oleo-gum resin of Sarala. Used for stiffness of the thigh muscles.

Śrīveṣṭaka was an ingredient of a mixture for fumigation used for healing wounds; an ingredient of a plaster used for muscular atrophy and infantile paralysis;²⁷ and a constituent of an ointment for herpes, skin eruptions and venereal sores. It was also given internally for skin eruptions and blood poisoning and as a paste for swellings and urinary disorders (Sushruta Samhitā, 1000 BC).²⁸

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g

Research potential: use of the oleo-gum resin in muscular atrophy and facial paralysis should be revalidated.

Piper betle Linn.

Nāgavallī

BOTANICAL SOURCE(S)

Piper betle Linn.
 (Fam. Piperaceae)

Main varieties are: *Desi* (local), *Maghai* (Bihar), *Bangla* (Bengal), *Jagannathi* (Odisha) and *Kapoori* (Tamil Nadu). For cultivars identified

by the National Botanical Research Institute, Lucknow, see Reference 2(c).

PHARMACOPOEIAL AYURVEDIC DRUG

Nāgavallī (Leaf).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Tāmbulī.

Tāmbūla, Tāmbūlavalli, Nāgini, Bhujangalatā.²⁷

HABITAT

Widely cultivated in hotter and damper parts of India.

The cultivated betel in India is usually the male plant selected from certain races and does not bear fruit.

(In Malaysia and Indonesia, many spp. bear flowers and fruits.)^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Betel leaf;

Assam: Pan;

Beng: Pan;

Guj: Pan;

Hindi: Pan;

Kan: Veelyadele ele;

Mal: Vettila;

Mar: Pan, Nagvel, Vidyachepan;

Punj: Pan;

Tam: Vettilai;

Tel: Tamalapaku, Tamulapaku;

Urdu: Pan.

CONSTITUENTS

Essential oil, Amino acids, Vitamins and Enzymes.

Essential oil varies from 0.7% to 2.6%; contains eugenol (26.8 to 42.5%), carvacrol, chavicol, allyl catechol, chavibetol, cineole, estragol, eugenol methyl ether, *p*-cymene, caryophyllene, cadinene, and unidentified sesquiterpenes.

Leaves contain significant amounts of all the essential amino acids; only lysine, histidine, and arginine occur in traces; there are good amounts of B vitamins, ascorbic acid (4.3–31.1 mg/100 g) and carotene; free reducing sugars (0.38%–1.46%). Among the enzymes, diastase and catalase are present.^{2(a),25}

Leaves yielded beta- and gamma-sitosterol, hentriacontane, *n*-triacontanol and stearic acid.²⁰⁽²⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Kaṇḍu, Hṛllāsa, Agnimāandya, Jwara, Hṛdroga, Swarabheda

Used in pruritus, nausea, digestive impairments, fever, cardiac disorders, and hoarseness of voice (therapeutic uses based on texts from the fifteenth to sixteenth centuries).

Charaka and Sushruta (1000 BC) prescribed leaves internally in halitosis, hoarseness, catarrh of the throat, larynx and bronchi, and for indigestion.

For treating obesity, one leaf, mixed with 10 g black pepper, with cold water, was given for 2 months (Vaidya Manorama, thirteenth century).

Tāmbula Bhasma (Sahasrayoga, CCRAS text) was for colics; Tambula lehyam was specific for whooping cough.^{27,28,16(a),18}

IMPORTANT FORMULATION/ APPLICATIONS

Bṛhat Sarvajwarahara Lauha (could not be traced). (Sarvajwarahara Lauha of Bhaishajya Ratnāvali does not contain Betel leaf).

Bṛhatvishanajwara Rasa (Bhaishajya Ratnāvali), Lokanātha Rasa (Rasendra Sāra Sangraha), Pushpadhanvā Rasa (Bhaishajya Ratnāvali) and Sūtashekhara Rasa (Yoga Ratnākara) are mercury-based mineral compounds. During drug processing, betel leaf juice is used.

Scarce use as a single or main drug in prescriptions during the classical period. Betel leaf (juice) was used as a vehicle (adjuvant) with other drugs or while processing mineral drugs.³⁰

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 mL of Swarasa.

Leaves contain total 1.35% oxalate and 10.2% calcium. Soluble oxalate (1.30%) renders calcium unavailable. Applying slaked lime to the leaves neutralizes this effect.²⁰⁽²⁾

Alcoholic extract of leaves yielded a compound giving a positive reaction for cardiotonic glucosides.²⁰⁽²⁾

Piper cubeba Linn. f.

Kaṅkola

BOTANICAL SOURCE(S)

Piper cubeba Linn. f.
(Fam. Piperaceae)

Adulterants: *Piper crassipes* Korth., *P. cannum* Blume, *P. baccatum* Blume, *Litsea cubeba* Pers.
Also African spp.: *P. clusii* DC. and *P. guineanse* DC.^{16(c)}

PHARMACOPEIAL AYURVEDIC DRUG

Kaṅkola (Fruit).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Kaṅkolaka, Cinoṣaṇa, Cinatikṣṇa, Kakkola, Kaṅkolikā.

HABITAT

Cultivated, specially in the Karnataka state.

Also cultivated in the East and West Indies.¹
Native to Indonesia.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Cubebs, Tailed Pepper;
Assam: Kakkol, Kababcheni;
Beng: Kababchini, Sugandhamaricha;
Guj: Chanakabab, Chinikabab;
Hindi: Settalchini, Kababchini;
Kan: Gandhamensau, Balamenasu;
Kash: Kushfal, Kababchini;
Mal: Cheenamulaku, Takkolam, Valmulaku;
Mar: Kankol;
Ori: Kababchini;
Punj: Kababchini, Sardchini;
Tam: Vaali milaku, Valmilagu;
Tel: Chalavamiriyalu, Tokamiriyalu;
Urdu: Kababchini.

Eng: Tailed pepper.

CONSTITUENTS

Essential oil (cubebin).

Essential oil 5%–20%, contains alpha- and beta-cubebenes 11%, copaene 10%, cubebol 10%, delta-cadinene 9%; humulenes;¹⁴ mono- and sesquiterpenes include sabinene, alpha-thujene, alpha- and beta-pinene and alpha-terpinene.³¹
The fruit gave lignans including (–)-cubebene with (–)-cubebinin and hinokinin; (–)-clusin and derivatives; cubic acid, resins, and gum.³¹
Seed oil contains palmitic, linoleic, oleic, linolenic, stearic, arachidic, behenic, and hexadecenoic acids.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Aruci, Mukharoga, Mūtrakṛcchra, Śula

Used for tastelessness, diseases of the mouth, dysuria, and colic (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Charaka and Sushruta prescribed a paste of the fruits as a mouthwash or dried fruits internally for oral and dental diseases, loss of voice, halitosis, fever, and cough.^{27,28}

According to Raja Nighantu (fourteenth century), Kankola is a stimulant, carminative, diuretic, expectorant, and deobstruent.^{16(c)}

A paste of the fruit was applied on male and female genitals to intensify sexual pleasure. Due to this attribute, it was known as Habb-ul-Uroos/*Nava-parinita-vadhu-phala*/ Bridegroom's berry.^{16(c)}

The drug's stimulating and irritating properties provide a psychological euphoria and a false feeling of confidence.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Dashamūlūrishta (Sharangadhara Samhitā, thirteenth century), Kankola fruit is among 12 supplementary herbs.

Kumāryāsava (Yogarātnākara, sixteenth century), contains the Kankola fruit among 12 supporting herbs.

Cubebs are traditionally used for urethritis, leucorrhea, cystitis, amenorrhea, diseases of the spleen and liver, chronic bronchitis, and digestive problems.¹⁸

Fruits have been used for amebic dysentery.³¹

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–2 g of the drug in powder form.

Contraindicated in nephritis, as well as in inflammatory conditions of the digestive tract.¹⁸

Piper longum Linn.

Root, stem

Pippalīmūla

BOTANICAL SOURCE(S)

Piper longum Linn.
(Fam. Piperaceae)

Long pepper sold in India is *Piper longum* or *P. peepuloides*. The Indonesian or Java long pepper, *P. retrofractum*, is also available.^{2(a)}

PHARMACOPEIAL AYURVEDIC DRUG

Pippalīmūla
(Stem).

API, Part I, Vol. II.

Roots and thicker parts of the stem, cut and dried, are used as Pipplimūla.

AYURVEDIC SYNONYMS

Māgadhi, Granthikā, Pippalikā.

(See also Pippali fruit.)

HABITAT

Hotter parts of India from central Himalayas to Assam up to lower hills of West Bengal and ever green forests of Western ghats as wild, also cultivated in North East and many parts of the South.

In some hilly parts of the Vishakhapatnam district in Andhra Pradesh, long pepper is grown for its roots.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Piper root;
Beng: Pipulmul;
Guj: Gantoda, Ganthoda;

Hindi: Piparamula;
Kan: Modikaddi; Hippali, Tippali, Modi;
Mal: Kattuthippaliver, Tippaliveru;
Mar: Pimplimula;
Ori: Pippalimula, Bana pippalimula;
Punj: Pippalimula, Magha;
Tam: Kanda tippili, Ambinadi desavaram;
Tel: Modi, Madikatta;
Urdu: Filfil daraz.

CONSTITUENTS

Alkaloids (Piperine, Piperlongumine, Piperlonguminine etc.), Essential oils.

Roots gave alkaloids piperine (0.15%–0.18%), piperlongumine (piplartine 0.13%–0.20%),^{2(a)} piperlonguminine, sesamin and methyl-3, 4, 5-trimethoxycinnamate. Stem gave triacontane and 22-23-dihydrostigmasterol.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Udararoga, Anāha, Gulma, Kṛmiroga, Vātaroga

Used for abdominal diseases, tympanites, abdominal lumps, and rheumatic diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

Root: diuretic, stimulant and sudorific;³² root and fruit find applications in diseases of the respiratory tract, dysentery, and skin diseases (leucoderma) and as a cholagogue in obstruction of the bile duct and gall bladder.

A combination of long pepper, its root, black pepper and ginger (in equal parts) is used in colic, flatulence, cough, coryza, and hoarseness.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

- Panchakola Churna (Shārangadhara Samhitā, thirteenth century), contains both Pippali fruit and root among main plant drugs. Used for diseases of the digestive system.
- Dashamūla-panchakolādi Kvātha Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains both Pippali fruit and root.
- Dashamūlaśatpalaka Ghrita (Chakradatta, eleventh century) contains both Pippali fruit and root.
- Dashamūla Taila (Bhaishajya Ratnāvali, seventeenth century) contains both Pippali fruit

and root in addition to the *Trikatu* group (dry ginger, long pepper, and black pepper). (*Trikatu* is used as a composite drug for increasing the bio-availability of the compound drugs.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

0.5–1 g of the drug in powder form.

Root powder exhibited anti-fertility activity; the waxy alkaloid is an anti-implantation agent or early abortifacient.³²

Standardization basis market compound: Pippali large fruiting spikes—piperine-NLT 1.0% w/w; small fruiting spikes—piperine-NLT 0.6% w/w (IP).

***Piper longum* Linn.**

Fruit

Pippali

BOTANICAL SOURCE(S)

Piper longum Linn.
(Fam. Piperaceae)

Long pepper sold in India is *Piper longum* or *P. peepuloides*. The Indonesian or Java long pepper, *P. retrofractum*, is also available.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Pippali (Fruit)

API, Part I, Vol. IV.

Charaka, Sushruta (1000 BC) and Vagabhatta (sixth to seventh century) mentioned two varieties of Pippali, Pippali, and Hastipippali (Gajapippali). Rāja Nighantu (fourteenth century) mentioned four varieties, Pippali, Gajapippali, Sainghali and Vana-pippali.

Gajapippali is equated with *Piper chaba* Hunter; Sainghali with *Piper retrofractum* Vahl.; and Vana-pippali (provisionally) with *Piper peepuloides* Roxb. (Savali pippal of commerce) or *P. sylvaticum* Roxb.

Pippali grown in Magadha and Videha (Bihar) was preferred.¹⁸

AYURVEDIC SYNONYMS

Kanā, Māgadhi, Māgadha, Krsnā, Saundi.

Pippali, Māgadhi, Vaidehi (Charaka and Sushruta, 1000 BC).

Kanā, Krishnā (Shārangadhara Samhitā, thirteenth century), Māgadha, Māgadhā, Magadhikā, Magadhodbhavā, Pippalikam, Chapalā (Bhāvaprakāsha, sixteenth century).

HABITAT

Hotter parts of India from central Himalayas to Assam up to lower hills of West Bengal and ever green forests of Western ghats as wild, also cultivated in North East and many parts of the South.

In some hilly parts of the Vishakhapatnam district in Andhra Pradesh, long pepper is grown for its roots.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Long pepper;

Assam: Pipali;

Beng: Pipul;

Guj: Lindi peeper, Pipali;

Hindi: Pipar;
 Kan: Hippali;
 Mal: Pippali;
 Mar: Pimpali, Lendi pimpali;
 Ori: Pipali, Pippali;
 Punj: Magh, Magh pipali;
 Tam: Arisi tippali, Thippili;
 Tel: Pippalu;
 Urdu: Filfil daraz.

CONSTITUENTS

Essential oil and Alkaloids.

Essential oil 0.7%.

Alkaloid piperine 4%–5%; pipartine;^{2(a)} two new piperidine alkaloids pipernonaline and piperundecalidene,²⁵ N-isobutyldeca-trans-2-trans-4-dienamide, and a lignan *d*-sesamin have also been isolated.²⁵ Fruit also gave L-tyrosine, L-cysteine hydrochloride, DL-serine and L-aspartic acid.³²

For essential oil constituents, see References 2(a) or 25.

THERAPEUTIC AND OTHER ATTRIBUTES

Svasa, Kasa, Pliha roga, Gulma, Jvara, Prameha, Arsa, Ksaya, Udara roga, Hikka, Trsna, Krmī, Kustha, Sula, Ama vata, Amadosa

Used for asthma, cough, splenic diseases, abdominal lumps, fever, urinary disorders/polyuria, piles, emaciation, abdominal diseases, hiccup, excessive thirst, worm infestations, obstinate skin diseases, colic, rheumatism, and digestive disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

Used for diseases of the respiratory tract and as a cholagogue, carminative, sedative, hematinic and emmenagogue, and topically as a counter-irritant or analgesic.

See Reference 16a for classical uses.

IMPORTANT FORMULATION/ APPLICATIONS

Dry ginger, pippali fruit and maricha (Black pepper) is used as a composite drug (*trikatu*) for increasing bioavailability of the compound herbs.

Trikatu was included in Gudapippali, Amritaprāsha, Kaishore Guggulu (Bhaishajya Ratnāvali, seventeenth century) and Shivagutikā and Ayaskṛti (Ashtāngahridaya, seventh century).

Kumāryāsava (Shārangadhara Samhitā, thirteenth century) contains *Trikatu*, while that of Yoga Ratnākara (sixteenth century) contains *Piper chaba* and *P. cubeba* (AFI).

Pippalayādi yoga (not in the AFI) contains *Piper longum* and *Embelia ribes* and *borax*. It is an anti-estrogenic.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

Pippali Vardhamāna Rasayana (a unique Ayurvedic therapy) was prescribed by Charaka and Sushruta (1000 BC) for chronic and malarial fevers, arthritis, gout, asthma, chronic bronchitis, allergic conditions, and wasting diseases.

An infusion of three long peppers was given with honey or sugar on the first day, then for successive days the dose was increased by three peppers every day; thus, on tenth day, the patient took 30 peppers as one dose. After this, the dose was reduced by three peppers daily and finally the drug was withdrawn.

Pippali, triturated in its own decoction for 192 hours, was prescribed for asthma, cough, and cold.

For analysis of clinical and experimental studies, see Reference 18.

Piper nigrum Linn.

Marica

BOTANICAL SOURCE(S)

Piper nigrum Linn.
(Fam. Piperaceae)

Whole black pepper is often adulterated with fruits of *Lantana camara* and *Vitex altissima* and the seeds of *Carica papaya* and the dried and roasted berries of *Schinus molle*.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Marica (Fruit).

API, Part I, Vol. III.

Some of the high-yielding types are: Kalluvalli, Uthirancotta, Kottanandan, Karimunda and Kaniakadan.^{2(a)}

Malabar and Tellicherry peppers are mainly valued.^{2(a)}

AYURVEDIC SYNONYMS

Vellaja, Kṣṇa, Uṣaṇa.

Tikshna, Malina, Shyāmbhushaṇa.⁴

White Maricha is the dried, overmatured fruits of *Piper nigrum*, but in Bhāvaprakasha (sixteenth century), seeds of Shigru (*Moringa oleifera* Lam.) are described as Shveta maricha.³

Not to be confused with Mārīcha, equated with *Piper cubeba*; or with Maricha-patraka, equated with *Vateria indica*.

HABITAT

Cultivated from Konkan Southwards, especially in North Konkan Kerala, also in Assam.

In Kerala, pepper is grown in all districts, with major ones being Cannanore, Calicut, Kottayam, and Trivandrum districts.

REGIONAL LANGUAGE NAMES

Eng: Black pepper;
Beng: Golmorich, Kalamorich, Morich;
Guj: Kalimori;

Hindi: Kalimirch;
Kan: Karimonaru, Menaru;
Mal: Kurumulaku;
Mar: Kalamiri;
Punj: Galmirich, Kalimirch;
Tam: Milagu;
Tel: Miriyalu, Marichamu;
Urdu: Filfil Siyah, Kalimirich.

CONSTITUENTS

Alkaloids (Piperine, Chavicine, Piperidine, Piperetine) and essential oil.

Amides piperylin, piperoleins A and B and N-*iso*-butyl cicoso-*trans*-2-*trans*-4-dien-amide.³²

Essential oil from the fruits contained alpha- and beta-pinene, sabinene, myrcene, limonene, terpinene, *P*-cymene, bergamotene, caryophyllene, alpha-humulene, and its oxides, selinene, camphor, linalool, terpineol and nerolidol in varying amounts.³²

Used for anti-bacterial, anti-fungal activity.²⁰⁽²⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Śwāsa, Śūla, Kṛmīroga, Tvagroga

Used for asthma, colic, worm infestations, and skin diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) included seeds in prescriptions for rhinitis, cough, consumption, anemia, hyperlipemia, and fainting.²⁷ Sushruta (1000 BC) prescribed fruits in indigestion, intestinal catarrh, colic, persistent skin diseases, and urinary discharges; it was an ingredient of a paste for baldness and alopecia.²⁸ Powder of Pippali or Maricha is used for chronic dysentery (Ashtāngahridaya, seventh century); jaggery water, boiled and when cool, added with Maricha and honey is used for coryza (Vrindamādhava, eighth century). For obesity, one betel leaf, pounded with 10 g of Maricha, with cold water for at least two months (Vaidya Manorama, thirteenth century).^{16(a)}

**IMPORTANT FORMULATION/
APPLICATIONS**

Marichādi Gutikā (Shārangadhara Samhitā, thirteenth century), contains black pepper and long pepper as main plant drugs.
Used for cough, asthma, and catarrh.
Trikatu Churna (Bhaishajya Ratnāvali, seven-teenth century) contains all three components of *Trikatu*, *Piper longum*, *Piper nigrum*, and ginger in equal proportions. Used for digestive and catarrhal disorders and hyperacidity.
Marichādi Taila (Bhaishajya Ratnāvali) contains aconite as the main drug with 15 supporting herbs, with Maricha being one of them. It is processed with cow's urine. Used for leprosy, ringworm, and leucoderma.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

250 mg–1 g of the drug in powder form.
Piperine, isolated from *P. nigrum*, exhibited CNS-depressant and muscle-relaxant activities in mice; alcoholic extract of the fruit is reported to counter seizures in experimental epileptic models.
Piperine showed anti-pyretic activity in typhoid-vaccinated rabbits; and analgesic and anti-inflammatory activities in mice and rats. It is also reported to have beneficial effects on lipid peroxidation and hepatocellular protection.^{2(d)}
The drug is contraindicated with alcohol.¹⁸

Piper retrofractum Vahl.

Cavya

BOTANICAL SOURCE(S)

Piper retrofractum Vahl.
Syn. *P. chaba* Hunter non Blume. *P. officinarum* DC.
(Fam. Piperaceae)

stem of *Scindapsus officinalis* (Roxb.) Schott are sold as Gajapippali.)³

HABITAT

Cultivated, mainly in Southern India.
Native to Moluccas. Exported from Indonesia as Java long pepper.

**PHARMACOPOEIAL AYURVEDIC
DRUG**

Cavya (Stem). (Chavya.)
API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Cavikā. (Chavikā.)
Chavyana, Kola-vallikā.⁴
Fruit of Chavya: Shreyasī, Hasti-magadhā, Gaja-pippali.⁴
(In Kerala, sliced and dried inflorescences of *Balanophora indica* Wall. and pieces of the

REGIONAL LANGUAGE NAMES

Eng: Cubeb;
Assam: Chepaan;
Beng: Chei;
Guj: Chavka, Chavaka;
Hindi: Chavya;
Kan: Kadumenasinaballi, Chavya;
Mal: Kattumulaku, Kattumulakunveru;
Mar: Chavaka;
Ori: Chainkath;
Punj: Chabak;
Tam: Chavyam, Chevuyam;
Tel: Chevyamu;
Urdu: Peepal Chab, Kababah.
Eng: Java long pepper.^{2(a)}

P

CONSTITUENTS

Alkaloids, Glycosides and Steroids.

Stem yielded alkaloids piperine, pipartine, beta-sitosterol,²⁰⁽²⁾ glycosides, mucilage, and glucose and fructose.^{2(a)}

Presence of a smooth muscle relaxant active principle in the stem.^{2(a)} Aboveground parts yielded retrofractamides A, B, C, and D, sesamin and 3, 4, 5-trimethoxy-dihydroxy cinnamic acid.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa, Krimi, Plihā roga, Gulma, Ānāha, Udara roga, Śūla

Used for piles, worm infestations, splenic disease, abdominal lumps, tympanities, diseases of the digestive system, and colic (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Charaka (1000 BC) included the root and dried fruit in a medicinal ghee for consumptive cough, indigestion, change of voice, and emaciation.²⁷ Sushruta (1000 BC) prescribed Chavya for colic, intestinal mucus and catarrh,

as well as for erysipelas, fever, asthma, internal tumors, and chlorosis.²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Prāṇḍā Gutikā (Bhaishajya Ratnāvali, seventeenth century), contains Chavya as a supporting herb with *Piper longum* fruit, root and *Piper nigrum*. Covers all therapeutic uses incorporated in the API.

Chandrāmṛta Rasa (Rasāmṛta) is a mercury-based herbo-mineral drug that contains nine supporting herbs, all in equal proportions, including *Trikatu* and Chavya. Used for cough, asthma, fever, and diarrhea with blood.

Chavyādi Ghritam (not in the AFI, Sahasrayoga, CCRAS text) contains Chavya and *Trikatu* with nine supporting herbs. Used for dysuria, rectal prolapse, and dysentery.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g of the drug in powder form.

LD₅₀ of the ethanolic extract of stem was found to be >1000 mg/kg i.p. in mice.²⁰⁽²⁾

Pistacia chinensis Bunge

Karkaṭaśṛṅgi

P

BOTANICAL SOURCE(S)

Pistacia chinensis Bunge

Pistacia integerrima Stew ex Brandis

Rhus succedanea Linn.

(Fam. Anacardiaceas)

PHARMACOPEIAL AYURVEDIC DRUG

Karkaṭaśṛṅgi (Gall).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Śṛṅgi, Viṣāṇī, Karkaṭa.

Karkaṭa śṛṅgikā, Kulira śṛṅgi, Vakra, Mahā ghorā, Śṛṅgi-nāmnī, Natāṅgi.⁴

Kulira, Kulira śṛṅgi, Viṣāṇikā, Karkatki, Karkatāhvā.³⁰

HABITAT

Western Himalayas from Indus to Kumaon at an altitude of 350–2400 m, often cultivated in Punjab plains.

Found in Afghanistan to China and Philippines,¹ the Mediterranean regions to East Asia, and in Mexico and Texas. Two species are found in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Crab's claw;
 Assam: Kakiarsngi;
 Beng: Kankda Shringi;
 Guj: Kakada shing, Kakada singi;
 Hindi: Kakadasingi, Kakarasingi, Gheekadava;
 Kan: Kakadasingi, Karkatakasringi;
 Kash: Kakkar, Kamaladina;
 Mal: Karkatasringi;
 Mar: Kakadshingi;
 Ori: Kakadashrungi, Kakadashringi;
 Punj: Kakar, Kakarsingi;
 Tam: Karkata singi;
 Tel: Kakarsingi, Karkatakashrungi;
 Urdu: Kakrasinghi.

Eng: Chinese Galls, Japanese Galls.⁶

CONSTITUENTS

Essential oil, tannins and resinous matters.

The essential oil from galls (Himachal Pradesh) contains alpha-pinene 21.8%, beta-pinene 16.2%, alpha-phellandrene 15.5% and car³-carene 11%, in addition beta-phellandrene, gamma-terpenene, alpha- and beta-terpenol, limonene, delta-pinene, and *cis*- and *trans*-beta-octimene.^{2(c)}

Galls contain tannins (20%–75%) and resin (5%).^{2(a)} The lanostane and triucullane type of triterpenoids pistacigerrimones A, B, C, D, E, and F have been isolated,^{2(d)} as well as pistacienoic acids, a triterpene alcohol, and beta-sitosterol.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Śvāsa, Kāsa, Hikkā, Kṣaya, Aruci, Chardi

Used for fever, asthma, cough, hiccup, phthisis, tastelessness, and emesis (therapeutic uses based on texts from the 1000 BC to sixteenth century).

Sushruta (1000 BC) prescribed it for spermatogenesis, for increasing breastmilk and as a spermatopoietic, and as an ingredient of a medicated oil for the quick healing of wounds.²⁸ Sushruta included Karkataśringi in the Kākolyādi group. Charaka included it in a group that is aphrodisiac.³⁰

It seems that classical Karkṭśringi was a different drug.

The gall of *P. chinensis*, now used as Karkataśringi, pacifies deranged cough; it is used in fever, pulmonary afflictions, diarrhea, dysentery, externally in psoriasis and as a decoction in bleeding gums.¹⁵ Not used as an aphrodisiac as prescribed in older classical texts.^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Bālachaturbhadraṁki Churna (Bhaishajya Ratnāvali, seventeenth century), contains 4 plant drugs including Śringi galls, in equal proportion. For acute diarrhea, emesis, cough, asthma, fever, and emaciation in children.

Śringyādi Chūrṇa (Shārangadhara Samhitā, thirteenth century, AFI, not quoted in the API) contains Śringi, aconite and pippali in equal proportions. Used for cough, asthma, fever, and respiratory diseases.

Śringyādi Churnam (Sahasrayoga, a non-Samhitā, Kerala Materia Medica; three compounds, CCRAS texts) is used for cough, asthma, and respiratory disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of drug in powder form.

Karkataśringi was a different drug during the period of Charaka and Sushruta³⁰ and Ashtāngasangraha (sixth century); it was used as a potent aphrodisiac.^{16(a)}

Pistacia lentiscus Linn.

Rūmīmastagī

BOTANICAL SOURCE(S)

Pistacia lentiscus Linn.
(Fam. Anacardiaceae)

Imported into India.

PHARMACOPOEIAL AYURVEDIC DRUG

Rūmīmastagī (Resin).

API, Part I, Vol. V.
Mastagi.³⁷
(An Unani drug.)³⁷

AYURVEDIC SYNONYMS

Kundur-rūmi, Rūmi.⁶³

HABITAT

Indigenous to the countries bordering on the Mediterranean.

Found in Portugal, Turkey, on the Canaries, and in tropical Africa.

Main source of supply is the island of Chios in the Aegean Sea. Grows up to an altitude of 500 m.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Mastic;
Beng: Rumi-mastungi;
Guj: Rumi mastagee;
Hindi: Rumi mastagee, Rumi mastiki, Mastagee;
Mar: Rumaa mastakee;
Urdu: Rume mastagee.

Eng: Lentisk.¹⁴

CONSTITUENTS

Resin, volatile oil, a bicyclic terpenoid and fatty acids.

Resin (90%): chief components are the triterpenes mastic acid, iso-mastic acid, oleanolic acid and tirucallol.

Polymers, 1, 4-poly-beta-myrcene, alpha-beta-masticoresins and a polymeric proanthocyanidin.¹⁴

Volatile oil (1%–3%), contains 69 components, major constituents are alpha-pinene, myrcene caryophyllene and germacrene-D.³¹

THERAPEUTIC AND OTHER ATTRIBUTES

Mūtrakṛcchra, Kāsa, Śvāsa, Ādhmāna, Agnimāndya, Grahni, Raktasrāva, Vatapittaja vikāra, Śoṭha

Used for dysuria, cough, asthma, flatulence, digestive impairment, malabsorption syndrome, hemorrhage, neurological and metabolic disorders and edema (therapeutic uses based on Sanskrit *slokas* composed by two contemporary scholars).

Clinical data are available on the anti-bacterial activity of mastic gum against pathogens such as *Streptococcus mutans* and *Lactobacilli*, primarily associated with dental caries. Animal studies are available on the anti-secretory and cytoprotective effects of mastic. Duodenal ulcer healing and anti-bacterial action against *H. pylori* in clinical studies showed conflicting results. Mastic exhibited anti-bacterial as well as anti-fungal activity *in vitro*.¹⁴

IMPORTANT FORMULATION/ APPLICATIONS

Elādi, Kameda, Sukrama vati: could not be traced. Mastic resin is imported into India. It is used in Unani medicine.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g.

Mastic resin has been studied as a treatment for duodenal ulcers at a daily dose of 1 g (for 2 weeks).¹⁷

Pistia stratiotes L.

Jalakumbhī

BOTANICAL SOURCE(S)

Pistia stratiotes L.
(Fam. Araceae)

Pistia stratiotes var. *cuneata* Engl.^{2(c)}

PHARMACOPOEIAL AYURVEDIC DRUG

Jalakumbhī (Whole plant).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Kumbhikā, Vāriparṇī.

HABITAT

Tropical and sub-tropical regions of India.

An aquatic plant, stoloniferous, floating on lakes, streams and stagnant, lime-rich water throughout India. Distributed in tropical and subtropical regions of Asia, Africa and America. Forms a dense mat on the water surface and causes serious clogging.

REGIONAL LANGUAGE NAMES

Eng: Water lettuce;
Ben: Tokaapaanaa;
Guj: Jalakumbhi, Jalashamkhala;
Hindi: Choti jala-kumbhi, lalakumbhi;
Kan: Antara gange;
Mal: Akasa thamara, Kudapayal, Muttapayal;
Mar: Prasni, Gondali;
Ori: Borajhanji;
Tam: Akasa tamarai, Koditamarai;
Tel: Antara-tamara, Nirubuduki;
Urdu: lalakumbhi.

Eng: Shellflower, Water cabbage,¹⁸³ Tropical duckweed.^{2(a)}

CONSTITUENTS

Flavonoids like vicenin, lucenin and cyanidin-3-glucoside.

Plant gave 2-di-C-glucosylflavones of vicenin and lucenin types, anthocyanin-cynidin-3-glucoside, luteolin-7-glucoside and mono-C-glucosyl flavones vitexin and orientin. Stigmasta-4, 22-dien-3-one, stigmasterol, stigmasteryl stearate and palmitic acids are reported.¹⁸³ The ash is rich in potassium chloride and sulfate.³² The plant contains phytocide-type anti-bacterial substances.^{2(d)} The leaves possess anti-fungal properties.¹⁸³

THERAPEUTIC AND OTHER ATTRIBUTES

Arsa (piles), Daha (burning sensation), Galaganda (goitre), Jvara (fever), Kustha (Leprosy/diseases of skin), Mutrakrcchra (dysuria), Sosa (emaciation), Raktapitta (bleeding disorder). (Therapeutic uses based on a text of fifteenth century.)

For goiter: the ash of Jalakumbhī, cooked in cow's urine and strained, was taken along with a Kodo millet and buttermilk diet (Vrindamādhava, eighth century?);^{16(a)} the ash, mixed with Pippali powder and salt, was given internally; the ash was also applied topically (Bhāvaprakāsha, sixteenth century).³ For treating leprosy, the whole plant of Jalakumbhi, powdered and mixed with honey, was given in the morning. For piles, powdered Jalakumbhi and curryleaf were taken with honey (Vaidya Manorama, thirteenth century).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Jalakumbhī-bhasma-prayogah (Bhāvaprakāsha, sixteenth century): Bhasma (ash) paste was applied externally for treating goitre.³ Plant: demulcent, anti-septic, anti-dermatophytic, anti-fungal, anti-microbial.^{32,183} Leaf: anthelmintic, anti-dysenteric, anti-asthmatic, anti-leprotic, anti-syphilitic, bechic; used in eczema, ulcer, piles, hemorrhoids; used externally in chronic skin diseases. Root: emollient, laxative, diuretic. Ash: applied to ringworm of the scalp.³²

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (powder): 3 to 5 g. Svarasa (juice): 10 to 20 mL.

Plant absorbs heavy metals like zinc and lead from wastewater. Cultivating the plant

in wastewater treatment ponds significantly increases the removal of organic and mineral substances, as well as harmful microorganism.^{2(d)}

Plantago lanceolata L.

Vanya-aśvagola

BOTANICAL SOURCE(S)

Plantago lanceolata L.
(Fam. Plantaginaceae)

Eng: Buckthorn plantain, English plantain, Ribgrass, Petit plantain.¹⁹

PHARMACOPEIAL AYURVEDIC DRUG

Vanya-aśvagola (Fresh Leaf).

API, Part I, Vol. VI.

Sanskritized version of wild isubgol.

CONSTITUENTS

Chlorogenic acid, chrysophanic acid, emodin, luteolin, plantaginidin, scutellarin, aesculetin.

A mucilage of leaves was composed of L-arabinose 4.6%; L-rhamnose 4.6% and uronic acid 6.9%. A water-soluble alpha-D-glucan was separated.^{2(a)}

Leaves contain tannin 2.1%; carotene 0.56 mg/100 g; and thiocyanogen 20 mg/100 g (of leaf juice). The alkaloid content is 0.26%.^{2(a)}
The glucoside aucubin is present in the leaves and roots.^{2(c)}

AYURVEDIC SYNONYMS

Vanya-iśadgola, Meṣa-jihvā.

(Non-classical synonyms.)

HABITAT

Western Himalayas. Also cultivated throughout the greater part of India.

Found from Kashmir to Shimla.^{2(a)}

Indian plant is referred to var. *mediterranea* (Kerner) Pilger.^{2(a)}

Also distributed in North Africa, Temperate Asia, Europe and widely naturalized elsewhere.¹⁹

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa (piles), Karnaśūla (otalgia), Aśṛāgdara (menorrhagia or metrorrhagia or both), Dantaśūla (toothache), Kāsa (cough), Raktasrāva (haemorrhage), Śoṭha (oedema), Śvāsa (asthma), Vraṇa (ulcer).

Used as single drug.

For therapeutic uses, classical sources are not quoted.

REGIONAL LANGUAGE NAMES

Eng: Ribwort;

Ben: Bartung;

Hindi: Baltanga, langali isabgola;

Kan: Siriportlagida;

Mar: Baltang;

Pun: Kashur-gul;

Tel: Adavi ishapogorulu;

Urdu: Bartang.

IMPORTANT FORMULATION/APPLICATIONS

Leaves and their aqueous extracts promote epithelial growth, diminish hyperthermia and accelerate promotion of scab. Alcoholic extract of young leaves showed antibacterial action against *Streptococcus betahaemolyticus*,

Micrococcus pyogenes var. *aureus*, and *Bacillus subtilis*.^{2(a)}

The leaves and roots are considered astringent, vulnerary and alterative; used for cough, asthma, and pulmonary diseases. Leaves, are used topically on wounds, inflamed surfaces, and sores.^{2(a)} In Turkish traditional medicine, the leaves are used against parasites on animals; a decoction is used to wash the cancerous uterus; leaves pounded with salt are used for wound healing; fresh leaves are eaten for stomach upset.^{2(c)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

Patra Svarasa (Leaf juice): 5 to 10 mL.

The aerial parts of *Plantago asiatica* Linn. are used as an anti-inflammatory and anti-asthmatic drug in China and Japan. Plantaglucide, isolated from the leaves of *P. asiatica*, showed anti-ulcer activity in several mouse models.^{2(c)}

Pluchea lanceolata Oliver & Hiern.

Rāsnā

BOTANICAL SOURCE(S)

Pluchea lanceolata Oliver & Hiern.
(Fam. Asteraceae).

P. lanceolata C.B. Clarke.³²

Polygonum glabrum Willd. has been sold for decades in Varanasi markets as Rāsanā. *Vanda roxburghii* R. Br. is used in Bengal. *Dodonaea viscosa* Linn. is used in Andhra Pradesh.

Heliotropium strigosum Willd. is sold in Bihar.³ Reference 15 equated *Vanda roxburghii* with Rāsnā.

P. lanceolata is the official Rāsnā; the substitute plant drug is *Alpina galanga* Willd. (used in South India). AFI, Part I, page 323.

Sandy or saline soils of Gujarat, Rajasthan, Punjab, and the upper Gangetic plains as far as Kanpur.³²

REGIONAL LANGUAGE NAMES

Assam: Rasnapat;
Beng: Rasna;
Hindi: Rayasan, Rayasana, Rasna;
Kan: Rasna, Dumme-rasna;
Mar: Rasna, Rayasana

CONSTITUENTS

Flavonoids – Quercetin and Isorhamnetin.

Plant gave choline, pluchine, taraxasterol and beta- and gamma-sitosterol.³²

Leaves contain the pentacyclic ursane-type triterpene pleuchioside; the sterol pleuchiol; 23-methyl-dotriacontan-3-one, and 22-methylhentriacontane-3,19-dione.

The stem and leaves contain moretenol, moretenol acetate, neolupenol, octacosanoic, hexacosanoic, and tetracosanoic acids, tetracosanol, hexacosanol, triacontanol, stigmasterol, and beta-D-glucoside.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śoṭha, Vātavyādhī, Swāsa, Kāsa, Jwara, Udararoga, Sidhma, Aḍhyavāta, Āmavāta, Vātarakta

P

PHARMACOPOEIAL AYURVEDIC DRUG

Rāsnā (Dired leaf).

API, Part I, Vol. III.

The drug available on the market as Rāsnā patra (leaf) is the leaf of *Pluchea lanceolata*, while Rāsnā mūla (root) or simply Rāsnā is the root of *Vanda tessellata* G. Don.³⁶

The leaf is used as a substitute of *Cassia senna* Linn.

AYURVEDIC SYNONYMS

Suvahā, Sugandhā, Yuktā

HABITAT

In sandy soils in upper Gangetic plain and Rajasthan.

Used in inflammation, neurological disorders, asthma, cough, fever, diseases of the abdomen, pityriasis versicolor, stiff joints, rheumatism, and gout (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Anti-edema activity (experimentally)—petroleum extract of stem and leaves 500 mg/kg p.o. 31.9%; chloroform-soluble portion of the methanolic acetate, moretenol and neolupenol at a dose of 50 mg/kg p.o. 55.2%, 32.8% and 39.7%, respectively, compared with Ibuprofen exhibiting 65.5%.^{2(c)}

IMPORTANT FORMULATION/APPLICATIONS

Quoted compounds contain Rāsnā as a supporting drug.

In Rāsnādi Kvātha Churna (Mahā), Sharangadhara Samhitā (thirteenth century), Rāsnā is the main plant drug (not quoted in the API).

All OTC massage oils used for rheumatic and nervine disorders prepared in Kerala and Tamil Nadu contain rhizomes of *Alpinia galanga* (Amavāta Taila, Kubja Prasārini Taila, Nārayana Taila and Mahā-vishagarbha Taila).

Mahāmāsha Taila of the South, specific for arthritis, neuritis, and muscular atrophy, contains goat's meat, while that of the North contains backgram as Māsha.

DOSAGE/USAGE/CAUTIONS/COMMENTS

25–50 g (Decoction).

Opinions differ with regard to plant part used as Rāsnā.³⁶

Roots and rhizomes of *Alpinia galanga* and *Vanda roxburghii* are sold as Rāsnā; dried leaves of *P. lanceolata* are known as Rāsnā patra.³⁶

Plumbago indica L.

Rakta Citraka, Chitraka

BOTANICAL SOURCE(S)

Plumbago indica L. Syn. *P. rosea* L. (Vol. VI) (Fam. Plumbaginaceae)

P. zeylanica Linn. (Vol. I)

Three varieties of Chitraka are mentioned in classical texts based on the color of the flower: red, white or black (blue). Vúgabhatta (sixth–seventh century) mentions a yellow-flowered variety instead of the red one.

The white-flowered variety (*Plumbago zeylanica* L.) is used in North India. The red-flowered variety (*P. indica*) is used in South India⁵ and Bengal.³ The black (blue)-flowered variety is possibly *P. auriculata* Lam. (= *P. capensis* Thumb.), and is not used as a source of Chitraka.^{5,30}

PHARMACOPOEIAL AYURVEDIC DRUG

Rakta Citraka (Root).

API, Part I, Vol. VI.

Chitraka (root).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Rakta chitraka: Analanāmā.

Chitraka: Agni, Vahni, Jvalanākhyā, Kṛṣṇāṇu, Huṭāśa, Dahana, Hutabhuk, Sikhī

Common synonyms: Agni, Agnika, Anala, Jyoti, Dahan, Nirdahan, Nirdahanī, Vahni, Vinirdahanī, Shikhi, Hutāshṇa.³⁰

In South India, Rakta chiraka is considered to be therapeutically more active.^{5,36} The roots as well as the root bark of *P. indica* form an important indigenous drug, but are less commonly used than those of *P. zeylanica*.^{2(a)} (Plumbagin is present in both, at about 0.9%.^{2(a)})

HABITAT

Rakta chitraka: Occurs all over India, cultivated or as an escape, roots are harvested at maturity.

Chitraka: found throughout India in the wild state and occasionally cultivated in gardens.

Plumbago: 24 species are found in tropical and warm regions, from the Mediterranean to Central Asia, as well as in South Africa and Southeast Asia.¹

Three species are found in India.^{2(a)}

REGIONAL LANGUAGE NAMES

P. indica:

Eng: Lead wort, Rosy flowered lead wort;

Assam: Ranga agyachit;

Ben: Rakto chita, Lai chitra;

Guj: Lal-chitrak, Rato-chatro;

Hindi: Lal-chita, Rakta-chita;

Kan: Kempacitramulam, Kempu chitramula;

Mal: Chuvannakkoduveli;

Mar: Lai chitrak;

Ori: Rangachitaparu;

Tam: Kotivel, Cenkotivel;

Tel: Errachitramulam;

Urdu: Cheetaa.

Eng: Rose-coloured leadwort.¹⁵

P. zeylanica:

Eng: Leadwort;

Hindi: Chitra;

Mal: Vellakeduveli, Thumpokkoduveli;

Tam: Chitramoolam; Kodiveli;

Urdu: Shhetraj;

Hindi: Cheetaah.

Eng: White leadwort¹⁵, Ceylon leadwort³²

CONSTITUENTS

P. indica root:

Quinones and naphthaquinones such as isoshinanone, plumbagic acid vanillic acid and zeylanone.

Root contains roseanone, droserone, zeylanone, and elliptinone.^{2(d)} Aerial parts contain naphthoquinone and 6-hydroxy plumbagin, in addition to plumbagin, sitosterol, stigmasterol, and campesterol.^{2(c)}

P. zeylanica root:

Plumbagin.

Naphthaquinone derivatives, pumbagin, 3-chloroplumbagin, 3,3'-biplumbagin, elliptinone, chitranone, droserone, zeylanone, *iso*-zeylanone, 1, 2(3)-tetrahydro-3,3'-biplumbagin, and plumbazeylanone.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Rakta chitraka: Arsa (piles), Grahani (malabsorption syndrome), Kasa (cough), Krmi (helminthiasis), Kustha (Leprosy/diseases of skin), Pandu (anaemia), Sikatameha (Lithuria), Sotha (oedema), Sula (pain). Used as single drug.

Chitraka: Agnimandya, Gahani roga, Arsa, Udara sula, Gudasotha.

(Therapeutic uses of both the species based on texts from 1000 BC to sixteenth century.)

P. indica: plumbagin, in small doses, has a stimulant action on the central nervous system, on plain muscles and on the secretion of sweat, urine and bile. Blood pressure shows a slight reduction. The root is used in dyspepsia, flatulence, and piles. The root extract in oil is used externally in rheumatic afflictions of the joints and paralytic conditions.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Chitrakādi vati (Charaka Samhitā, 1000 BC).

Chitraka root is among 11 plant drugs and 5 salts. For digestive disorders and malabsorption syndrome.

Chitrakaharitaki (Bhāvaprakāsha, sixteenth century); Chitraka root is among four plant drugs and *Dashamūla*, with nine supporting herbs. Used as a digestive, carminative, and expectorant and in abdominal obstructions.

Chitrākadi Churna (Shārangadhara Samhitā, thirteenth century); Chitraka root is among eight main plant drugs, with eight supporting herbs. Used for digestive disorders and malabsorption syndrome.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

P. indica: Curna (powder): 0.5 to 2 g.

P. zeylanica: 1–2 g of the drug in powder form.

Plumbagin induces anti-implantation, abortifacient, and anti-ovulatory activities, and causes selective testicular lesions in dogs.³² In South India, it is valued as a remedy for secondary syphilis and leprosy.^{2(a)} The alcoholic extract of the root was reported to have tumor-inhibiting and radio-sensitizing effects on mouse tumors.^{2(d)}

Polygonatum cirrhifolium Royle**Mahāmedā, Medā****BOTANICAL SOURCE(S)**

Polygonatum cirrhifolium Royle
(Fam. Liliaceae)

Identified as both Mahāmedā and Medā in API,
Vol. V and VI.

Polygonatum verticillatum (L.) Alloini has been
identified as Medā.^{30,184}

Asparagus racemosus Willd. is the substitute of
Medā and Mahāmedā.^{3,184}

**PHARMACOPEIAL AYURVEDIC
DRUG**

Mahāmedā (Rhizome & root)

API, Part I, Vol. V.

Meda (rhizome).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Mahāmedā: Vasucchidrā, Tridanti, Devamañi.

Vasu chhidrā, Tridantā, Devatāmañi.⁴

Medā: Mañichidrā, Dharā, Sutragrapatrā.

Shālyaparni, Abhayā, Adharā⁴

HABITAT

Mahāmedā: Temperate Himalayas.

Medā: temperate Himalayas from Shimla east-
ward to Bhutan and Manipur up to an altitude
of 1500–3300 m.

Found in the temperate Himalayas from
Himachal Pradesh eastwards to Sikkim at
an altitude of 1500–3000 m, in Manipur
at an elevation of 1200 m and in regions
of Uttarakhand up to an elevation of
2000–3000 m.¹⁸⁴

Meda: *Polygonatum verticillatum* (L.) Allioni:
found in the temperate Himalayas from
Kashmit (at an altitude of 2000–3600 m) to
Sikkim (at an altitude of 2600–4000 m above
sea level). Also found in Himachal Pradesh and
Uttarakhand (1600–3500 m).¹⁸⁴

REGIONAL LANGUAGE NAMES

Eng: Mahameda;

Hindi: Mahameda; Devarigaala;

Kan: Mahamedha;

Mal: Mahameda;

Tam: Mahameda;

Tel: Mahameda.

Eng: King Solomon's seal, Coiling leaved
Solomon's seal.¹⁸⁴

Medā: Assam: Meda;

Ben: Meda; Guj: Meda;

Hindi: Medaa;

Kan: Medhaa;

Mal: Meda;

Mar: Meda;

Ori: Meda;

Pun: Meda;

Tel: Meda.

Eng: Whorled Solomon's seal. *P. multiflorum* All.
is equated with Solomon's seal.^{13,31}

CONSTITUENTS

Mahāmedā: Glucose, Sucrose. Meda: Steroidal
saponins (diosgenin), proteins and resins.

Steroidal saponins sibiricoside A and B; *n*-butanol
extract contained steroid terpenoid, polysac-
charides, phenol and tannin; alpha-L-rhamno-
pyranosyl, beta-D-glucopyranoside, dauvosterol,
beta-sitosterol-6-nonadecenoic acid, and 6-stea-
ric acid have also been identified.¹⁸⁴

P. verticillatum: rhizomes contain lysine, serine,
aspartic acid, threonine, beta-sitosterol,
sucrose, and glucose.¹⁸⁴

**THERAPEUTIC AND OTHER
ATTRIBUTES**

Mahāmedā: Jvara, Raktavikāra, Kṣaya, Dāha,
Raktapitta, Bālaroga, Kāmalā, Kṣata, Kṣīṇa

Used for fever, blood disorders, phthisis, burn-
ing sensation, bleeding disorders, infantile
ailments, jaundice, wounds, and impairment

(therapeutic uses based on texts from 1000 BC to sixteenth century).

Medā: Balaroga (disease of children), Bhagandara (fistula-in-ano), Gulma (abdominal lump), Kamala (jaundice), Karsya (emaciation), Kasa (cough), Ksaya (phthisis), Naktandhya (night blindness), Netrasrava (chronic dacrocystitis or epiphora), Rajayaksma (tuberculosis), Raktapitta (bleeding disorders), Sosa (emaciation), Svasa (asthma), Timira (cataracts), and Visarpa (erysipelas).

IMPORTANT FORMULATION/ APPLICATIONS

In all quoted compounds. Mahāmēda and Medā are used as a constituent of the *Ashta varga*

(the “Eight Tonic Herbs”) of classical Ayurveda which was included in prescriptions for senility debility and as a rejuvenating tonic. Even during classical period. *Ashta varga* was not easily available. Substituents were recommended.^{3,4,184}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Rhizomes of *P. verticillatum* are valued as Salep.^{2(a)} *Orchis latifolia* Linn. is an aphrodisiac and nerve tonic.⁷

In Unani medicine, *P. verticillatum* is equated with Shaqāqul (substitute for *Pastinaca secacul*, Linn.), an aphrodisiac and spermatogenetic agent.⁷

Pongamia pinnata (Linn.) Merr.

Karañja

BOTANICAL SOURCE(S)

Pongamia pinnata (Linn.) Merr. Syn. *Pongamia glabra* Vent.
(Fam. Leguminosae)

P

Syn. *Derris indica* (Lam.) Bennet (Fam. Fabaceae, Papilionaceae).^{2(c)}

Karañja of classical Ayurvedic period is associated with three plant species:

Pongamia pinnata (Karañja, Karañjakā, Naktamāla); *Caesalpinia crista* Linn.

(Nātākarañja, Kāñṭā/Latākarañja); and

Holoptelea integrifolia Planch. (Pūtikarañja, Chirbilva, Pūtika).^{3,30}

PHARMACOPOEIAL AYURVEDIC DRUG

Karañja (Seed).
API, Part I, Vol. I.

Karañja (leaf).
API, Part I, Vol. II.

Karañja (stem bark).
API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Karañjaka, Naktamāla, Naktāhva, Ghṛtakarañja.

HABITAT

Almost throughout India up to an altitude of 1200 m.

Distributed eastwards, chiefly in littoral regions of Southeastern Asia and Australia.^{2(a)}

The tree is considered to be a native of Western Ghats and is chiefly found along the banks of streams and rivers or near the sea coast in beaches and tidal forests.^{2(a)}

Pongamia: indigenous to the Indo–Malesian region.¹

REGIONAL LANGUAGE NAMES

Eng: Smooth leaved pongamia;

Assam: Korach;

Beng: Nata Karañja, Dahara Karañja;

Guj: Kanaji, Kanajo;

Hindi: Dithouri, Karuaini;

Kan: Honge, Hulagilu;

Mal: Avittal, Ungu, Unu, Pungu;

Mar: Karanja;
Ori: Karnja;
Punj: Karanj;
Tam: Pungan, Pongana;
Tel: Lamiga, Kanuga;
Urdu: Karanj.

Eng: Indian beech,¹ Pongum oil tree, Hongay oil tree.³²

CONSTITUENTS

Seed:
Fixed oil, flavones and traces of essential oil.

Fixed oil 27%–39%.^{2(a)} Seeds and seed oil (Pongamam oil) gave karanjin, pongamol, pongapin and kanjone. Seeds also gave lanceolatin B, iso-pongachromene, and pongaglabrone. Glabrachalcone (a chromeonochalcone) was also isolated from the seed oil, which also gave fatty acids oleic 56.9%, linoleic 19.8%, myristic 0.6%, palmitic 13.8%, stearic 7.1%, and arachidic 1.6%, along with beta-sitosterol.^{25,32}

THERAPEUTIC AND OTHER ATTRIBUTES

Vrana, Krmi, Kustha

Used for ulcers, worm infestations and obstinate skin diseases including leprosy (therapeutic uses based on texts from 1000 BC to sixteenth century).
Sushruta (1000 BC) prescribed the fruits internally in leprosy, internal tumors, piles and urinary and vaginal discharges; seeds with honey for intrinsic hemorrhage; oil internally as a

laxative and in intestinal parasites and urinary diseases; externally in dermatosis, rheumatic afflictions, and muscular atrophy; and as an ingredient of a hair oil for baldness.^{16(a),28}
Oil of Karanja was applied topically on leprotic wounds (Sushruta Samhitā).^{16(a)}
The aqueous extract of the seeds showed significant anti-viral activity against herpes simplex viruses HSV-1 and 2 cell lines experimentally, and also showed protective properties against sunburn.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Āragavadhādi Kvātha Churna (Ashtāmgahridaya, seventh century), contains 20 plant drugs, in equal proportion, including Karanja root (not seed) and Chirbilva leaf. For toxemia, urinary disorders, skin diseases (AFI).
Pathyādi Lepa (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains seven plant drugs, including Karanja seeds, processed in cow's urine. Used for obstinate skin diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

0.25 g of the drug in powder form.
5–10 g of the drug for decoction.
In toxicological studies, Karanja oil and other fractions (acid, arid, basic and neutral fractions) were found to be toxic.²⁰⁽²⁾
The oil showed potent anti-bacterial and anti-fungal activities. It was found to be more potent than neem oil.²⁰⁽²⁾

P

Leaf

CONSTITUENTS

Leaf:
A new Furanoflavone-3'-methoxy pongapin in addition to Karanjin, Kanjone and its two isomers 7-methoxyfurano- (4'', 5'', 6, 5) - flavone and 8-Methoxyfurano-(4'', 5'', -6, 5) - flavone

and 8-methoxy-furano - (4'', 5'' 6, 7)-flavone. (see References 32, 20–22).
Leaf galls contain prenylated beta-ketones and pongagallone A and B, in addition to pongapin, acrylamide, and glabrin.^{2(c)}
Leaves contain four triterpenoids, cycloart-23-ene-3-beta 25-diol, friedlin, lupeol and lupenone,

and four furanoflavones, karanjin, 5-methoxy-furano-(4', 5'', 8, 7)-flavone, pongapin and 3'-methoxypongapin. They also contain pongachromene, kanugin and beta-sitosterol.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kustha, Krmiroga, Vrana, Kandu

Used for obstinate skin diseases including leprosy, worm infestations, and pruritus (therapeutic uses based on texts from 1000 BC to sixteenth century).

Leaves soaked in ox bile and made into an ointment were used topically in dermatosis. Dried powder of leaves, in prescriptions, was given internally for pain of the stomach and diseases of the spleen.²⁷

Tender leaves, fried in oil and *ghee* and added to parched grain flour, were given as a carminative and laxative (Charaka Samhitā, 1000 BC).^{16(a)}

Liquid gruel, cooked with leaves of Karanja, was given to check vomiting (Sushruta Samhitā, 1000 BC).^{16(a)}

Juice of the leaves is prescribed in flatulence, dyspepsia, diarrhea and cough, and externally a remedy for leprosy and gonorrhea.^{2(a),32} The aqueous extract of leaves showed wound-healing properties in rabbits.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Jātyādi Taila (Shārangadhara Samhitā, thirteenth century), contains 18 plant durgs including Naktamāla (Karanja) leaf, as well as seed, all in equal proportion.

Externally for non-healing ulcers.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

For external use only.

Stem bark

CONSTITUENTS

Stem bark:

Flavones and Furanoflavones like Karanjin, Pongapin, Demethoxy- kanugin, Kanugin, Pinnatin, Tetra-o- Methylfisetin, Gamatin, 5-Methoxyfurano (2'', 3'', 7:8), flavone & two new Furano compounds Glabra- I and Glabra-II. It also contains alkaloids and Triterpenoid saponin. (Source: Reference 32.)

Stem bark contains natural chromenoflavone, (–)-isoglabrachromene and two esters, hexacosanyl caffeate, and tricontanyl caffeate, along with known flavonoids, glabra chromene, ovalitenone, pongachromene, a new chromenochromone (pongalfavone), lanceolatin B, karanjin, pongapin, glabra II, kanugin, desmethoxykanugin, fisetin-tetramethyl ether, and betulinic acid. Bark also contains two phenylpropanoids, pongapinone A and B.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kustha, Kandu, Dustavrana, Prameha, Yoniropa, Krmiroga, Antravidradhi, Vidradhi

Used for obstinate skin diseases including leprosy, pruritus, non-healing ulcers, urinary disorders/polyuria, vaginal diseases, worm infestations, intestinal abscesses, and abscesses (therapeutic uses based on texts from 1000 BC to sixteenth century).

Fresh stem bark is given internally in bleeding piles. A decoction is used for beriberi.^{2(a)}

The alcoholic and aqueous extracts of the fresh bark are reported to exhibit marked anti-bacterial activities against *Micrococcus pyogenes* var. *aureus*.^{2(a)}

The aqueous extract of the stem bark shows significant sedative and anti-pyretic effects in rats and anti-spasmodic and spasmogenic effects *in vitro* on smooth and skeletal muscles, respectively.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Brhan manjishṭhādi Kvātha Churna (Shārangadhara Samhitā, thirteenth century), contains 45 plant drugs including Karanja stem bark, all in equal proportion.
For chronic skin diseases.
Mustakākaranjādi Kvātha Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains eight plant drugs, including Karanja stem bark,

all in equal proportions. Used for diarrhea and colic.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g of the drug in powder form.

Higher doses of kanugin and desmethoxykanugin, isolated from the stem bark, led to clonic convulsions in rats.²⁰⁽²⁾

Pongamia pinnata (Linn.) Merr.

Root, root bark

Karañja

BOTANICAL SOURCE(S)

Pongamia pinnata (Linn.) Merr. Syn. *P. glabra* Vent (Fam. Fabaceae)

Karanja of the classical Ayurvedic period is associated with three plant species: *Pongamia pinnata* (Karanja, Karanjakā, Naktamāla); *Caesalpinia crista* Linn. (Nātākaranja, Kāntā/Latākaranja); and *Holoptelea integrifolia* Planch. (Pūtikaranja, Chirbilva, Pūtika).^{3,30}

of streams and rivers or near the sea coast in beaches and tidal forests.^{2(a)}

Pongamia: indigenous to the Indo–Malesian region.¹

REGIONAL LANGUAGE NAMES

Assam: Korach;
Beng: Natakaranja, Dahara karanja;
Guj: Kanaji;
Hindi: Karanj;
Kan: Honge беру;
Mal: Pongu, Ungu;
Mar: Karanja;
Ori: Karanja;
Punj: Karanj;
Tam: Pungai;
Tel: Ganuga, Kanuga;
Urdu: Karanj.

Eng: Indian beech,¹ Pongum oil tree, Hongay oil tree.³²

PHARMACOPOEIAL AYURVEDIC DRUG

Karañja (Root).
API, Part I, Vol. II.

Karanja (root bark).
API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Karanñjaka, Naktamāla, Naktāhvā, Ghr̥tajarañja.

HABITAT

Almost throughout India up to an altitude of 1200 m.

Distributed eastwards, chiefly in the littoral regions of Southeastern Asia and Australia.^{2(a)}
The tree is considered to be a native of Western Ghats and is chiefly found along the banks

CONSTITUENTS

Root:
Karanjin, Kanugin, Demethoxy-kanugin, Pongachromene & Tetra-O-Methylfisetin.
Root bark: Flavones kanugin, Demethoxy-kanugin. (Source: References 15, 25, 2a.)
Kanugin has been characterized as 3, 7, 5'-trimethoxy-3'-4'-methylenedioxy flavone.

The ligroin extract of the roots yielded kanugin; the alcoholic extract gave demethoxy kanugin; the petroleum ether extract gave a flavonal methyl ether, tetra-O-methylfisetin.²⁰⁽²⁾ Glabra I, II, III and pongachromene, found in the stem bark, were also present in the root.³² Karanjin, the principal furanoflavonoid constituent of *P. pinnata*, was isolated from the seed oil in 1925 and from the roots in 1939.²⁰⁽²⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Root: Kustha, Kandu, Dustavrana, Prameha, Yoniroga, Krmiroga, Antravidradhi, Vidradhi

Used for obstinate skin diseases including leprosy, pruritus, non-healing ulcers, urinary disorder/polyuria, vaginal diseases, worm infestations, intestinal abscesses, and abscesses.

Root bark: same uses (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka prescribed a hot paste of Karanja bark topically in erysipelas.^{16(a)}

Root and leaf: anti-gonorrheic and used externally on foul ulcers.³² Juice of the root is used for

cleansing foul ulcers, for closing fistulous sores and for strengthening gums.^{2(a)}

Aqueous and alcoholic extracts of the fresh bark showed marked anti-bacterial activities.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Dhanvantara Ghrita (Ashtāngahridaya, seventh century), contains 14 plant drugs in equal proportion, including Karanja root, with 11 supporting herbs. For diabetes, urinary disorders, anemia.

Prabhanjan-vimardana Taila (Sahasrayoga, a non-Samhita, Kerala Materia Medica) contains Karanjaka stem bark (not root bark) with 15 plant drugs and 16 supporting herbs. Mainly used externally for all nervous disorders and paralysis.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g of the drug in powder form.

Portulaca oleracea Linn.

Kozuppā

P BOTANICAL SOURCE(S)

Portulaca oleracea Linn.
(Fam. Portulacaceae)

Wild var. is equated with *P. oleracea* var. *sylvestris* DC.; cultivated with var. *sativa* DC.

The smaller variety is equated with *P. quadrifida* Linn.^{2(a)}

In Kerala, at least three different plants are currently used as the source of Loṇika (Mal. Kozuppa) in different parts of Kerala: *Alternanthera sessilis* Linn., *Glinus oppositifolius* and *Portulaca oleracea*.⁵

Alternanthera sessilis (Matysākshi) has been the source of Kozuppā for a long time in Kerala.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Kozuppā (Whole dried plant).

API, Part I, Vol. II.

Kozuppā is confined to Kerala and Tamil Nadu, while Loṇika and Loṇi are classical Ayurvedic plant names, mentioned in Charaka Samhitā, Sushruta Samhitā (1000 BC) and Ashtāngahridaya (seventh century).³⁰

As a pharmacopoeial name, Loṇikā was a better option.

AYURVEDIC SYNONYMS

Loṇikā, Loṇi, Ghoṭikā.

Smaller var.: Laghu loṇikā, Loni.

Bigger var.: Bṛhloṇi (Vṛhatloṇikā), Ghotikā.⁵

Common names of smaller var.: Noniā, Loniā.

Bigger var.: Kulphā.³⁰

HABITAT

Throughout India, ascending up to an altitude of 1500 m in the Himalayas.

Also cultivated as a vegetable in the plains; thrives best on rich loam.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Garden purslane, Common Indian purslane;

Beng: Baraloniya, Badanuni, Baranunia;

Guj: Luni, Loni, Moti luni;

Hindi: Khursa, Kulfa, Badi lona;

Kan: Dudagorai, Doddagoni soppu, Lonika, Loni;

Mal: Koricchira, Kozhuppa, Kozuppa,

Kozuppaccira;

Mar: Kurfah, Ghola;

Punj: Lonak, Chhotalunia, Khurfa, Kwfa;

Tam: Pasalai, Pulikkirai, Paruppukkeerai,

Kozhuppu;

Tel: Pappukura, Peddapavila kura, Payilikura,

Pavilikura;

Urdu: Khurfa.

CONSTITUENTS

Protein, Carbohydrates, Vitamin C and Mucilage.

Edible leaves and stems (51% of the herb) contain protein 2.4%, carbohydrates 2.9% and vitamin C 29 mg/100 g (decreases after flowering). Rich in sodium and potassium.^{2(a)} Oxalic acid is present at 521.8 mg/100 g (from a sample of Konkan).^{2(d)}

The herb yielded *L*-nor-adrenaline (2.5 mg/g fresh plant in one sample), dopamine and *L*-dopa.^{2(a),32} Presence of quercetin and betacyanin is reported in the vegetable.³² Aerial parts gave nicotinic acid and tocopherol.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Vrana, Gulma, Prameha, Sotha, Arsa, Agnimandya

Used for ulcers, abdominal lumps, urinary disorders/polyuria, edema, piles, and digestive impairments (therapeutic uses based on texts from 1000 BC to sixteenth century).

Loṇikā was cooked as a vegetable with curd for piles, diarrhea and dysentery, excessive mucus, cough and as a laxative (Charaka Samhitā, Sushruta Samhitā, 1000 BC; Ashtāṅgahridaya, seventh century).^{16(a),27,28} The herb is used for scurvy, diseases of the liver, spleen, kidney, and bladder, cardiovascular diseases, dysuria, hematuria, gonorrhea, dysentery, sore nipples, and ulcers of the mouth.^{2(a)} The juice is analgesic; the leaf and flowering tops are anti-hemorrhagic; the seeds are a diuretic, vermifuge and anti-dysenteric;³² used for burns and scalds.^{2(a)} The plant is anti-bacterial. The macerated herb exhibited carbonic anhydrase activity.³²

IMPORTANT FORMULATION/ APPLICATIONS

Marma Gutikā (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains 45 plant drugs (4 still unidentified), thrice impregnated with herbs, Kozuppā is identified as Loṇikā in AFI, Matsyākshi in CCRAS text.

For trauma.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Whole plant: 10–20 g.^{16(a)}

The alcoholic extract of the seeds showed anti-spermatogenic activity in rats.^{2(d)}

Prosopis cineraria Druce

Śamī

BOTANICAL SOURCE(S)

Prosopis cineraria Druce Syn. *P. spicigera* L.
(Fam. Leguminosae/Mimosaceae)

Syn. *Mimosa cineraria* Linn.¹⁵

PHARMACOPEIAL AYURVEDIC DRUG

Śamī (Leaf).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Keśahantrī, Saktuphalā, Śaṅkuphalikā, Tuṅga.
Pavitrā, Kesha hṛt phalā, Lakshmi, Shivā, Vyādhi
shamī, Bhū shamī, Shankarāhvya.⁴
Mangalya, Supatrā.²⁷

HABITAT

In the dry and arid regions of India.

REGIONAL LANGUAGE NAMES

Eng: Sponge tree;
Ben: Sain, Shami;
Guj: Kheejado, Sami;
Hindi: Chhonkar, Sami, Chhikur, Jhand, Khejra;
Kan: Banni, Kabanni;
Mal: Parampu, Tambu, Vahni;
Mar: Sami, Saunder;
Ori: Shami;
Pun: Jand;
Tam: Vanni;
Tel: Jammi.

CONSTITUENTS

Rich in tannin, volatile fatty acid.

The plant affords patulitrin, prosogerin A, B, C, and D; lipid; beta-sitosterol; proteins consisting of prolamines, albumins, globulins, and glutelins; an alkaloid spicigerine characterized

as 3-hydroxy-2-methyl-6-piperidyl alkanoic acid; sugars; amino acids; vitamins.¹⁵
Leaves contain phosphorus 0.4%, potassium 1.4%, and calcium 2.8%.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa (piles), Atisāra (diarrhoea), Bālagraha (psychotic syndrome of children), Bhrama (vertigo), Kṛmi (worm infestation), Kāsa (cough), Kuṣṭha (Leprosy/diseases of skin), Netraroga (diseases of the eye), Raktapitta (bleeding disorder), Śvāsa (Asthma), Viṣavikāra (disorders due to poison).

Used as single drug.
(Therapeutic uses based on texts, 1000 BC to 16th century.)

IMPORTANT FORMULATION/ APPLICATIONS

Powdered flowers, mixed with sugar, is given to pregnant women as a safeguard against miscarriage.¹⁵
Pods are considered to possess astringent, demulcent and pectoral properties.^{2(a)}
Fruits, as well as leaves, were given internally so that excessive mucus or fluid dried up.^{16(a),28}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 3 to 5 g.

<i>Prunus avium</i> L.	Stem bark, root	Elavālukam
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BOTANICAL SOURCE(S)

Prunus avium L.
(Fam. Rosaceae)

Syn. *Cerasus avium* Moench.
Elavāluka has been equated with sour cherry, *Prunus cerasus* Linn.^{3,30}
Elavāluka had long remained unidentified. It is now equated with *Prunus cerasus* on the basis of its folk name Ālūvālū in Punjab.³⁰
The bark of Elavāluka was used for preparing fermented liquors (Charaka Samhitā). The part

that was used for insanity, epilepsy, cough, gout, obesity, leprosy, and as an aphrodisiac³ is not known. It is claimed that the kernels of the seeds are used in medicine.³

PHARMACOPOEIAL AYURVEDIC DRUG

Elavālukam (Stem bark).
API, Part I, Vol. VI.

Elavālukam (root).
API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Āluka, Vāluka, Eluka.

Āluka is a confusing synonym. It is equated with yam (*Dioscorea alata*).^{3,7} It is Eluka, Elukākhyā of Charaka Samhitā and Sushruta Samhitā (1000 BC).

Āruka (Charaka Samhitā, Sushruta Samhitā, Ashtāngahridaya) is equated with the fruit of *Prunus domestica* Linn. Aruka and Āluka were synonyms in Charaka Samhitā.²⁷

HABITAT

Cultivated in Kashmir and lower Himalayas of Uttar Pradesh and West Bengal.

Believed to be indigenous to Southern and Central Europe and Western Asia. Cultivated in Kashmir, Shimla hills and Kullu valley at elevations of 1500–2000 m and above.^{2(a)}

P. cerasus is believed to be a native of West and Southeast European regions. Grown in Kashmir, Kumaun, and Garhwal at elevations up to 2300 m.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Sweet cherry;

Ben: Elavaaluka;

Hindi: Alubukhara*, Aluvaalu, Gilaas, Aalubaalu;

Kan: Chary hannu;

Ori: Mitha cherry;

Pun: Alubukhara;

Tel: Cherychettu, Alubakraapandu;

Urdu: Alubalu, Alubukhara.

CONSTITUENTS

Stem bark: Cyanogenic glycoside like D-mandelonitril-β-glucoside (prunasin), D-mandelonitrile-β-gentiobioside, dehydrowogonin 7-glucoside and chrysin 7-glucoside are main components. Tectochrysin, apigenin 5-glucoside, genkwanin 5-glucoside and neosakuranine are the minor components.

Enzymatically labile cyanide is found in all parts of *P. avium*. D-mandelonitril-beta-glucoside (prunasin) occurs in the vegetative parts (except for the wood of the twigs); prunasin and D-mandelonitril-beta-gentiobioside (amygdalin) are found in the generative parts.¹⁹²

Root: cyanogenic glycoside like D-mandelonitril-beta-glucoside (prunasin).

THERAPEUTIC AND OTHER ATTRIBUTES

Stem bark: Arsa (piles), Aruci (tastelessness), Hrdroga (heart disease), Kandu (itching), Krmi (worm infestation), Kustha (Leprosy/diseases of skin), Mutraroga (urinary diseases), Raktapitta (bleeding disorder), Vrana (ulcer).
Used as single drug.

(Therapeutic uses based on texts from 1000 BC to sixteenth century.)

Root: Arsa (piles), Aruci (tastelessness), Krmi roga (worm infestations), Kandu (itching), Kustha (leprosy/diseases of the skin), Vrana (ulcers), Mutraroga (urinary diseases), and Raktapitta (bleeding disorder). Used as a single drug.

(Therapeutic uses based on texts from 1000 BC to sixteenth century.)

IMPORTANT FORMULATION/ APPLICATIONS

Cherry bark has a strong sedating effect on cough reflux; is used to treat dry, nonproductive coughs, whooping cough, and other respiratory conditions; also used in asthma with supporting herbs. (Inhibition of cough is not related to the healing of chest infection which will still need to be treated.)

The bark is used for sluggish digestion, dyspepsia, diarrhea, and dysentery as a bitter tonic and astringent.

Root and bark are used as an astringent, sedative and appetite stimulant. Root is preferred for respiratory problems and for its sedative effect on the nervous system. Also given for pin worms.

Root bark is used as a wash for old sores and ulcers.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 1 to 3 g.

* Ālūbukhāra is equated with *Prunus communis*. Syn. *P. domestica* Linn.^{2(a),30} Smaller fruit is called Alucha (Aluca, which is quite similar to Alukā, Eluka).^{2(a)}

Sour cherries contain higher concentrations of total phenolics than sweet cherries, due to their higher concentration of anthocyanins and hydrocin-
namic acids. Cherry phenolics protect neuronal
cells from cell-damaging oxidative stress.¹⁹³

P. cerasus (sour cherry) was originally suggested
for Elāvalukā, but the API equated it with
P. avium (sweet cherry).

***Prunus avium* Linn. f.**

Seed

Elavālukaṁ

BOTANICAL SOURCE(S)

Prunus avium Linn. f.
(Fam. Rosaceae)

Syn. *Cerasus avium* Moench.
Elavāluka has been equated with sour cherry,
Prunus cerasus Linn.^{3,30}
Elavāluka had long remained unidentified. It is
now equated with *Prunus cerasus* on the basis
of its folk name Ālūvālū in Punjab.³⁰
The bark of Elavāluka was used for preparing fer-
mented liquors (Charaka Samhitā). Which was
used for insanity, epilepsy, cough, gout, obesity,
leprosy and as an aphrodisiac³ is not known. It
is claimed that the kernels of the seeds are used
in medicine.³

PHARMACOPOEIAL AYURVEDIC DRUG

Elavālukaṁ (Seed).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Aileyah, Elavālūh, Elukākhyah.

API, Vol. VI synonym: Āluka is a confusing
synonym. It is equated with yam (*Dioscorea*
alata).^{7,3} It is Eluka and Elukākhyā of Charaka
Samhitā and Sushruta Samhitā (1000 BC).
Āruka (Charaka Samhitā, Sushruta Samhitā and
Ashtāṅgahridaya) is equated with the fruit of
Prunus domestica Linn. Aruka and Āluka were
synonyms in Charaka Samhitā.²⁷

HABITAT

Cultivated in Kashmir and lower Himalayas of
Uttar Pradesh and West Bengal.

Believed to be indigenous to Southern and Central
Europe and Western Asia. Cultivated in
Kashmir, Simla hills and Kullu valley at eleva-
tions of 1500–2000 m and above.^{2(a)}

P. cerasus is believed to be a native of West
and Southeast European regions. Grown in
Kashmir, Kumaun, and Garhwal at elevations
up to 2300 m.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Sweet cherry;
Ben: Elavaaluka;
Hindi: Alubukhara*, Aluvaalu, Gilaas, Aalubaalu;
Kan: Chary hannu;
Ori: Mitha cherry;
Pun: Alubukhara;
Tel: Cherychettu, Alubakraapandu;
Urdu: Alubalu, Alubukhara.

CONSTITUENTS

Prunasin (D-mandelonitrile-β-glucoside),
Quercetin-3-O-rutinosyl-7, 3-O-biglucoside,
Kaempferol-3-O-rutinosyl-4'-di-O-glucoside and
6-ethoxykaempferol.

While eating the cherry, if the pit is crushed
with the pulp or it is chewed, it can release
pussic acid, which is a component of hydrogen
cyanide. The cherry pit contains cyanogenic
glycosides.
Kernels of *P. cerasus* on steam distillation yield
1% of an essential oil similar to the oil of bitter
almonds.^{2(a)}

* Ālūbukhāra is equated with *Prunus communis* syn. *P. domes-
tica* Linn.^{30,2(a)} The smaller fruit is called Alucha (Aluca, quite
similar to Alukā and Eluka).^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kandu, Vrana, Chardi, Aruci, Kasa, Hrdroga, Raktapitta, Kustha, Krmiroga, Mukharoga, Medoroga, Trsna, Arsa, Pandu, Unmada, Jvara, Daha

Used for pruritus, ulcers, emesis, tastelessness, cough, heart disease, bleeding disorders, obstinate skin diseases, leprosy, worm infestations, diseases of the mouth, hyperlipemia, excessive thirst, piles, anemia, insanity, fever, and burning syndrome (therapeutic uses based on texts from 1000 BC to sixteenth century).

Studies on Indian sweet or sour cherry kernels have not been included in standard reference works.

Kernels of the Japanese cherry (*Prunus japonica*) are used in the form of confections for dropsy, rheumatism, fevers, cardialgia, indigestion and constipation. It is considered to be a diuretic, demulcent, and deobstruent.¹⁹¹

IMPORTANT FORMULATION/ APPLICATIONS

Ashvagandhā Taila (Chakradatta, eleventh century), contains Ashvagandhā root as the main plant drug, with 22 supporting herbs, including Elavālu seed, in equal proportion. Massage oil for rheumatic and neurological disorders.

Kernel preparations were used for arthritic pains, acne, and verrucas in ancient Roman medicine.

Aileya (Elavāluka) seed is among 62 herbo-mineral drugs of Mānasmitra Vataka (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) specific for insanity, epilepsy, and brain disorders (AFI).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Prunus cerasoides D. Don

Padmaka

BOTANICAL SOURCE(S)

Prunus cerasoides D. Don
(Fam. Rosaceae)

Syn. *P. puddum* Roxb. ex Brandis non Miq.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Padmaka (Heart wood).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Padmagandhi, Pitarakta.

Malaya, Chāru, Suprabhā.⁴

HABITAT

Temperate Himalayan region from Garhwal to Sikkim up to an elevation of 910–1820 m.

Found from Kashmir to Bhutan and in Aka and Khasi hills in Assam, as well as in Manipur at altitudes of 900–2300 m.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Bird cherry;
Assam: Diengsoh-iog-Krems;
Beng: Padmakastha;
Guj: Padmakastha, Padmaka;
Hindi: Padmakha, Padma kastha, Paja;
Kan: Padmaka;
Mal: Pathimukam;
Mar: Padmakastha, Padmaka;
Punj: Pajja;
Tam: Padmakashdham;
Tel: Padmakasththamu.
Eng: Himalayan wild cherry.^{2(a)}

CONSTITUENTS

Flavonoids.

Heart wood contains dihydrotectochrysin, tectochrysin, dihydrowogonin, pinocembrin, sakuranetin, chrysin, naringenin, kaempferol, aroraadendrin, quercetin, taxifolin, 7-hydroxy-5,2',4'-trimethoxyflavanone, padmatin and its precursor taxifolin, 2'-hydroxy-2,4',6'-tetramethoxychalcone and 2',4-dihydroxy 2,4,6'-trimethoxy-chalcone.¹⁵

The leaves, twigs, bark, and kernels contain a cyanogenetic principle.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Visphota, Daha, Kustha, Raktapitta, Vami, Trsa, Bhrama, Visarpa

Used for pustular eruptions, burning syndrome, obstinate skin diseases, bleeding disorders, vomiting, thirst, vertigo and erysipelas (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Padmaka belonged to the vitalizing, nourishing and aphrodisiac *Kākolyādi gana*.

Taken internally, the bark increases the secretion of breast milk and semen, cures hemoptysis, bilious fever, persistent dysentery, and ulcers.

Used for the adhesion of fractured bones (Sushruta Samhitā, 1000 BC).²⁸

Smaller branches are crushed and soaked in water and taken internally to stop miscarriage.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Among 10 quoted compounds only 2 contain the heartwood, 8 contain stem (Guduchyādi Kvātha Churna, Bṛhchhāgalādyā Ghrita, Shatāvaryādi Ghrita, Guduchyādi Taila, Ushirāsava, Chandanāsava, Dashmūlārishta, Karpūradhyarka). (AFI)

Stem bark contains beta-sitosterol, behenate, tectochrysin, genistein and its 4'-glucoside sakuranetin and its 5-glucoside genkwanin, prunetin, padmakastein, hydroprunetin and its 4'-glucoside neosakuranin and leucocyanidin.¹⁵

The stem is reported to be anti-pyretic and refrigerant and finds application in vomiting, leprosy and leucoderma.^{2(c)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g (Curna).

P

Psoralea corylifolia Linn.

Bākuci

BOTANICAL SOURCE(S)

Psoralea corylifolia Linn.
(Fam. Leguminosae/Papilionaceae.)

PHARMACOPOEIAL AYURVEDIC DRUG

Bākuci (Fruit).

API, Part I, Vol. I (also Vākuchi).

In Ayurvedic medicine, the seed is used for the fruit. The seeds are indehiscent pods of the plant, with the pericarp closely adhering to the seed.^{2(a)}

International Pharmacopoeial name: *Psoraleae fructus*.

AYURVEDIC SYNONYMS

Avalguja, Somarāji.

Chandrikā, Somavalli, Pūtiphalā, Ambarā, Krishna phalā, Meshikā.⁴

Chāndri, Soma, Soma-vallikā²⁷

Indu-rāji, Indu-rājikā, Indra lekhā, Chandra lekhā, Chandrakalā, Shashānka-lekhā, Bākuchikā.³⁰

Somarāji is also equated with *Vernonia anthelmintica* Willd., syn. *Centratherum anthelmincticum* (Willd.) Kuntze (used as a substitute for Bākuchi).^{3,30}

HABITAT

Throughout India, found commonly in Uttar Pradesh, Bengal and Maharashtra.

Seeds of good quality are produced in Rajasthan.^{2(a)}

Psoralea: distributed in tropical and subtropical regions of the world. Four species are found in India.^{2(a)} Fifty species are found in South Africa.¹

REGIONAL LANGUAGE NAMES

Assam: Habucha;

Beng: Bakuchi, Somraji, Hakucha Veeja;

Guj: Bavachi;

Hindi: Bakuchi, Bavachi, Babchi;

Kan: Bauchige, Bhavantibeeja, Bhavanchigid, Baukuchi;

Kash: Babchi;

Mal: Karkokil;

Mar: Bawchi;

Ori: Bakuchi;

Punj: Babchi, Bavchi;

Tam: Karpokarisi, Karpogalarisi, Karbogalarisi;

Tel: Bavanchalu; Urdu: Babchi.

Eng: Purple Fleabane.⁷

CONSTITUENTS

Essential oil, fixed oil, psoralen, psoralidin, isopsoralen and bakuchiol.

Seeds contain 0.05% essential oil and fixed oil of about 10%;^{2(a)} psoralen (a cytotoxic principle), wo psoralen; psoralidin and wo psoralidin (in pericarp); (+)-bakuchiol (also a cytotoxic principle); and bavachinin-A (an anti-inflammatory, anti-pyretic and analgesic principle).^{2(c)}

Curative properties are attributed to chalcones, flavones, isoflavones, furanocoumarins, and the coumesterol group of compounds.^{2(c),15,32}

THERAPEUTIC AND OTHER ATTRIBUTES

Svitra, Kustha, Krmiroga, Jvara, Meha

Used for leucoderma/vitiligo, obstinate skin diseases including leprosy, worm infestations, fever, and urinary disorders (therapeutic uses based on texts from the fourteenth to sixteenth centuries).

Charaka (1000 BC) gave Somarāji seeds cooked in gruel or in prescription, internally, for toxico-sis, night blindness, tumors, and cataracts.²⁷

Sushruta (1000 BC) included Vākuchi in a medicated *ghee* for malignant skin diseases.²⁸

Bākuchi seeds (160 g) with Haritaki (Chebulic myrobalan, 40 g), pounded with cow's urine, was applied to restore normal color in vitiligo (Vrindamādhava, eighth century).

(For classical uses, see Reference 16[a].)

IMPORTANT FORMULATION/ APPLICATIONS

Somarāji Taila (Bhaishajya Ratnāvali, seventeenth century), contains Somarāji seed with 7 plant drugs.

Used externally for melasma, malanoderma, facial chloasma, leprosy, ringworm, eczema, scabies, pruritus, and non-healing ulcers.

Avalgujada Lepa (Ashtāngahridaya, seventh century), a medicinal paste, contains Avalguja seeds and orpiment (a mineral) in a 4:1 ratio (processed in cow's urine).

Shveta-avalgujaphala Rasāyana of Sushruta and Bākuchi Rasāyana of Ashtāngahridaya were anti-toxic and blood-purifying tonics of the classical period.^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

A mixture of psoralen and iso-psoralen (1:3 ratio), under influence of ultraviolet light, is recommended for application in leucoderma under medical supervision.^{2(c)}

The Central Council for Research in Unani medicine is running a research center at Hyderabad where patients of vitiligo/leucoderma are treated.

***Pterocarpus marsupium* Roxb. Stem bark Asana**

BOTANICAL SOURCE(S)

Pterocarpus marsupium Roxb.
(Fam. Fabuceae, Papilionaceae).

The heart woods of *Terminalia tomentosa* W.&A. and *Bridelia montana* Willd. are sometimes found as adulterants.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Asana (Stem bark).

API, Part I, Vol. III.

Asana is not be confused with synonyms of *Terminalia tomentosa*²⁷ and *Bridelia montana* (Asānā is a common name in Maharashtra). Incision made through the bark up to the cambium yields the exudate known as Gum Kino.

AYURVEDIC SYNONYMS

Bijaka, Pitasara, Asanaka, Bijasāra.

HABITAT

Throughout deciduous forests in peninsular India; Gujarat, Madhya Pradesh, Bihar and Odisha.

Pterocarpus: more than 35 species are found in the tropics, especially Africa.¹ Four species occur in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Indian kino tree,
Assam: Aajar;
Beng: Piyasala, Pitasala,
Guj: Biyo;
Hindi: Vijayasara, Bija;
Kan: Bijasara, Asana;
Kash: Lai chandeur;
Mal: Venga;
Mar: Bibala;
Ori: Piashala;
Punj: Chandan lal, Channanlal;
Tam: Vengai;
Tel: Yegi, Vegisa;
Urdu: Bijasar.

CONSTITUENTS

Tannins and Gum kino (which contains Kino-Tannic acid, 1-Epicatechin and a reddish brown colouring matter).

Ethanol extract of the bark yielded (–)-epicatechin and two sterols, sitosterol, and stigmasterol.¹⁸⁵ The bark showed a significant dose-dependent anti-hyperglycemic effect in rats.¹⁸⁶ (–)-epicatechin extracted from the bark showed cardiac-stimulant activity.¹⁸⁵ Aqueous extract of the bark exhibited anti-cataract activity.¹⁸⁶ Methanol extract of the bark possesses hepatoprotective activity.¹⁸⁸ Gum Kino is an independent drug.

THERAPEUTIC AND OTHER ATTRIBUTES

Pāndu, Prameha, Medodośā, Kustha, Krmiroga, Switra, Madhumeha, Sthoulya

Used for anemia, urinary disorders/polyuria, hyperlipidemia, obstinate skin diseases, worm infestations, leucoderma/vitiligo, diabetes, and obesity (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) gave a decoction of bark, in prescriptions, for rheumatism, fever, and urinary diseases.²⁷

Bijakasārāshta (Ashtāngasamgraha, sixth century) was prescribed in anemia.^{16(a)}

Bark: astringent, decoction in diarrhea. The bark showed hypocholesterolemic and hypotensive action experimentally.²⁰⁽²⁾ The usefulness of the bark appears to be minimal in established diabetic cases.^{2(d)}

Gum Kino: astringent, used for diarrhea, dysentery, passive hemorrhage, leucorrhea, and toothache.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Narasingha Ghrita Rasāyana (Ashtāngahridaya, seventh century), does not contain stem bark of Asana. Main drug is iron filings, equal to the quantity of 8 herbal drugs which included Asana heartwood. For sexual

debility. As an aphrodisiac, blood purifier, hematinic.

The aqueous extract of the bark substantially prevented insulin resistance (hyperinsulinemia) and hypertriglyceridemia experimentally.¹⁸⁷

DOSAGE/USAGE/CAUTIONS/COMMENTS

32–50 g of the drug for decoction.

Pterocarpus marsupium Roxb. Heart wood Asana

BOTANICAL SOURCE(S)

Pterocarpus marsupium Roxb.
(Fam. Fabaceae, Papilionaceae)

The heart woods of *Terminalia tomentosa* W.&A. and *Bridelia montana* Willd. are sometimes found as adulterants.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Asana (Heart-wood).

API, Part I, Vol. I.

Asana is not be confused with synonyms of *Terminalia tomentosa*²⁷ and *Bridelia montana* (Asānā is a common name in Maharashtra).

AYURVEDIC SYNONYMS

Bijaka, Pitasāra, Asanaka, Bijasāra.

HABITAT

Throughout deciduous forests in peninsular India; Gujarat, Madhya Pradesh, Bihar and Odisha.

Pterocarpus: more than 35 species are found in the tropics, especially Africa.¹ Four species occur in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Indian Kino Tree;
Assam: Aajar;
Beng: Piyasala, Pitasala;
Guj: Biyo;
Hindi: Vijayasara, Bija;

Kan: Bijasara, Asana;
Kash: Lal Chandeur;
Mal: Venga;
Mar: Bibala;
Ori: Piashala;
Punj: Chandan Lal, Channanlal;
Tam: Vengai;
Tel: Yegi, Vegisa;
Urdu: Bijasar.

CONSTITUENTS

Alkaloids and resin.

Alkaloids 0.017% and resin 0.9%.^{2(a)} Tannins; phenolics include catechin, (–)-epicatechin, marsupin, ptersupin, stilbene and pterostilbene; the flavonoids pseudobaptigenin, liquiritigenin, garbanzol and 5-deoxykaempferol; the chalcones isoliquiritigenin, dihydrochalcone and pterosupin; the isoflavonoids glycol marsupol and *p*-hydroxybenzaldehyde;^{2(c)2(d)190} the sesquiterpene alcohols beta-endesmol, selin-4 (15)-en-1 beta, 11-diol and pterocarpols A and B; the triterpene alcohol^{2(d)}; and aurone glycosides.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Pāndu, Prameha, Medodośā, Kustha, Krmiroga

Used for anemia, urinary disorders/polyuria, hyperlipidemia, obstinate skin diseases, and worm infestations (therapeutic uses based on texts from 1000 BC to sixteenth century).

Asana was an important constituent of the Sālasarādi group of Sushruta Samhitā (1000 BC), specific for skin diseases,

polyuria, anemia, bronchial afflictions, and hyperlipidemia.

Various fractions of *P. marsupium* heart wood exhibited anti-diabetic and anti-hyperglycemic activities.¹⁹⁰ (–)-epicatechin, isolated from the heart wood, showed regeneration of pancreatic beta-cells in a series of studies. A novel anti-diabetic mechanism has been claimed.²⁰⁽²⁾

IMPORTANT FORMULATION/ APPLICATIONS

Nyagrodhādi Churna (Yogaratrākara), contains 28 plant drugs including Asana heartwood, all in equal proportion. For dysuria, urinary disorders, diabetes carbuncle.

Asana-bilvādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica, not in the AFI) contains four plant drugs, including Asana heart wood, all in equal proportions, with five supporting herbs. Used for external application to the head in diseases of the eyes, ears, and cranium.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

50–100 g of the drug for decoction.

A clinical study indicated that *P. marsupium* gave encouraging results in non-obese diabetics.¹⁸⁹

Pterocarpus santalinus Linn. f.

Raktacandana

BOTANICAL SOURCE(S)

Pterocarpus santalinus Linn. f.
(Fam. Fabaceae)

Heart wood of *Adenanthera pavonia* Willd. is often passed on as a substitute. Heart wood of *Caesalpinia sappan* Linn. is sometimes mistakenly used.³⁶

Raktachandana may be used in place of Chandan-shveta (*Santalum album* Linn.) and Karpura (camphor).³

(Red heart wood has no aroma.)³

PHARMACOPEIAL AYURVEDIC DRUG

Raktacandana (Heart wood).

API, Part I, Vol. III.
(Rakta chandana.)

AYURVEDIC SYNONYMS

Raktānga, Kṣudracndana, Raktaśara.

Lohita, Tāmrasāra, Jyoti soma, Ranjana.⁴

HABITAT

Andhra Pradesh and neighbouring area of Chennai and Karnataka at an altitude of 150–900 m.

Restricted to parts of Andhra Pradesh, particularly the Cuddapah district and neighboring areas of Tamil Nadu, and Mysore.^{2(a)}
Also found in Sri Lanka and the Philippines.

REGIONAL LANGUAGE NAMES

Eng: Red sanders, Red sandal wood;
Assam: Sandale, Sandal ahmar;
Beng: Raktachandana;
Guj: Ratanjali; Lalchandana;
Kan: Raktha Chandanam;
Mal: Rakta chandanam;
Punj: Lai chandan;
Tam: Sanchandanam;
Tel: Erra chandanamu;
Urdu: Sandal surkh.

CONSTITUENTS

Glycosides, Colouring matter.

Contains 16% of a red coloring matter, benzyl-anthenone derivatives, santalins A and B (red), as well as santalin A, C and Y (yellow). Isoflavonoids include santal pterocarpine (0.25%) and homopterocarpine (0.2%). Stilbene derivatives include pterosilbene.

Volatile oil (traces) contains cedrol (cedar camphor, up to 50%) and pterocarpol, iso-pterocarpol, and eudesmol,^{14,2(a)} and the lignans savinin and calocedrin.³¹

Coumarin glycosides have been isolated from the heart wood.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Chardi, Trsna, Raktadosahara, Twara, Vrana

Used for emesis, morbid thirst, blood disorders, fever (jwara) and ulcers (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Powdered bark was used internally for bleeding piles, diarrhea and morbid menstrual discharges (Charaka Samhita, 1000 BC).²⁷

Rakta chandana is a component in Pushyānuga Churna (for leucorrhea and metrorrhagia); Triphalādi Ghrita (for chronic fevers); Lakshādi Ghrita (for promoting complexion of face) and in pastes for freckles.¹⁸ It belonged to the Bhadrashriyādi group of Charaka Samhitā, which was used for intrinsic hemorrhage.

IMPORTANT FORMULATION/ APPLICATIONS

Chandana balā lakshādi Taila (Yoga Ratnākara, sixteenth century), contains Chandan (Rakta-chandana, as a substitute) as one of the three main plant drugs, with 25 supplementary herbs. Used for bleeding disorders, cough, asthma, fever and skin diseases, internally and externally (AFI).

Chandanādi Lauha (Bhaishajya Ratnāvali, seventeenth century), the main drug of which is iron calx with 12 plant drugs, including Rakta chandana, in equal proportions. Used for intermittent and chronic fevers.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drag (Powder).

Anti-diabetic activity is attributed to pterostilbene; anti-inflammatory activity is attributed to lignans.³¹

Pueraria tuberosa DC.

Vidārīkanda

BOTANICAL SOURCE(S)

Pueraria tuberosa DC.
(Fam. Fabaceae)

Vidārī is a substitute for Jivaka and Rshabhaka (of *Ashta varga* of classical Ayurveda).³

Kshira-vidārī is equated with *Ipomoea digitata* Linn. Syn. *I. paniculata* Linn. R. Br.³

Stem tubers of *Ipomoea paniculata* are more frequently used in Bihar, Bengal and Odisha. Stem tubers of *Trichosanthes cordata* Roxb. are also sometimes sold as Vidārīkanda.³⁶

Kerala physicians prefer Kshira-vidārī (*Ipomoea paniculata*) in medicine.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Vidārīkanda (Tuber).

API, Part I, Vol. V.

Vidārī (Tuberous root).

API, Part I, Vol. II.

Vidārīkanda is an anti-implantation drug,^{2(c)} while *Ipomoea digitata* did not show anti-fertility activity.²⁰⁽²⁾ Classical attributes of Vidārī and its use as a substitute for Jivaka and Rshabhaka are closer to *I. digitata*.

AYURVEDIC SYNONYMS

Vidārī, Ikṣugandhā. Vidārīkā, Bhumikuṣmāṇḍa.

Vṛksha valli, Vṛkshaka, Dāvidālikā, Shrgālika, Kaṇḍa valli, Svaduka, Pāpa-nāshaka.⁴

Ikshugandha is a synonym of Kshira-vidārī.⁴

Vidārīgandhā is also a synonym of Shālīparni (*Desmodium gangeticum* DC.).²⁸

See comparative pharmacognostical studies of *P. tuberosa*, *Cycas circinalis*, and *Ipomoea mauritiana* Jacq.¹⁹⁴

HABITAT

Throughout India, except in very humid or very arid regions, and ascending up to 1,200 m.

REGIONAL LANGUAGE NAMES

Tuber:

Eng: Indian kudju;*

Beng: Shimiya, Shimiabatraji, Bhui kumdo;

Guj: Khakharvel, Vidaree, Vidareekand;

Hindi: Vidareeand, Bilaikand, Sural, Patal kand;

Mar: Bendriya bel, Bindree, Vendrichavel;

Punj: Siali;

Tam: Nilpushni keshugu;

Tel: Nelagummudu.

Tuberous root:

Hindi: Vidarikanda;

Mal: Mudakku;

Tam: Nilapoosani;

Tel: Nelagummuda, Darigummadi.

CONSTITUENTS

Tuber: Pterocarpan-tuberosin, pterocarpanone-hydroxytuberosone, two pterocarpenes-anhydro-tuberosin and 3-O-methylanhydro-tuberosin, and a coumestan tuberostan. An isoflavone-puerone and a coumestan-puerarostan.

Tubers contain beta-sitosterol, sucrose, fructose and carbohydrates 64.6%,^{2(a)} yielded pterocarpanone viz. hydroxytuberosone, an epoxychalcanol derivative peutuberosanol (an anti-implantation principle).^{2(d)} Previously, puerarin, daidzein, and tuberosin exhibited anti-implantation activity,^{2(c)} Isoflavone puerarone and a comestan puerarostan^{2(c)}; modified isoflavonoids 1-alpha-hydroxytuberosone, tuberosin, anhydrotuberosin, and 3-O-methylanhydro-tuberosin and a coumestan tuberostan³² are reported.

Tuberous root: gluconic and malic acids.

Beta-sitosterol, stigmasterol, daizein, puerarin, and 4'-6"-di-O-acetylpuerarin.¹⁵

* Kudzu (China and Japan) is equated with *P. lobata* (Willd.) Ohwi.

THERAPEUTIC AND OTHER ATTRIBUTES

Tuber: Raktapitta, Sukraksaya, Raktadosa, Daha, Ksaya, Kasa, Sula, Mutrakrcchra, Visarpa, Visamajvara

Used for bleeding disorders, oligospermia, blood disorders, burning syndrome, phthisis, cough, colic, dysuria, erysipelas, and intermittent fever (therapeutic uses based on texts from 1000 BC to sixteenth century).

Tuberous root: Daha, Raktapitta, Angmarda, Daurbalya, Sosa.

Used for burning syndrome, bleeding disorders. Body ache, debility, and cachexia (therapeutic uses based on texts from 1000 BC to sixteenth century).

Tuber: hypoglycemic, estrogenic, diuretic, cardiac tonic, and galactagogue. Also used for fertility control.^{7,26} Roots are used as demulcent and refrigerant in fevers, as cataplasm for the swelling of joints and as a lactagogue.^{2(a)} Aphrodisiac activity as reported in the literature could not be confirmed.²⁶

IMPORTANT FORMULATION/ APPLICATIONS

API, Vol. V:

Marma Gutikā (Sahasrayoga, root-tuber);

Nityānanda Rasa (Bhaishajya Ratnāvali, root-tuber); Sārasvatārishta (Bhaishajya Ratnāvali, root-tuber); Shatāvaryādi Ghrita (Sahasrayoga, root-tuber); Ashvagandhādyarishta (Bhaishajya Ratnāvali, root-tuber); Mahā vishgarbha Taila (Bhaishajya Ratnāvali root-tuber).

API, Vol. II:

Vidāryādi Kvāthchurna (Ashtāngahridaya, root-tuber); Vidāryadi Ghrita (Ashtāngahridaya, root-tuber); Marma Gutikā (Sahasrayoga, root-tuber); Manmathabra Rasa (Bhaishajya Ratnāvali, root-tuber); Pūgakhanda, Aparah (Bhaishajya Ratnāvali, root).

Chyavanaprāsha (Charaka Samhitā), not quoted in the API; Vol. V and Vol. II, also contain Vidari root-tuber.

(Analysis based on the AFI, Parts I and II.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

For alcoholism, Kutzu (*Pueraria lobata* Ohwi) root extract 1.2 g twice daily has been used. An extract is standardized to contain 19% puerarin, 4% daidzin, and 2% daidzein.¹³

Punica granatum Linn.

Dried fruit rind

Dadima

BOTANICAL SOURCE(S)

Punica granatum Linn.
(Fam. Punicaceae)

P. granatum has been classified into two subspecies, *chlorocarpa* and *porphyrocarpa*, each having two varieties. *Chlorocarpa* is mainly found in Transcaucasia, *porphyrocarpa* is mainly in central Asia.

Source of dried seeds (*Anāradānā*) along with the dried fleshy portion of commerce is said to be the wild species from Jammu, parts of the Chamba, Kangra and Mandi districts of Himachal Pradesh and Punjab.

Dried leaf is not available in herb stores. Fresh fruit of Kāndhāri variety is preferred for medicinal use.

Native to the Middle East, Eastern Mediterranean, and Northern India.¹⁰⁽⁴⁾

REGIONAL LANGUAGE NAMES

Eng: Pomegranate;
Assam: Dalim;
Beng: Dadima, Dalimgach, Dalim;
Guj: Dadam, Dadam phala;
Hindi: Anar, Anar-ke-par;
Kan: Dalimba, Dalimbe haonu;
Mal: Mathalam;
Mar: Dalimba;
Ori: Dalimba;
Punj: Anar;
Tam: Madulam pazham;
Tel: Dadimbakaya, Dadimma;
Urdu: Anar.

PHARMACOPEIAL AYURVEDIC DRUG

Dadima (Dried fruit rind, pericarp).

API, Part I, Vol. IV.

Dadima (dried seed).

API, Part I, Vol. II.

Dadima (dried leaf).

API, Part I, Vol. IV.

International Pharmacopeial name: *Pericarpium granati*.¹⁰⁽⁴⁾

AYURVEDIC SYNONYMS

Dantabija, Lohitapuspa.

Dādīm̐ba, Raktapushpa, Raktakusumā.^{27,28}

HABITAT

Wild in the valley and outer hills of Himalayas, between 900 and 1800 m, also cultivated.

CONSTITUENTS

Dried fruit rind, pericarp: Tannic acid, Sugar and gum.

Major constituents are hydrolysable ellagitannins (up to 28%) and other polyphenols.¹⁰⁽⁴⁾

Dried pericarp: casuarinin, granatin B, punicalin, pedunculagin, tellimagranidin, unicalin, gal-lagylidilactone, ellagic acid, and gallic acid.¹⁷⁸

Fruit peel: chrysanthemin, cyanin, granatin A, pelargonin, punicalin, pectin, and polyphenol.¹⁷⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Daha, Jvara, Kantharoga, Mukhadaurgandha, Aruci, Amlapitta, Atisara, Pravahika, Raktapitta, Raktavikara, Kasa

Used for burning syndrome, fever, throat diseases, halitosis, tastelessness, hyperacidity, diarrhea, dysentery, blood impurities, and cough

(therapeutic uses based on texts from 1000 BC to sixteenth century).

Pericarp: orally for chronic diarrhea, dysentery, gingivitis, and intestinal parasites.

Anti-oxidant, anti-microbial, anti-parasitic, anti-viral, anti-diarrheal, anti-ulcer and immune stimulant activities of pericarp extract have been examined in experimental studies.

A mouthwash against oral pathogens was clinically tested (WHO).¹⁰⁽⁴⁾

IMPORTANT FORMULATION/ APPLICATIONS

Khadirādi Gutika-kāsa (Yogaratanākara, sixteenth century). Dāḍima bark is among 7 supplementary herbs, while the compound has been quoted for dried fruit rind.

Kalyānaka Ghrita (Ashtāngahridaya, seventh century) contains Dāḍima fruit peel among 28

plant drugs, all in equal proportions. Used for epilepsy, mental disorders and toxicosis.

Marichādi Gutika (Shārangadhara Samhitā, thirteenth century); Dāḍima fruit rind is among the four main plant drugs. Used for cough and dyspnea.

Nilakāḍya Taila (Shārangadhara Samhitā);

Dāḍima bark (not fruit rind) is among 18 supporting herbs. Used for alopecia.

Mṛtasanjivani Surā (Bhaishajya Ratnāvali, seventeenth century); Dāḍima fruit rind is among 22 supporting plant drugs. Used for high fever and collapse.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Powder 3–6 g.

Oral daily dose: 2.5–1.5 g.¹⁰⁽⁴⁾

Dried seed

CONSTITUENTS

Punica granatum

Dried seed: sugars, vitamin C, sitosterol, ursolic acid, protein, fat and mineral matters, nicotinic acid, pectin, riboflavin, thiamine, delphinidin diglycoside, B372 aspartic, citric, ellagic, gallic and malic acids, glutamine, isoquercetin, estrone, and puniceic acid.

Seeds: estrogenic compounds, estrone (4.0–17.0 µg/kg) and estradiol; genistin, genistein and coumesterol.¹⁷⁸ Seed coat: callistephin, chrysthemine, cyanidin-3,5-diglucoside, cyanin, diadzen, delphin, delphinidin-3-O-beta-D-glucoside, and pelargonin.¹⁷⁸ Seed oil contains polyphenols and fatty acids, puniceic (33.3%), palmitic (10.4%), heneicosanoic, lauric, nonadecanoic, and stearic acids.^{13,178}

THERAPEUTIC AND OTHER ATTRIBUTES

Trsna, Daha, Jwara

Used for morbid thirst, burning syndrome and fever (therapeutic uses based on texts from 1000 BC to sixteenth century).

See properties of pomegranate juice. Dried seed extract, administered subcutaneously at variable dose levels to ovariectomized mice, was active. Activity was equal to 4.0–17.0 µg estrone/kg.

Seed oil also showed strong activity at a dose of 0.4 mL/animal i.p.

Seed oil, administered i.p. to mice at a dose of 0.2 mL/animal, showed uterine relaxation effect.

IMPORTANT FORMULATION/ APPLICATIONS

Dāḍmāshataka Churna (Bhaishajya Ratnāvali, seventeenth century), contains 12 plant drugs, including Dāḍima seed, in equal proportion. For dysentery.

Dāḍmādi Ghrita (Ashtāngahridaya, seventh century) contains Dāḍima dried seed as the main drug with four supporting herbs. Used for anemia, duodenal ulcers, and diseases of the spleen.

Dadhikā Ghrita (Ashtāngahridaya) contains Dāḍima fruit juice and fruit rind in a formulation of 73 constituents. Used for insanity, epilepsy, and neurological disorders.

Bhāskara Lavana (Shārangadhara Samhitā, thirteenth century), a salt-based digestive compound, contains Dādima seed.

Shukra-mātrika Vati (Bhaishajya Ratnāvali), a herbo-mineral drug for dysuria, contains Dadima seed as one of the supporting herbs.

DOSAGE/USAGE/CAUTIONS/COMMENTS

5 to 10 g of the drug in powder form.

Contra-indicated during pregnancy in high doses due to its uterine-stimulant effect.

Dried leaf

CONSTITUENTS

Punica granatum

Tannins and β -sitosterol.

Betulinic acid, brevifolin carboxylic acid, ellagic acid; corilagin, cyanidin, delphinidin; punicafolin, pyridine, *N*-(2'-5' dihydroxyphenyl) strictinin; mannitol; 1,2,4,6-tetra-O-galloyl-beta-D-glucose, 1,2,3,4,6-penta-O-galloyl-beta-D-glucose; apigenin-4'-O-beta-D-glucoside, luteolin-3'-O-beta-D-glucoside, luteolin-3'-O-beta-D-xylopyranoside, and luteolin-4'-O-beta-D-glucoside.¹⁷⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Aruci, Agnimandya, Atisara, Pravahika, Krmi, Raktapitta, Kasa, Jvara, Mukhapaka

Used for tastelessness, digestive impairment, diarrhea, dysentery, helminthiasis, bleeding disorders, cough, fever, and stomatitis (therapeutic uses based on texts from 1000 BC to sixteenth century).

Flower-bud, seed, fruit, fruit rind, and bark are used in Ayurvedic formulations.^{16(a)} Leaf was rarely used.

The leaf extract, containing hexahydroxydiphenyl-2,4-dehydroglucopyranose, granatin and

sitosterol, has been used in body weight-reducing preparations.^{2(d)}

A paste of green leaves is applied topically on eyelids in conjunctivitis.²⁰⁽²⁾

IMPORTANT FORMULATION/APPLICATIONS

No classical compound quoted.

Leaf extract exhibited anti-hyperlipidemic and anti-obesity effects, possibly by inhibiting pancreatic lipase and decreasing energy intake. In an animal model of obesity, the leaf extract reduced weight, caloric intake and serum levels of triglycerides and cholesterol.¹³

Leaf contains gallotannins and ellagitannins; used as an astringent for dysentery, diarrhea, and sore throats (tannin content 11%).^{2(a)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

Patra svarasa: 5–10 mL.

Patra kalka: 5–10 g.

Menthol extract of dried leaves was inactive on *Plasmodium falciparum* (MIC >25.0 μ g/mL).¹⁷⁸

Ethanol/water (1:1) extract of aerial parts (250.0 mg/kg) showed only a 30% drop in blood sugar in mice.¹⁷⁸

Punica granatum Linn.

Fresh fruit

Dādima

BOTANICAL SOURCE(S)

Punica granatum Linn.
(Fam. Punicaceae)

P. granatum has been classified into two subspecies, *chlorocarpa* and *porphyrocapa*, each having two varieties. *Chlorocarpa* is mainly found in

Transcaucasia, and *porphyrocarpa* is mainly in central Asia.

PHARMACOPOEIAL AYURVEDIC DRUG

Daḍima (Fresh fruit).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Dantabija, Lohitapuspa, Dādimacchada.

Dāḍimba, Raktapushpa, Raktakusumā.^{27,28}

HABITAT

Wild in the valley and outer hills of Himalayas, between 900 and 1800 m, also cultivated.

Native to the Middle East, Eastern Mediterranean and Northern India.¹⁰⁽⁴⁾

REGIONAL LANGUAGE NAMES

- Eng: Pomegranate;
Assam: Dalim;
Beng: Dadima, Dalimgach, Dalim;
Guj: Dadam, Dadam phala;
Hindi: Anar, Anar-ke-par;
Kan: Dalimba, Dalimbe haonu;
Mal: Mathalam;
Mar: Dalimba;
Ori: Dalimba;
Punj: Anar;
Tam: Madulam pazham;
Tel: Dadimbakaya, Dadimma;
Urdu: Anar.

CONSTITUENTS

Edible portion of Kannur (Kerala) variety contains carbohydrates 14.5% and mineral matter 0.7%; calcium 10, magnesium 12, oxalic acid 14, phosphorus 70.0, iron 0.3, sodium 0.9, potassium 133.0, copper 0.2, sulphur 12.0, choline 2.0, carotene 0, thiamine 0.66, riboflavin 0.10, nicotinic acid 0.30, vitamin C 14 mg/100 g. Reducing sugars in juice from 7.8 to 13.78/100 mL, acidity from 0.45 to 3.47 g/100 mL.^{2(a)} Pomegranate juice typically contains 0.2%–1.0% polyphenols, anthocyanidins (delphinidin, cyaniding and pelargonidin) and hydrolyzable

tannins (punicalin, pedunculagin, punicalgin and gallic and ellagic acids).¹³

THERAPEUTIC AND OTHER ATTRIBUTES

Daha, Jvara, Trsna, Kasa, Amavata, Atisara, Raktapitta, Arocaka

Used for burning syndrome, fever, morbid thirst, cough, rheumatism, diarrhea, bleeding disorders, and tastelessness (therapeutic uses based on texts from 1000 BC to sixteenth century). Fresh juice alone or in prescriptions was given for diarrhea, cough, edema and as an anti-emetic and digestive (Charaka Samhita, 1000 BC).²⁷ Extracted juice of ripe fruit, which was first roasted in closed heating, was used for all types of diarrhea (Shārangadhara Samhitā, thirteenth century).^{16(a)} Ghee cooked with Dāḍima juice and Yavakshāra (barley ash) was used for bleeding piles and pain (Charaka Samhitā).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Dāḍimāshtak Churna, Dadhika Ghrita, Bhaskaralavana Churna (see Dāḍima dried seed). Brhacchāglādyā Ghrita (Bhaishajya Ratnāvali, seventeenth century); goat's flesh, Ashvagandha and Balā roots are the main drugs, with Shatāvri and ten other plant drugs. Dāḍima dried fruit is a minor component with 40 supplementary herbs. Used for insanity, epilepsy, and nervine disorders. Dadhikā Ghrita (Ashtāngahridaya) contains Dāḍima fruit juice and fruit rind in a formulation of 73 constituents. Used for insanity, epilepsy, and neurological disorders. Bhāskara Lavana (Shārangadhara Samhitā, thirteenth century), a salt-based digestive compound, contains Dāḍima seed.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

15–30 mL.

Pomegranate juice contains more polyphenols than red wine, blueberry, cranberry or orange juice or green tea.¹³

BOTANICAL SOURCE(S)

Quercus infectoria Oliv.
(Fam. Fagaceae)

Tamarix aphylla Karst. and *T. gallica* Linn. galls are equated with Māchikā of Ayurveda³⁰ and Mayeen of Unani medicine.

PHARMACOPOEIAL AYURVEDIC DRUG

Māyākku (Gall).

API, Part I, Vol. IV.

Oak galls, used in medicine, are excrescences on the *Quercus infectoria*, as a result of the puncture of the bark of young twigs by the female gall-wasp, *Cynips gallae-tinctoria*, who lays eggs inside. Galls are collected before the insects escape.¹⁸

AYURVEDIC SYNONYMS

Māyāphala.

Māyuka was mentioned for the first time in Sōdhal Nighantu (eleventh century), syn. Brahma-vitaka, Shishubheshaja. In Rājanighantu (fourteenth century), it was mentioned as Māyāphala^{16(b)}; in Bhāvaprakāsha (sixteenth century), it was mentioned as Mājuphalaka.³

HABITAT

The tree is native of Greece, Asia Minor, Syria and Iran; galls are imported into India.

The tree is also found in Kumaun, Garhwal and Bijnor forests.³

REGIONAL LANGUAGE NAMES

Eng: Oak-gall;
Assam: Aphsa;
Beng: Majoophal, Majuphal;
Guj: Muajoophal, Mayfal;
Hindi: Maajoophal, Majuphal;

Kan: Machikaai, Mapalakam;
Mal: Majakaanee, Mashikkay;
Mar: Maayaphal;
Ori: Mayakku;
Punj: Maju;
Tam: Machakaai, Masikki, Mussikki;
Tel: Machikaaya;
Urdu: Mazu, Mazuphal.

Eng: Dyer's oak, Mecca gall, Turkey gall, Levant gall, Smyrna gall, Syrian gall.

Galls from Asia Minor, Aleppo (Haleb) galls, contain the highest tannin content.^{2(a)}

CONSTITUENTS

Tannic acid, Starch and Sugars.

Tannins 60%–70%, gallotannins, particularly hexa- and hepta-galloyl-glucoses; phenol carboxylic acids—gallic acid 3% and ellagic acid 2%.¹⁴

Galls contain a cytotoxic principle 1,2,3- and 6-tetra-O-galloyl-beta-D-glucose.^{2(d)} See also References 18 and 25.

THERAPEUTIC AND OTHER ATTRIBUTES

Atisara, Grahani, Pravahika, Sveta pradara, Arsa, Danta roga, Mukha roga, Yoni kanda

Used for diarrhea, malabsorption syndrome, dysentery, leucorrhea, piles, dental diseases, diseases of the oval cavity and vaginal laxity (therapeutic uses based on Sanskrit *shlokas* composed by contemporary Ayurvedic scholars; classical texts also quoted).

Mājuphala powder is included in a number of dental powders for strengthening gums and teeth.

A decoction or infusion is used as a gargle for relaxing the throat, tonsillitis, and stomatitis. Ointment (one part of finely powdered galls and four to six parts of Vaseline or benzoated lard) is used for hemorrhoids, anal fissures, chapped nipples, vaginal laxity, and prolapse of the rectum.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Gorochanādi Vati (Vaidya Yoga Ratnāvali, English edn. published by IMPCOPS, excluded the compound), contains solid bile of ox, semen of civet cat, horns of 6 animals, 6 mineral drugs and 32 herbs including Māyākku galls, all in equal proportion. Used for high fever with extreme prostration.

Asthi-sandhānaka Lepa (Rasaratnasāra) contains 12 plant drugs, including Māyāphala galls. Used for external application on bone fractures, improper alignment of bones, and edema.

Mājūphalaka powder was included in an aphrodisiac sweet preparation, Kāmeshwara Modaka (Bhāvaprakāsha, sixteenth century); it acts as an astringent, not as an aphrodisiac.³ (It is a misleading compound.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Raw powder produces blisters, so must be diluted 1:6.

BOTANICAL SOURCE(S)

Raphanus sativus Linn.
(Fam. Brassicaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Mūlaka (Fresh root).

API, Part I, Vol. II.

Mūlaka (dried seed).

API, Part I, Vol. III.

Mūlaka (whole plant).

API, Part I, Vol. II.

International Pharmaceutical name: *Raphini sativi radix*.⁸

AYURVEDIC SYNONYMS

Sālāmarkaṭaka, Visra, Śāleya, Marusambhava.

(Synonyms based on Bhāvaprakāsha, sixteenth century).

Mūla,²⁸ Mūli.³

Hasti-kanda,⁴ Mahākanda.²⁷

Tender variety: Bāla-mūlaka, Potikā.⁴

Pods (common names): Sungrā, Singri, Mungrā.⁷

HABITAT

Cultivated throughout India, up to an altitude of 3,000 m in the Himalayas and other hilly regions.

Indigenous-type radish is white with a conical shape. Purple-skinned radish from Kangra (Himachal Pradesh) was found to contain cyanidin diglycoside.

Introduced-type red-skinned radish yields cyanidin-5-glucoside-3-sophoroside; scarlet-skinned radish yields the corresponding pelargonidin diglycoside (catechol is also reported).^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Radish;

Assam: Mula;

Beng: Mula;

Guj: Mula, Mulo;

Hindi: Muli;

Kan: Moolangi, Moclangi gadde, Mullangi, Mugunigadde;

Mal: Mullanki;

Mar: Mula;

Ori: Mula, Rakhyasamula;

Punj: Mulaka, Muli, Mulaa;

Tam: Mullangi, Mulakam, Mullangu;

Tel: Mullangi;

Urdu: Muli.

CONSTITUENTS

Raphanus sativus Fresh root:

glucoside, methylmercaptan, and volatile oil.

Radish contains glucose as a major sugar, as well as fructose and sucrose. Pectin (0.3% as calcium pectate) and pentosans (starch is absent). Organic acids—*p*-coumaric, caffeic, ferulic, phenyl pyruvic, gentisic, and *p*-hydroxybenzoic.^{2(a)} Amino acids—ornithine, citrulline, arginine, glutamic and aspartic. Glycoproteins, cationic and anionic peroxidases.^{2(c)} Choline and methionine in considerable amounts.^{2(c)} Steroidal sapogenins.^{2(a)} Pungent principle: *trans*-4-methyl-thiobutenyl *iso*-thiocynate. Glucoside *iso*-thiocynate is released when hydrolyzed by an enzyme present in the radish.

Enzymes include phosphatase, catalase, sucrase, amylase, alcohol dehydrogenase and pyruvic carboxylase.^{2(a)}

R**THERAPEUTIC AND OTHER ATTRIBUTES**

Jvara, Svāsa, Kāsa, Pīnasa, Galaroga, Vraṇa, Dadru, Netraroga, Gulma, Arsa, Agnimāndya, Udāvarta

Used for fever, dyspnea, cough, sinusitis, throat diseases, ulcers, ringworm, diseases of the eye, obstructive jaundice/chlorosis, piles, digestive impairments and tympanites (therapeutic uses based on texts from 1000 BC to sixteenth century).

Tender tubers are taken cooked or used in prescriptions (internal and external) for discordance of the three humors (*tri-doshas*), skin

diseases, edema, and alcoholism,² or as a soup for diarrhea. Decoction is used for gastroenteritis and for promoting digestion when added with *Piper longum* powder. Hot paste of dried radish is used for erysipelas. Soup of dried radish is used for asthma (Charaka Samhitā 1000 BC).^{16(a)} Soup of tender radish is used for chronic coryza (Ashtāngahridaya, seventh century).^{16(a)}

IMPORTANT FORMULATION/APPLICATIONS

Chandana balā lakshādi Taila (Yogarātnākara, sixteenth century), contains 4 main plant drugs; Mūlaka root is among 28 supplementary components, all in equal proportion. For cough, asthma, fever, bleeding disorders, nervine affections.

Mūlaka kshāra (Sushruta Samhitā, 1000 BC); alkaline ash of Mūlaka plant is used for dysuria and calculus.

DOSAGE/USAGE/CAUTIONS/COMMENTS

15–30 mL of the drug in the juice form.

Average daily dose: 50–100 mL pressed juice.⁸

Contraindicated in cholelithiasis.^{8,14}

Caffeic and ferulic acids are hepatotropic and choleretic/cholagogues; they lower cholesterol, increase bile secretion and improve liver function. Choline prevents deposition of fat in the liver and methionine helps in synthesis of choline. Amino acids remove toxins produced due to poor liver function and prevent urea accumulation.^{2(c)}

Dried seed

CONSTITUENTS

Raphanus sativus Dried seed:

fixed oil and volatile oil.

Fatty oil yield 30%–50%.^{2(a)} Seeds contain glycosidically bound mustard oils, of which allyl, methyl and isopropyl isothiocyanates and sulforaphene have been identified in different varieties; sulforaphene shows anti-bacterial activity against *Streptococcus*, *Pyrococcus*, *Pneumococcus*, and *E. coli*. Another sulfur-containing oil, raphanin, is active against several Gram-positive and Gram-negative bacteria; a broad-spectrum antibiotic, machrolisin, is specific against *Mycobacterium tuberculosis*.^{2(a)} Seeds also contain cysteine-rich potent anti-fungal proteins.^{2(d)}

versicolor, fever, dyspnea, diseases of the nose, diseases of the eye and amenorrhea (therapeutic uses based on texts from 1000 BC to sixteenth century).

Sushruta (1000 BC) included dried seeds in an ointment for ringworm.²⁸ Charaka (1000 BC) prescribed a paste of Mūlaka and Bakuchi (*Psoralea corylifolia*) seeds, pounded with cow's urine, for leprosy.²⁷ A paste of Mūlaka and Apāmārga (*Achyranthes aspera*) seeds was used topically for pityriasis versicolor (Rājāmārtanda, eleventh century).^{16(a)}

Seeds were also used as a peptic, expectorant, and diuretic. Seeds contain a high tocopherol content.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Hṛdroga, Kaṇṭha roga, Sidhmakuṣṭha jwara, Swāsa, Nasikā roga, Aksi roga, Anārtava

Used for obstructive jaundice/chlorosis, heart disease, throat diseases, leprotic pityriasis

IMPORTANT FORMULATION/APPLICATIONS

Sarṣapādi Lepa (Bhaishajya Ratnāvali, seventeenth century), contains paste of 6 plant seeds including Mūlaka seeds.

For external application on cervical lymphadenitis, goiters, and cysts.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–5 g of the drug in powder form.

Whole plant

CONSTITUENTS

Raphanus sativus Whole plant:

glucoside and volatile oil (containing butyl crotonyl isothiocyanate sulfide) with a typical radish odor. (Source: Reference 2a.)

Volatile oil (0.002%) contains 2-hexen-1-al (leaf aldehyde) and 3-hexen-1-ol (leaf alcohol)^{2(a)}; leaves contain small quantities of *n*- and *iso*-butyraldehyde and *iso*-valeraldehyde, as well as a histaminergic component and a weak spasmolytic factor.¹⁹⁵

Leaves are rich in calcium, iron and ascorbic acid, and they have one of the richest sources of vitamin A among leafy vegetables. They have a high strontium content (82.9 mg/100 g dry basis) and also contain iodine (19.8 µg/100 g).^{2(a)}

Leaves contain 4'-O-methyl kaempferol and 7,4'-di-O-methyl kaempferol.^{2(c)} Plant contains carotene 12.7 mg/100 g, of which beta-carotene is 2–3 mg/100 g.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Arṣa, Agnimāndya, Pināsa, Udāvarta

Used for obstructive jaundice/chlorosis, piles, digestive impairments, sinusitis, and tympanites (therapeutic uses based on texts from 1000 BC to sixteenth century).

Leafy tops and pods are eaten as vegetables.

For assimilation of calcium content, leaves should be consumed as a vegetable with rice. Phytin in rice helps with calcification, which will be low due to the high oxalic acid.^{2(a)} All radish preparations are used in liver, gall bladder, urinary and gastric problems.

Roots, leaves, flowers, and pods are active against a number of pathogens.

Juice of the whole plant is given in sinusitis. Only pods of *R. sativa* var. *caudatus* Linn. (rat-tail radish) are consumed for the properties of *R. sativa*; its root is not used.⁷

IMPORTANT FORMULATION/ APPLICATIONS

Mūlaka sāra (juice/extract), used for liver and gall bladder ailments.

Gandhaka Vati (Bhaishajya Ratnāvali, seventeenth century) is a mercury- and sulfur-based mineral drug that contains the alkaline ash of the Mūlaka plant. Used for constipation and impaired digestion.

Hajarulyahūda Bhasma (Siddhayoga Sangraha, Yadavji Trikamji, a contemporary *vaidya*) is an adaptation of Kushta-e-Hajr-ul-Yahood (National Formulary of Unani Medicine, Part I, page 70) that contains calcined Hajr-ul-Yahood 100 g, Kulthi 400 g and Mooli juice 1.5 L. In the Ayurvedic adaptation, Kulthi (horsegram), an important drug, has been excluded. It is used for calculus.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–40 mL of the drug in juice form.

Contraindicated in cholelithiasis.^{8,14}

Leaf extract enzymes are used to produce *cis*-3-hexenol (used in cosmetics and foods) from linoleic acid.^{2(c)}

Leaves show activity against several Gram-positive and Gram-negative bacteria.^{2(d)}

Rauvolfia serpentina (Linn.) Benth. ex Kurz

Sarpagandhā

BOTANICAL SOURCE(S)

Rauvolfia serpentina (Linn.) Benth. ex Kurz
(Fam. Apocynaceae)

Rauvolfia serpentina.^{2(d),36}

Syn. *Ophioxylon serpentinum* L.¹⁰⁽¹⁾

Roots of *Rauvolfia tetraphylla* Linn., cultivated in various parts of India, are employed as substitutes when *R. serpentina* root is not available³⁶ (known as Baḍā chānda; *R. serpentina* is known as Chhotā chānda).⁷ Among major adulterants are thin roots of *Tabernaemontana divaricata* (L.) R. Br.

Roots of *Rauvolfia densiflora* Benth. and *R. micrantha* Hook. f. are sometimes found mixed in Kerala and Western India.³⁶

PHARMAKOPEIAL AYURVEDIC DRUG

Sarpagandhā (Root).

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Sarpagandhā of Ayurvedic texts was not *Rauvolfia serpentina* of modern medicine, which was identified by the German scientist Rauwolf.¹⁸

Dalhan's equation of Sarpachhatrikā and Varshāsu chhatrakārā indicates that Sarpagandhā of Ayurvedic texts was a Kavaka (mushroom) that was toxic.^{18,16(a)}

(For opinions of Ayurvedic scholars, see References 16(a), 18 and 30.)

International Pharmacopoeial name: *Radix rauwolfiae*.

AYURVEDIC SYNONYMS

Nākuli, Candrikā, Chandramārah.

Synonyms of Nākuli: Sarpa gandhini, Gandha nākuli, Sarpa-netrā, Suvahā, Nakuleshtā and Chīratpatrikā.⁴

HABITAT

Sub-Himalayan tracts up to 1,000 m as well as, in the lower ranges of the Eastern and Western Ghats and in the Andamans.

Punjab eastwards of Nepal, Sikkim, and Bhutan. Commercial supply of the root is mostly from Uttar Pradesh, Bihar, Odisha, West Bengal, Assam, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, and Maharashtra.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Rauvolfia root, Serpentina root;
Beng: Chaandar;
Guj: Amelpodee;
Hindi: Chhotā chaand, Dhavalbaruaa;
Kan: Sutranaabhu;
Mal: Amalpori;
Mar: Adkai, Chandra;
Ori: Dhanbarua, Sanochado;
Tam: Sarppaganti;
Tel: Sarpagandhi.

CONSTITUENTS

Rauvolfia contains indole alkaloids, such as reserpine, serpentinine and ajmalicine.

Contains more than 60 indole alkaloids; the principal hypotensive alkaloids are identified as reserpine and rescinnamine.¹⁰⁽¹⁾

Others include ajmalinine, yohimbine, coryanthine, *iso*-ajmaline, *neo*-ajmaline, papaverine, raubasine, rauwolscine, sarpagine, serpentine, serpentinine, serpinine, and deserpidene.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Madaroga, Yoniśūla, Jvara, Śūla, Krmiroga, Anidrā, Unmāda, Apasmāra, Bhrama, Raktavāta, Bhūtabādhā, Mānasaroga, Visūcikā, Vrana

Used for drug addiction, vaginitis, fever, worm infestations, insomnia, insanity, epilepsy, giddiness, gout, ghost syndrome, mental diseases, gastro-enteritis, and ulcers.

(Incomplete classical texts and Sanskrit *shlokas* composed by contemporary Ayurvedic scholars have been quoted.)

Rauvolfia serpentina as a medicinal plant was first recorded in Europe in 1785, but its efficacy was

not screened until 1946. It was tried in modern medicine to lower high blood pressure and for controlling symptoms of mental illness. The drug is now used only sparingly.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Quoted compounds are not found in any text of classical period.

Sarpagandhā ghana Vati (Siddhayoga Saṅgraha by a contemporary *vaidya* Yadavji Trikamji) contains Sarpagandhā root as the main drug with *Cannabis sativa* leaf, Jatāmāṃsi (Indian Valerian) and Khurāsāni yavāni (Black hal-lebore). (Dose: 750 mg to 1.25 g.) Used for insomnia. (Not a time-tested compound.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g.

Powder: 200 mg daily in divided doses for 1–3 weeks; maintenance dose 50–300 mg daily.¹⁰⁽¹⁾

Standardization basis marker compound: reserpine & Ajmalicine-NLT 0.15% w/w (IP).

For mild essential hypertension, the drug is administered in combination with a diuretic agent to prevent fluid retention, which may develop if *R. serpentina* is given alone.¹⁰⁽¹⁾

Contraindicated in depression, ulceration, pheochromocytoma, pregnancy, and lactation.¹⁴

Rhus parviflora Roxb.

Tintidīkaḥ

BOTANICAL SOURCE(S)

Rhus parviflora Roxb.
(Fam. Anacardiaceae)

R. parviflora and *R. sinuata* Thunb possess similar properties.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Tintidīkaḥ (Aerial part).

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AYURVEDIC SYNONYMS

Tintidīka.

Chakrapāṇi (eleventh century) created confusion by equating Amlikā with Tintidi.¹⁸ (Fruits on mixing with salt taste like tamarind and contain citric acid-2-methyl ester.)^{2(c)} Amlikā is now equated with *Tamarindus indica* Linn. (tamarind).¹⁸

HABITAT

Dry hot slopes of Himalayas from Punjab to Nepal and in the hills of Peninsular India at an altitude of 600–2100 m.

R. sinuata is found in Northwestern India in drier parts, extending into the Deccan peninsula.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Sumac;

Hindi: Samakadana, Raitung, Tungalaa;

Punj: Khatte masoor, Raitung, Tungaa;

Urdu: Sumaak.

Eng: Nepalese sumac.

CONSTITUENTS

Tannins (Gallic acid); flavones (myricetin, quercetin, myricitrin, quercitrin, kampferol); glycosides (isorhmnetin-3- α -L-arabinoside).

Leaves contain flavonoids myricetin, quercetin and kaempferol and their 3-O-rhamnosides. Stem and leaves also gave hentriacontane, hentriacontanol, beta-sitosterol, lignoceric acid and *iso*-rhamnetin-3- α -L-arbinoside.³² Fruits contain echinulin, trimethyl citrate, and citric acid 2-methyl ester. Presence of a flavone naringenin, as a major component, has been reported.¹⁹⁶

THERAPEUTIC AND OTHER ATTRIBUTES

Vatavikara, Atisara, Agnimandya, Aruci, Trsna, Pravahika

Used in neurological complications, diarrhea, digestive impairments, tastelessness, morbid thirst and dysentery (therapeutic uses based on texts from 1000 BC and fourteenth century). Sushruta (1000 BC) included ripe fruits in prescriptions as an astringent, stomachic and appetizer. Mature fruits were prescribed as a cardiac tonic (Madhava Dravya Guṇa, twelfth century), as well as in diarrhea, dysentery, polyuria, and fevers (Bhāvaprakāsha, sixteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Hinguvachādi Churna (Ashtāṅgahridaya, seventh century), contains 24 plant drugs including Tintidika fruit pulp, all in equal proportion. Used for acute constipation, tympanites, anemia and liver and spleen disorders. Sri Ramabana Rasa (Bhaishajya Ratnāvali, seventeenth century), a mercury-based herbo-mineral drug, is processed with Tintidi fruit juice. Used for dysentery, digestive impairments, and rheumatic afflictions. In folk medicine, fruit juice is used as a vermifuge. Paste of the fruit, mixed with charcoal powder, is applied to unhealthy ulcers and suppurating piles.¹⁸

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

In an experimental study, isolated bioflavonoid constituents of the fruit showed sedative–hypnotic effects, decreased sleep latency and increased sleep duration in mice.¹⁹⁶

Ricinus communis Linn.

Leaf

Eraṇḍa

R BOTANICAL SOURCE(S)

Ricinus communis Linn.
(Fam. Euphorbiaceae)

Two varieties have been mentioned in Ayurvedic texts, Shveta (white) and Rakta (red), with small, gray–white seeds (oil yield 37%) and large red seeds (oil yield about 40%).

PHARMACOPOEIAL AYURVEDIC DRUG

Eraṇḍa (Fresh leaf).

API, Part I, Vol. III.

Eraṇḍa (seed).

API, Part I, Vol. III.

Eraṇḍa (root).

API, Part I, Vol. I.

The white variety is used especially for fevers and the red for swellings and mental diseases. Flowers of the red variety are prescribed for painful micturition, the seeds for hepatitis and splenitis and the tender leaves for bladder problems.¹⁸

International Pharmacopoeial names: *Ricini oleum* (oil), *Ricini semen* (seed) and *Ricini radix* (root).

AYURVEDIC SYNONYMS

Gnadhārva-hasta, Pañchāṅgul, Vātāri.

Shveta-eraṇḍa: Dirgha-danda, Chitra, Vyāghra-puchcha, Vardhamānaka.⁴

Rakta-eranda: Rakta-danḍa, Hastikarṇa, Vyāghra, Rubu, Uttānapātra.⁴
Eranda and Urubūka have been mentioned as two separate entities.³⁰

HABITAT

Throughout India, mostly grown wild on waste land and also cultivated for its oil seeds.

Indigenous to East and Northeast Africa, naturalized throughout the tropics.¹

REGIONAL LANGUAGE NAMES

Eng: Castor oil plant;
Assam: Erri;
Beng: Berenda;
Guj: Erando;
Hindi: Erand, Rendee, Andu;
Kan: Harlu;
Mal: Abanakka, Avanakku;
Mar: Erand, Erandee;
Ori: Bheranda;
Punj: Erand;
Tam: Amanakku;
Tel: Amudanu, Amudmuchetu;
Urdu: Erand.

CONSTITUENTS

Ricinus communis.

Fresh leaf: leaves contain alkaloids ricinine and *N*-demethylricinine and flavone glycosides, kaempferol-3-*O*-β-*D*-glucoside and its 3-*O*-β-*D*-xylopyranoside and 3-*O*-β-rutinoside, quercetin-3-*O*-β-*D*-xylopyranoside and its 3-*O*-β-*D*-glucopyranoside and 3-*O*-β-rutinoside, as well as rutin and hyperoside.^{2(d)} Chlorogenic acid, neochloreginic acid and gallic acid have been reported.^{2(c)}

Leaves are toxic due to ricinine.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Krmi, Mutrakṛcchra, Gulma, Vātavyadha, Vastīśūla, Arocaka, Vidradhi

Used for worm infestations, dysuria, abdominal lumps, rheumatic afflictions, pain in urinary bladder, tastelessness and abscesses (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

For improving lactation, warmed leaves were applied to the breasts, and a fluid extract or juice of the leaves was also given.^{178,18} Alkaline ash of leaves was prescribed for cough; mixed with asafetida for obesity; or as an ingredient of Vata patra lavana for rheumatic disorders.^{16(a)} Leaves coated with oil and warmed are commonly applied over the abdomen to give relief to children with flatulence. An infusion is used for stomachache. Leaves are applied to boils and sores as a poultice.¹⁵ Tender leaves cure pain in bladder.⁵

Fresh juice is used as an emetic in poisoning.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Chaturbhujā Rasa (Rasendrasāra Sangraha), Chaturmukha Rasa (Bhaishajya Ratnāvali, seventeenth century), Chintāmaṇi Chaturmukha Rasa (Bhaishajya Ratnāvali). All the three are mercury based multimineral drugs. During the last phase of processing, the drugs are covered with Eraṇḍa leaves and kept inside a heap of grains for 3 days.

All three compounds are used for insanity, epilepsy and a host of neurological disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 mL (Svarasa). 2–5 g (Powder).

Toxic constituents: 3% ricinin and ricinine.

Seed

CONSTITUENTS

Ricinus communis.

Seed: fixed oil.

Seeds yield 40%–45% of a fixed oil.^{2(c)} Seeds contain 2.8%–3% toxic components; the main toxic principle is albumin ricin, and the feebly toxic alkaloid is ricinine. Ricinine, present in the seed coat, leaves and stems, shows a toxicity comparable with lead arsenate. Oil obtained by cold expression does not contain ricin.

Glyceride composition of cold-pressed castor oil: triricinolin 68.2%, diricinonoleins 28.0%, monoricinolein 2.9% and non-ricinoleo glyceride 0.9 mole %.

Laxative property of castor oil is reported due to ricinoleic acid formed by hydrolysis under the influence of lipolytic enzymes.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavata, Vibandha, Yakṛt roga, Plīhodara, Arśa, Kaṭi Śūla, Gr̥dhrasi

Used for rheumatic and neurologic afflictions, constipation, liver diseases, splenitis, piles, pain of the lower back and sciatica (therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Bṛhat Saindhavādi Taila (Bhaishajya Ratnāvali, seventeenth century), contains Eranda Taila

and Dill fruits as main plant drugs, with 16 supporting herbs and rock-salt. Used for calculus, dysuria, internal abscesses, and intercostal neuralgia.

Gandharvahastādi Taila contains Eranda root. See root.

Simhanāda Guggulu (Bhaishajya Ratnāvali), a Guggulu-based herbo-mineral drug, contains Chitra oil. Used for rheumatic and neurologic afflictions and gout.

Mishraka-sneha (Ashtāngahridaya, seventh century) contains Eranda oil and cow's *ghrita* in equal proportions with 21 supporting herbs. Used for abdominal lumps, constipation, abscesses, and neurologic disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

0.5–3 g (Powder).

Castor oil should not be used as a cathartic in the treatment of hookworm or other infestations with tetrachloroethylene or other fat-soluble vermifuges.^{2(a)}

Contraindicated in intestinal obstruction, acute inflammatory intestinal diseases and appendicitis.

Ricin side chain A of the castor seed protein showed cytotoxic activity, but only at ED₅₀ doses experimentally.^{2(a,c)}

R

Root

CONSTITUENTS

Ricinus communis.

Root: alkaloid (ricinine).

The root and root bark contain potassium, sodium, magnesium, chloride, nitrate, iron,

aluminium, manganese, calcium carbonate and phosphate. Gallotannins, a germanicol ester derivative and l-tridecene-3, 5, 7, 9, 11-pentyne, along with beta-sitosterol²⁵ and a sedimentable enzyme, adenylate cycease,^{2(c)} have been reported.

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavata, Śoṭha, Vastiśūla, Kaṭiśūla, Udararoga, Jvara

Used for rheumatic afflictions, edema, pain in the urinary bladder, lower backache, diseases of the abdomen and fever (therapeutic uses based on texts from 1000 BC to sixteenth century).

The root, mixed with warm milk, was prescribed for misperistalsis, constipated bowels and diarrhea with blood and mucus (Charaka Samhitā, Sushruta Samhita, 1000 BC; Ashtangahridaya, seventh century).

A decoction of the root, mixed with the paste of dry ginger, was given in rheumatic afflictions, lumbago, sciatica and plurodynia (Shārangadhara Samhitā, thirteenth century; Bhāvaprakāsha, sixteenth century).^{16(a),27,28}

Root bark is reported to be a powerful purgative.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Gandharvahasta Kvātha Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica),

contains 8 plant drugs including Eranda root, all in equal proportion.

Used for impaired digestion, constipation, and tastelessness.

Gandharvahasta Taila (Ashtāngahridaya, seventh century); Eranda root is the main drug. Used for tympanites, rheumatic and neurological affluctions, edema, abscesses, and splenitis.

Vidāryādi Ghrita (Ashtāngahridaya, not quoted in the API) contains Eranda root in a compound of 20 plant drugs. Used for cough, phthisis, and emaciation.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–30 g of the drug for decoction.

The enzyme adenylate cyclase, reported from the roots, has a vital role in signal transduction in mammalian tissues; specific receptors on the external membrane recognize and bind extracellular hormones and neurotransmitters, leading to the release of the secondary messenger cyclic AMP into the cell.^{2(c)}

Rosa centifolia Linn.

Satapatrika

R

BOTANICAL SOURCE(S)

Rosa centifolia Linn.
(Fam. Rosaceae)

Shatapatri is also equated with Rosa damascena Mill.¹⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Satapatrika (Flower).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Devataruṇī, Karnikā.

Taruni.³⁰

Deva-taruni, Karnikā.⁷

Not to confused with Shatapatra (Nelumbo nucifera) or Shatapushpā (Peucedanum graveolens or Foeniculum vulgare).

HABITAT

Cultivated in gardens. Cultivated chiefly in Uttar Pradesh and Bihar.⁷

Grows mainly in France and North Africa, and is often called Moroccan Rose.

Rosa damascena grows in abundance in Bulgaria. Cultivated in a few areas of Uttar Pradesh (Aligarh, Ghazipur and Kannauj) for the preparation of rose water and *attar*.

REGIONAL LANGUAGE NAMES

Eng: Rose;
Assam: Varde ahamar;
Beng: Golap;
Guj: Moshamee gulab;
Hindi: Gulab;
Kan: Rojahu;
Mal: Rosappoovu;
Mar: Gulab;
Punj: Gulab;
Tam: Rojapoo;
Tel: Rojapuvvu, Gulabi;
Urdu: Gulab, Ward.

Eng: Cabbage rose, Provance rose, Hundred-leaved rose.

In Unani medicine, *Rosa damascena* Mill. is used as Gul-e-Surkh.³⁷

CONSTITUENTS

Essential oil.

Fresh petals yield 0.05% of an essential oil containing geraniol 26.7%, citronellol 22.9%, nerol 14.26% and nonadecane 11.2% as major constituents.^{2(d)} Contains 15% tannins (oligomeric proanthocyanidins).⁷

Flowers and leaves contain 1.3% and 8.5% saponins, respectively. Petals are reported to contain methionine sulphoxide.⁷

Quercetin-3-glycoside, isolated from the petals, showed scavenging and hyaluronic acid depolymerization effects *in vitro*.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kustha, Daha, Mukhasphota, Raktapitta, Raktavikara

Used for obstinate skin diseases, burning syndrome, stomatitis, bleeding disorders, and blood impurities (therapeutic uses based on texts from the fourteenth to sixteenth centuries).

Rose water is used extensively in skin lotions, ointments and eye drops. Gulkand prepared from *Rosa damascena* petals is preferred, as the petals contain cyanidin-3, 5-diglucoside (95% of total anthocyanins). Flowers contain juglanin, tribuloside, afzelin, astragalin and trifolin. The essential oil contains sulfur compounds.

Shatapatri of Ayurvedic texts was considered cooling, a cardiac tonic and carminative. It promotes improved complexion and eyesight, alleviates vitiated blood and exhaustion and elevates mood.

IMPORTANT FORMULATION/ APPLICATIONS

Tarunārka (Rose water) is used externally as a natural, soothing, antiseptic and anti-inflammatory skin tonic, especially for dry skin.

Vasanta Kusumākara Rasa, a mineral compound, is triturated and processed in six plant parts, including rose petals.

Pravāl Pishi, Mukta Pishti, Zaharmohrā Pishta and Trṇkāntā Maṇi Pishti are also triturated in rose water.

Gulkand (not mentioned in the API) is an important tonic of Indian medicine (prepared by pounding together a mixture of rose petals and sugar in equal proportions). Used as a tonic, laxative and in sore throat and enlarged tonsils.^{2(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Essential oils are blended by adding three drops of essential oil into 5 mL of base oil. However, just one drop into 5 mL of carrier oil is enough for therapeutic use in aromatherapy.

Rubia cordifolia Linn.

Mañjiṣṭhā

BOTANICAL SOURCE(S)

Rubia cordifolia Linn.
(Fam. Rubiaceae)

Rubia cordifolia Linn. sensu Hook. f.
In the Eastern Himalayas, at least two distinct
races are found: *R. manjith* Roxb. ex Flem. syn.
R. cordifolia var. *manjista* (Roxb.) Miq. and
R. wallichiana Decne.^{2(a)}
Material originating from Sikkim and
Northeastern hills consists of the root of
R. sikkimensis Kurz.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Mañjiṣṭhā (Stem).

API, Part I, Vol. III.

Roots are used in Ayurvedic medicine, and some-
times pieces of the stem are adulterated.³ The
applicable part of Madder is the root.¹³

International Pharmacopoeial name: Tinctorium
Radix.¹³

AYURVEDIC SYNONYMS

Yojnavāllī, Vastrarajinī, Rakta.

Raktāngi, Raktayaṣṭikā, Sāmaṅgā, Vikasā, Jingi.²⁵
Arunā, Gandira, Jingi, Lohitayashtikā, Tamravallī.³

HABITAT

Throughout India ascending to 3,750 m.

Distributed in Asia, Africa, and Australia.

REGIONAL LANGUAGE NAMES

Eng: Indian madder;
Assam: Phyvva;
Beng: Manjistha, Manjith;
Guj: Manjitha;
Hindi: Manjitha, Manjit;
Kan: Manjustha;

Mal: Manjatti;
Mar: Manjihtha;
Punj: Manjistha, Manjit;
Tam: Manjatte;
Tel: Manjishtha;
Urdu: Majeeth.

CONSTITUENTS

Glycosides.

Root afforded cyclic hexapeptides, several sub-
stituted naphthaquinones and hydroxy anthra-
quinones, and their glycosides rubiadin, a
major dihydroxy-anthraquinone, exhibited
potent hepatoprotective action against car-
bon tetrachloride-induced hepatic damage in
rats;¹⁹⁷ and anti-oxidant action that was better
than EDTA.¹⁹⁸

Cyclic hexapeptides RA-III, -IV, -V and -VII
showed anti-neoplastic and anti-tumor activ-
ity; rubiate stimulated hemostatic activity; nep-
thahydroginones, furomollugin and mollugin
strongly suppressed the secretion of hepatitis B
surface antigen and showed lipoxxygenase- and
cyclooxygenase-inhibiting activities.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Yoni roga, Akṣi roga, Ślesmaja śoṭha, Kama roga,
Mañjiṣṭha meha, Raktātīsara, Kuṣṭha, Visarpa,
Prameha, Sarpaviṣa, Bhagna, Arśa, Vyanga

Used for vaginal disorders, eye diseases, bronchial
inflammation, diseases of the ear, menor-
rhagia, diarrhea with blood, obstinate skin
diseases, erysipelas, urinary disorders, snake
bites, fistula-in-ano, piles, and chloasma of
face (therapeutic uses based on texts form the
thirteenth to sixteenth centuries).

Mañjiṣṭhā root was included in a number of pre-
scriptions by Charaka, Sushruta (1000 BC) and
Ashtangahridaya (seventh century). During the
sixteenth century, 48 compounds appeared in
Bhāvaprakāsha alone.

**IMPORTANT FORMULATION/
APPLICATIONS**

Root is a supporting herb in all the quoted compounds, except in Khadirādi Gutikā Mukharoga (Charaka Samhitā, 1000 BC); stem is a secondary herb.

In all Indian medicinal systems, the root is preferred. The root remained a potent drug for obstinate skin diseases, erysipelas, edema and was an excellent aid for the promotion of complexion throughout the classical period, from 1000 BC to sixteenth century. The root was included as a supporting herb in compounds for urinogenital diseases and as a deobstruent, anti-bacterial and anti-inflammatory agent in various prescriptions.¹⁸

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

2–4 g of the drug.

European madder (*R. tinctorium* Linn.) contains lucidin, an anthracene derivative. Anthracene is genotoxic and causes dose-dependent increases in benign and malignant liver and kidney tumors in experimental rats.¹³ The root of Indian madder (*R. cordifolia* Linn. sensu Hook. f.) afforded cytotoxic cyclic hexapeptides.^{2(u)}

Standardization basis marker compound:
Rubiadin-NLT 0.02% w/w (IP).

BOTANICAL SOURCE(S)

Saccharum bengalense Retz.

Syn. *S. sara* Roxb. *S. munja* Roxb.

(Fam. Poaceae)

Erianthus manja (Roxb.) Jesw.

Tr̥na panchamūla (the roots of five grasses):

Charaka: Shāli, Kāsha, Shara, Darbha and Ikshu.

Sushruta: Kusha, Kāsa, Nala, Darbha and Kāndekshu.

South India: Kusha, Ikshu, Shāli, Darbha and Kāndekshu.

Saccharum arundinaceum Retz. is used as Śāra in Kerala.⁵ *Arundo donax* Linn. is also used in many places as Śāra.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Śāra (Root).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Bhadra munja.

Munja, Vāna, Sara, Shara.⁷

Ishikā.³⁰

Rāmashara is equated with *S. arundinaceum*.⁷

HABITAT

Found mainly in Punjab, Uttar Pradesh, Bihar, Bengal and Odisha.

S. arundinaceum is used in Kerala as Śāra and is found in Bengal, Assam, Sikkim, Odisha, Tamil Nadu and Kerala, extending to Sri Lanka, Malaysia, Indonesia and New Guinea.^{2(a)}

REGIONAL LANGUAGE NAMES

Beng: Sara;

Guj: Sarkat;

Hindi: Sarkand, Moonja;

Kan: Munji hullu, Hodake hullu;

Mal: Ama, Amaveru, Sara, Munjappullu;

Mar: Munja, Trikande;

Ori: Sara;

Punj: Moonja, Sarkanda;

Tarn: Munjipul, Munjappullu;

Tel: Munja;

Urdu: Munja, Sarkanda.

CONSTITUENTS

Sugars.

The grass yields 19.5% sugars (on a dry weight basis) when digested with sulfuric acid.

Glucose, xylose, galactose, and rhamnose have been identified in the hydrolysate containing 34.5% fermentable sugars.^{2(a)}

In the root, carbohydrates were present and calcium oxalate was abundant.¹⁹⁹ The water extract, containing carbohydrates of the roots, was tested against the microbial strains responsible for urinary tract infections; it showed significant anti-bacterial, anti-fungal and anti-oxidant activities.²⁰⁰

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Akṣiroga, Tr̥ṣṇa, Visarpa, Mūtrakṛcchra, Bastiśūla, Mūrchā, Bhrama

Used for burning syndrome, diseases of the eye, thirst, erysipelas, dysuria, lower back pain, syncope and vertigo (therapeutic uses based on texts from thirteenth to sixteenth centuries).

Quoted texts indicate that there were two varieties of Śāra (*Śaradvya*) and Munja (*Munjadvya*). Possibly these were Śāra and Ramasara (*S. arundinaceum* and *S. munja*).

IMPORTANT FORMULATION/ APPLICATIONS

Sukumār Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains *Tr̥na panchamūla* with 16 other plant drugs,

all in equal proportion. Used for edema, gout, lumps, abscesses, and piles.
Ṭṛṇa Panchamūla Kvātha Churna (Bhaishajya Ratnāvali, seventeenth century) contains only *Ṭṛṇa panchamūla*. Used for dysuria.
Brahma Rasāyana (Charaka Samhitā, 1000 BC) contains 41 herbal drugs in varying proportions, including *Ṭṛṇa panchamūla*. Used as a rejuvenating tonic for the whole body.

DOSAGE/USAGE/CAUTIONS/COMMENTS

20–50 g of Kvatha churna for decoction. 6–10 g powder.
 All five grass roots are used as one composite drug for urinary tract infections.

Saccharum officinarum Linn. Stem Ikṣu

BOTANICAL SOURCE(S)

Saccharum officinarum Linn.
 (Fam. Poaceae)
 In Bhavaprakasha, under Ikshu *varga*, the following varieties have been mentioned: Pauṇḍraka, Bhiruka, Vaṁśaka, Sataporaka, Kāntārekshu, Tāpasekṣu, Kāṣṭhekṣu, Sūchi patraka, Naipāla, Dirgha patra, Nilapora and Kaśakṛi.
 Properties of *Ikshu varga* have been described in Bhavaprakasha and Madhava Dravya Guna (prior to the twelfth century).

PHARMACOPOEIAL AYURVEDIC DRUG

Ikṣu (Dried stem).
 API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Root: Dirghcchada, Bhurirasa, Gudamula, Asipatra, Traarasa (API, Vol. IV)
 Plant: Mahārasā, Vaṇunihsṛta, Guḍa patraka, Ṭṛṇa rāja, Madhu ṛṇa, Gaṇḍiri, Mr̥tyupushpaka.⁴

HABITAT

Cultivated in all hotter parts in warm climate throughout India.

REGIONAL LANGUAGE NAMES

Eng: Sugarcane;
 Assam: Kusiya;
 Beng: Ganna;
 Guj: Sherdi, Serdi;
 Hindi: Ikha, Ganna;
 Kan: Kabbu;
 Mal: Karumbu, Karimpu;
 Mar: Ush;
 Ori: Akhu;
 Punj: Ganna;
 Tam: Karumbu;
 Tel: Gheraku;
 Urdu: Ganna, Naishkar.
 Eng: Noble Cane.^{2(a)}

CONSTITUENTS

Sucrose.
 Indian sugar canes generally contain water 70%–75%; sugars (sucrose, glucose and fructose) 12%–15%; fiber 10%–20%; nitrogenous substances 0.3%–4%; fats and waxes 0.15%–0.25%; gums and pectins 0.15%–0.25%; free acids 0.10%–0.12%; and ash 0.3%–0.5%. The internode is richer in sucrose than the node; the rind is poorer in sucrose.

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Mūtra kṣaya.

Used for bleeding disorders and anuria (therapeutic uses based on texts from 1000 BC to sixteenth century). Quoted excerpts refer to sugar cane juice.

Juice with milk was given in hemoptysis and urinary diseases. Used as a part of diet and as a diuretic, demulcent and spermopoetic (Sushruta Samhita, 1000 BC).

Phanita (sugar cane juice boiled down to a quarter volume) was prescribed for exhaustion and for cleansing the urine and urinary bladder. Jaggery was also prescribed for cleansing the urine. *Sitopalā* (double-purified sugar candy) was used as demulcent and pectoral.¹⁸

IMPORTANT FORMULATION/
APPLICATIONS

Both the quoted compounds do not represent the therapeutic contribution of *Ikshu*.

In *Amṛtaprāsha Ghrita* (*Ashtāṅgahridaya*, seventh century) and *Dhātrādi Ghrita* (*Sahasrayoga*, a non-Samhitā, Kerala Materia Medica), *Ikshu rasa* is an important constituent. (Not quoted in the API.)

DOSAGE/USAGE/CAUTIONS/
COMMENTS

200–400 ml. in the juice form.

Policosanols (main component *octacosanol*) derived from sugar cane wax is used in many countries as a cholesterol-lowering agent.¹⁷⁸

Saccharum officinarum Linn. Root stock Ikṣu

BOTANICAL SOURCE(S)

Saccharum officinarum Linn.
(Fam. Poaceae)

Tṛṇa panchamūla (the roots of five grasses).
Charaka: *Shāli*, *Kāsha*, *Shara*, *Darbha* and *Ikshu*.
Sushruta: *Kusha*, *Kāsa*, *Nala*, *Darbha* and *Kāndekshu*
South India: *Kusha*, *Ikshu*, *Shāli*, *Darbha* and *Kāndekshu*.

PHARMACOPOEIAL AYURVEDIC DRUG

Ikṣu (Root stock).
API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Dirghacchada, *Bhurirasa*, *Gudamula*, *Asipatra*, *Trnarasa*.

Mahārāsa, *Veṇu nihsṛta*, *Guda patrakā*, *Tṛṇa rāja*, *Madhu tṛṇa*, *Gaṇḍiri*, *Mṛtyu pushpaka*.⁴

HABITAT

Cultivated in all hotter parts in warm climate throughout India.

REGIONAL LANGUAGE NAMES

Eng: Sugar-cane;
Assam: *Kuhiyare*;
Beng: *Ganna*, *Akh*;
Guj: *Sheradi*;
Hindi: *Ganna*, *Ikh*;
Kan: *Ikshu*, *Kabbu*;
Mai: *Karimpu*;
Mar: *Us*;
Punj: *Ganna*;
Tam: *Karumbu ver*;
Tel: *Cheraku*, *Cheruku*;
Urdu: *Ganna*, *Naishkar*.

Eng: Noble cane.^{2(a)}

CONSTITUENTS

Constituents not quoted.

Root contain an aromatic ester vanilloyl-1-O-beta-glucoside acetate.^{15,178}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Mutrakrcchra, Ojoksaya, Nasa rakta srava, Graham, Pandu, Ksataja kasa, Visarpa

Used for bleeding disorders, dysuria, low immunity, nosebleeds, malabsorption syndrome, anemia, cough due to the lung cavity, and erysipelas (therapeutic uses based on texts from 1000 BC to sixteenth century).

The root of Ikshu was used in prescriptions for dysuria, anuria, retention of urine, and other urinary disorders during pregnancy (Bhāvaprakāsha, sixteenth century).

The root is a component of *Trna panchamula* of Ayurveda.

IMPORTANT FORMULATION/ APPLICATIONS

Trṇapanchmūla Kvāth, Sukumara Ghrita, Brahma Rasāyana. (See *Saccharum bengalense*, root.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

15–30 g in decoction form.

Decoction of dried root is taken orally to treat diabetes mellitus.^{178,204}

Saccharum spontaneum Linn.

Kāśa

BOTANICAL SOURCE(S)

Saccharum spontaneum Linn.
(Fam. Poaceae)

Trṇa panchamūla (the roots of five grasses).
Charaka: Shāli, Kāsha, Shara, Darbha and Ikshu.
Sushruta: Kusha, Kāsa, Nala, Darbha and Kāndekshu
South India: Kusha, Ikshu, Shāli, Darbha and Kāndekshu.

HABITAT

Throughout India, in warmer parts ascending up to 1,800 m in the Himalayas.

Distributed widely in the subtropical and tropical parts of Asia and Africa.^{2(a)}
S. spontaneum has the widest geographical range of members of the genus *Saccharum*.

REGIONAL LANGUAGE NAMES

Eng: Tatch-grass;
Beng: Chhote-kase, Kash, Keshe;
Guj: Kansado, Kansa, Kansado, Ghans;
Hindi: Kans, Kasa;
Kan: Kirayikagachchha, Kasalu;
Mal: Nannana, Kusa, Kuruvikarimpu;
Mar: Kasai;
Punj: Kani;
Tam: Nanal, Nanalu, Karumbu, Kasa, Amaver;
Tel: Kakicheraku, Relu;
Urdu: Kansa, Kasa.

PHARMACOPOEIAL AYURVEDIC DRUG

Kāśa (Root stock).

API, Part I, Vol. III.

Kāsha is one of the five components of Trṇa panchamūla of Charaka and Sushruta, which is used as a composite drug for dysuria and urinary tract infections.

AYURVEDIC SYNONYMS

Śvetacāmara.

Shāradā, Kāshī, Chāmrapushpikā.²⁷
Sukānda, Kāsekshu, Ishaka.⁴

CONSTITUENTS

Constituents, not quoted.

Aqueous and alcoholic extracts of the root contained carbohydrates, glycosides, tannins, flavonoids, and amino acids; gum and mucilage were absent.

Root extract showed potent anti-oxidant activity.²⁰¹

In an experimental study, the effect of the ethanolic extract of the root in calcium oxalate calculi of rats was quite encouraging. Urinary urea, uric acid, and creatinine were significantly normalized.²⁰²

Root extract was active against *Staphylococcus aureus*.²⁰³

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Mūtarakṛcchra, Asmarī, Dāha, Raktadosa, Śoṣa, Kṣaya

Used for bleeding disorders, dysuria, calculus, burning syndrome, blood disorders, cachexia and wasting diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

The root was taken internally as a purgative; the plant was taken with cow's milk in hemoptysis and urinary diseases (Sushruta Samhita, 1000 BC).

A decoction of the grass was prescribed internally for fever, senility and for promoting lactation (Charaka Samhitā, 1000 BC).

Milk, processed with decoctions of Kāsha, Kusha and Ikshu of the *Tr̥na panchamūla* group and Vidāri (*Pueraria tuberosa* DC.), was beneficial in epilepsy (Ashtāngahridaya, seventh century).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Brahma Rasāyana, Sukumāra Ghrita, Tr̥napanchamūla Kvātha Churna: contain *Pancha tr̥namūla* group.

Karpurādyā Arka and Mutravirechaiya Kashāya contain Kusha, Kāsha and Darbha roots.

Stanyajanana Kashāya contains Kusha, Kāsha, Darbha and Shāli roots.

Ashmarihara Kashaya Churna contains Kusha, Kāsha and Shali roots.

All of the root components belong to the diuretic, urinary tract disinfectant, and galactagogue *Pancha Tr̥namūla* group of Ayurveda, and are used for vesicle calculi, dyscrasia, hemorrhagic disorders, and strangury.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

The decoction is preferred.

Salix alba L.

Śveta Vetasa

BOTANICAL SOURCE(S)

Salix alba L.
(Fam. Salicaceae)

In the Dhanvantari Nighantu (thirteenth century) text, *Vetas-dwya* (the “Two Vetasa”) have been mentioned. Vetasa is now equated with *Salix caprea* Linn.³ and Jala vetasa with *Salix tetrasperma* Roxb.³ Vanjula and Vanira (synonyms of Vetasa)³⁰ still remain unidentified, though these are provisionally equated with Jala vetasa.

It still remains unexplained why Vetasa was included in the “Five Latex-bearing

Trees” (*Panchci-kshiri vr̥ksha*) as a substitute.^{3,30}

In Kerala, *Homonoia riparia* Lour. (Euphorbiaceae) is used as Vetasa or Jala-vetasa.³

PHARMACOPOEIAL AYURVEDIC DRUG

Śveta Vetasa (Leaf).

API, Part I, Vol. VI.

Non-classical.

European willow is known as White willow or Silver willow.

AYURVEDIC SYNONYMS

Śvata veda-muśka.

Bed (not Veda) Mushk (*Salix caprea*) is used in Unani medicine,³⁷ as well as in other traditional medicinal systems.

The bark of European willow (*Salix alba*) is known as Bed-sādā. *S. alba* resembles Jala vetasa of classical texts to a great extent.

In Europe, medicinal part is bark.

HABITAT

Cultivated in Western Himalayas.

S. caprea has been correctly identified as Vetasa, as it grows on dry and even rocky ground, as well as in swampy places.

S. tetrasperma is found growing gregoriously along the banks of rivers and streams and in wet places.

S. alba is frequently cultivated (propagated by cuttings) in the Western Himalayas up to an altitude of 2,400 m, mostly along water courses or on swampy grounds; it is not found wild. It should have been equated with Jala vetasa.

REGIONAL LANGUAGE NAMES

Eng: European willow, White willow;

Hindi: Svata veda muska;

Kan: Neerganjimara;

Mar: Pandra veda muska;

Pun: Bis, Malchang, Bhushan, Madnu;

Urd: Bed sada.

S Svata veda mushka is not a common name in the Hindi region. Bed mushk is a common trade name.

CONSTITUENTS

Amentoflavone, apigenin, (+)- catechin, (+)-galocatechin, isoquercetrin, rutin, narcissin, isorhamnetin-3-O-β-D-glucoside, salicin, fragilin, salicortin.

Leaves contain flavonoid glycosides rhamnazine-3-beta-D-glucoside, apigenin-7-O-(4-*p*-coumaryl) glucoside, terniflorin (an artefact), quercetin-3-O-glucoside, quercetin-3-O-rutinoside, iso-rhamnetin-3-O-glucoside,

iso-rhmanetin-3-O-rutinoside, quercetin-7-3'-dimethylether-3-O-glucoside and luteolin-7-O-beta-D-glucopyranoside; leucoanthocyanidins; phenolic compounds salicin, salicortin, salidroside, fragilin, grandidentatin and triandrin; piperidine imino acid.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta (rheumatism), Śvitra (Leucoderma/Vitiligo), Atisāra (diarrhoea), Kāmāla (Jaundice), Kārṇaroga (disease of ear), Pravāhikā (dysentery), Raktaṣṭhivana (haemoptysis), Raktapitta (bleeding disorder), Vātarakta (Gout).

Used as a single drug.

Therapeutic uses based on Danvantari Nighantu (thirteenth century).

Vetasa (Vetasa/Jala-vetasa) is cooling, cures afflictions caused by evil spirits (protects from fear psychosis), disinfects wounds, cures bleeding disorders and alleviates kapha imbalances (based on quoted text in the API).

IMPORTANT FORMULATION/ APPLICATIONS

Charaka and Sushruta (1000 BC) gave leaves cooked as vegetable for fever with rigor, hemothermia, morbid thirst, menstrual disorders;^{27,28} a dietary preparation of leaves with *ghee*, sours and salt for checking diarrhea.^{16(a)}

Tender leaves were prescribed for treating intrinsic hemorrhage (Bhāvaprakāsha, sixteenth century).^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Cūrṇa (powder): 3 to 6 g.

Kaṣāya (decoction): 50 to 100 mL.

Bark is used in Europe and the U.S. The ester glycosides salicortin, tremulacin, and fragilin can be considered to be prodrugs of salicylic acid that deliver the compound into the systemic circulation without irritating the gastro-intestinal tract.¹⁷

Salvadora persica Linn. var. *wightiana* (Planch.ex Thw.) Verdc

Fruit

Pīlūh

BOTANICAL SOURCE(S)

Salvadora persica Linn. var. *wightiana* (Planch.ex Thw.) Verdc

Syn. *S. persica* Linn.
(Fam. Salvadoraceae)

Salvadora oleoides Decne is equated with Brihat Pīlu.^{3,15}

S. persica fruits are smaller.^{3,29}

PHARMACOPOEIAL AYURVEDIC DRUG

Pīlūh (Fruit).

API, Part I, Vol. V.

Pīlūh (Leaf).

API, Part I, Vol. V.

Pīlūh (Root bark).

API, Part I, Vol. V.

(Correct nomenclature is Pīlu, not Pīlū.)³

Not to be confused with Pīluparnī, equated with *Maerua arenaria* Hook. f. & Th.

AYURVEDIC SYNONYMS

Guḍaphala, Srānsī, Pīlū.

Tikshna vṛksha (a Sanskritized synonym based on spear-shaped leaves of *S. oleoides*).^{16(c)}

Sahasrayāngi, Sahasrākshi, Tikshnadru, Karabhapriya.⁴

Fruit: Pīlu, Pīluja.⁴

HABITAT

Arid tracts of Punjab and north western parts of India.

Found on saline lands. Found in tropical Africa to Asia.¹

REGIONAL LANGUAGE NAMES

Eng: Salt bush, Toothbrush tree;

Assam: Arak, Irak;

Beng: Peelugachh, Jhal;

Guj: Peelu, Khareejal;

Hindi: Pīlu, Jhak, Peelu, Kharjal;

Kan: Gonimara, Kankhina, Genumar;

Mal: Uka;

Mar: Pīlu, Khakhan;

Punj: Peelu;

Tam: Kotumaavali, Chittuva, Perungoli, Udhaiputtai;

Tel: Gogu, Varagogu, Gunia.

Eng: Mustard tree.^{2(a)}

Twigs: Miswak.

CONSTITUENTS

Salvadora persica Fruit:

Beta-sitosterol, sterol glycoside, benzyle isothio-agnate, traces of alkaloid, fixed oil, sugar and fat; the non-saponifiable portion of the oil consists of dibenzylurea and dibenzlethiourea.

Fruits of *S. oleoides* contain beta-sitosterol and its glucoside and stigmasterol; benzylisothiocy-nate, *n*-octacosanol and tetracosane; flavonoids quercetin and rutin; thio-urea derivatives; phospholipids phosphatidylethanolamine, phosphatidylcholine, phosphatidylinositol and cardiolpin. Seed fat contains myristic, lauric and palmitic acids.³²

S. oleoides fruit contains Ca 630 mg/100 g, P 167 mg/100 g, Zn 2 mg/100 g, Fe 8 mg/100 g, and Mn 2 mg/100 g.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Aśmari, Mūtrakṛcchra, Jvara, Sarpavisa, Arśa, Bastivikāra, Udararoga, Visavikāra, Ānāha

Used for abdominal lumps, calculus, dysuria, fever, snake bites, piles, diseases of the urinary system, diseases of the abdomen, disorders due to poison, and distention (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta (1000 BC) prescribed fruits, as well as the oil of the seeds, as a laxative in rhinitis, hemicrania, intestinal parasites,

urinary disorders, and suppurating skin diseases.¹⁸

Fresh fruits were given with buttermilk for piles (Ashtāṅga Samgraha, Ashtangahridaya, sixth to seventh centuries).

Pilu belongs to the group of fruits that are used as antidotes to poisons.⁴

IMPORTANT FORMULATION/ APPLICATIONS

Mishraka sneha (Ashtāṅgahridaya, seventh century), contains 21 plant drugs, including Tikshna vrksha fruit as a synonym of Pilu, all in equal proportion. (May be, *S. oleoides*, due to its spear-shaped leaves, was known as Tikshna vrksha.)

Used for abdominal lumps, constipation, colic, abscesses, and neurological diseases.

Ghee, cooked with the paste of Pilu fruits, removes hardness of the bowels and is efficacious in abdominal lumps, diseases of the abdomen and poisoning (Charaka Samhitā, 1000 BC).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Fruits are taken early in the morning in constipation.^{2(d)} Dried, ground berries are also used as a laxative. Dried fruit, cooked with cloves, sugar and ginger, is eaten to regulate menstruation.

Leaf

CONSTITUENTS

Salvadora persica Leaf:

Beta-sitosterol, glucotropaeolin, terpenes, and flavonoids.

The leaves contain an indole alkaloid salvadoricine. The lignan glycosides salvadoside and salvadoraside have been isolated from the stem, along with syringin, liriiodendrin, and sitosterol-3-O-glucopyranoside.^{2(c)} Minfiensine and mormavacurine are also reported.¹⁵

consumption, splenic diseases, all obstinate skin diseases, fistula-in-ano, and scrofula (therapeutic uses based on texts from 1000 BC to sixteenth century).

Juice of Pilu acts as a bitter tonic on the digestive system and on kidney functions; it eliminates poisons and is specific for abdominal lumps (chlorosis) and piles (Dhanvantari Nighantu, Rāja Nighantu, thirteenth to fourteenth centuries).

IMPORTANT FORMULATION/ APPLICATIONS

Pilu Taila (details could not be traced).

In Maharashtra, Khāṅkhand oil (Pilu oil) is used as a massage oil for gout and rheumatic afflictions.

Leaves possess anti-scorbutic and astringent properties. A decoction is used in asthma and cough.^{2(a),15} The tender parts are taken with honey for catarrh.^{2(d)}

Dried leaves, in small doses, are taken with copious amount of water for flatulence and dyspepsia.^{2(a)}

Juice of the leaves is used in scurvy.²⁰⁵ In Punjab, the leaves are considered to be an antidote to poison.²⁰⁵

A poultice of leaves is applied to painful tumors, piles, and rheumatic afflictions.^{2(d)}

S THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Aśmari, Mūtrakṛcchra, Jvara, Sarpavisa, Arsa, Bastivikāra, Anāha, Udararoga, Udāvarta, Vātarakta, Yonivyāpat, Kṛmi, Nāḍivraṇa, Duṣṭavraṇa, Vraṇa, Vransoṭha, Mukhapāka, Madyaja trṣṇā, Plihāroga, Sarva kuṣṭha, Bhagandara, Apacī

Used for abdominal lumps, calculus, dysuria, fever, snake bites, piles, diseases of the urinary system, distention of the abdomen, diseases of the abdomen, tympanites, gout, disorders of the female genital tract, worm infestations, sinusitis, non-healing ulcers, ulcers, inflamed ulcers, stomatitis, morbid thirst after alcohol

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g.

The leaf extract was found to be active against *Aspergillus niger*, *A. flavus* and *A. xyliniumi*,

but did not show significant activity against *Candida albicans*.²⁰⁶

In another study, inhibition of *C. albicans* lasted up to 36 hours at a concentration of 15% and above of the aqueous extract.²⁰⁵

Root bark

CONSTITUENTS

Salvadora persica Root bark:

Beta-sitosterol and elemental γ -monoclinic sulfur (S-8) and glucotropaeolin isolated from the root.

Root: octacosanol, 1-triacontanol, beta-sitosterol, trimethylamine, kaempferol, quercetin, quercitrin, rutin and its 7-O-glucoside, singrin.¹⁵

Elemental γ -monoclinic sulfur, benzyl glucosinolate, a methoxybenzyl derivative of urea (salvadourea), *m*-anisic acid and sitosterol.³² High content of minerals (27.06%).²⁰⁵ Benzyl isothiocyanate, isolated from the root, is anti-viral against HSV-1.^{2(c)}

Root bark contains trimethylamine as a chloride.^{15,32}

Inorganic constituents of the chewing stick:

CaSO₄, Ca, Mg, Mn, and Ti.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Aśmari, Mūtrakṛcchra, Jvara, Sarpavisa, Arśa, Bastivikāra, Ānāha, Udararoga, Udāvarta, Vatarakta, Yonivyāpat, Kṛmi, Nadivraṇa, Duśtavraṇa, Vrana, Vṛṇśoṭha, Mukhapāka, Madyaja tṛṣṇā, Pliharoga, Sarva kuṣṭha, Bhagandara, Apacī

Used for abdominal lumps, calculus, dysuria, fever, snake bites, piles, diseases of the urinary system, distention of the abdomen, diseases of the abdomen, tympanites, gout, disorders of the female genital tract, worm infestations, sinusitis, non-healing ulcers, ulcers, inflamed ulcers, stomatitis, morbid thirst after alcohol consumption, splenic diseases, all abstinate skin diseases, fistula-in-ano, and scrofula

(therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/APPLICATIONS

Arsha kuthāra Rasa (Yogaratanakara, sixteenth century), does not contain any plant part of Pilu. (AFI, Part I and II.)

Chitrakādi Taila (Sushruta Samhitā, 1000 BC) does not contain any plant part of Pilu (AFI, Part I).

Nārāchaka Churna (Shārangadhara Samhitā, thirteenth century) does not contain any plant part of Pilu (AFI, Part II).

Vaidūrya Rasāyana, Triphalādi Gutikā, Vilvakhādi lepa, Pippalyādi Gutikā (not in AFI, Parts I and II; details could not be traced).

In saliva, Miswak sticks (twigs) produced significant increases in calcium (22-fold) and chloride (6-fold) and significant decreases in phosphate and pH.²⁰⁵

DOSAGE/USAGE/CAUTIONS/COMMENTS

10–20 g for decoction.

Salvadora persica root, root bark, stem and leaves are active ingredients in a number of toothpastes: Sarkan (UK), Quali-miswak (Switzerland), Epident (Egypt), Siwak-F (Indonesia), Fluroswak miswak (Pakistan), and Dentacare Miswak plus (Saudi Arabia).²⁰⁵

In India, Miswak toothpaste has been introduced recently.

Miswak can also be used as a mouthwash as it reduces plaque.²⁰⁵

S

Santalum album Linn.

Śvetacandana

BOTANICAL SOURCE(S)

Santalum album Linn.
(Fam. Santalaceae)

Sandal is governed by special laws and regulations.
In Ayurvedic texts, 4 Chandans have been mentioned: Chandana (*Santalum album*), Rakta chandana (*Pterocarpus santalinus* Linn, f.), Kuchandana (*Caesalpinia sappan* Linn.) and Pita chandana (*Coscinium fenestratum* [Graetn.] colsbr.).

PHARMACOPOEIAL AYURVEDIC DRUG

Śvetacandana (Heart wood).
API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Śrīkhaṇḍa.
Bhadra-shrīya.⁴
Malayaja.³
(When Srikhanda chandana was not available, karpura was used. If both were not available, then Rakta-chandana was used.³ If Rakta-chandana was also not available, then fresh Ushira was used.)⁴
Bhadra-shrīya is also known as Hari chandana.

HABITAT

Dry regions of peninsular India from Vindhya mountains southwards, especially in Karnataka and Tamil Nadu.
There is a tract of sandal forests running from Kolhapur (Maharashtra) to Bellary (Mysore) and on to Chittoor (Andhra Pradesh) from the northern fringe of this region. Chittoor to Erode and on to Mettupalayam (Tamil Nadu) forms the Eastern and Southern boundaries; while the Western sandal border runs along from Mettupalayam through Kerala to Mercara and Mangalore, then extending to

Sagar and on to Kolhapur in the North to join the starting point.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Sandal wood;
Assam: Sandale avyaj;
Beng: Chandan;
Guj: Sukhad;
Hindi: Chandan, Safed chandan;
Kan: Shrigandhamara, Shrigandha, Chand;
Mal: Chandanam;
Mar: Chandan;
Punj: Chandan;
Tam: Chandana maram, Sandanam, Ingam;
Tel: Gandhapu chekka, Manchi gandham, Telia chandanam, Sriga;
Urdu: Sandal safed.

Eng: East Indian sandalwood.

CONSTITUENTS

Volatile oil (alpha- and beta-santalol).
Sandalwood oil contains alpha- and beta-santanol, santene, alpha- and beta-santalenes, santenol, teresantalol, *nor*-tricycloekasantalal, isovaleraldehyde, *l*-santenone, santenone, teresantallic acid and alpha- and beta-santallic acids.¹⁵ Bisbolenols A–E and alpha-*trans*-bergamotenol are also present.^{2(c)}
The sesquiterpene alcohol 12, 13-dihydro-alpha-santalol and its beta-isomer have been isolated.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śoṣa, Dāha, Raktapitta, Raktārśa, Hikkā, Vamana, Raktātisāra, Pradara, Śukrameha, Netra roga, Mutraghāta, Bhrama, Raktavikāra, Kṛmi roga
Used for cachexia, burning syndrome, bleeding disorders, bleeding piles, hiccup, diarrhea with blood, leucorrhea, spermatorrhea, diseases of the eye, urinary obstruction, vertigo, blood disorders, and worm infestations (therapeutic

uses based on texts from 1000 BC to sixteenth century).

Sandalwood oil inhibited the replication of HSV-1 and -2; this was more pronounced against HSV-1. The oil also showed chemoprophylactic effects on skin papillomas.¹⁷

IMPORTANT FORMULATION/ APPLICATIONS

Popular Chandan compounds: Chandanāsava (Bhaishajya Ratnāvali, seventeenth century), contains Śveta chandana heartwood with 21 plant drugs, all in equal proportion. Used for spermatorrhea, dysuria and cystitis.

Chandandādi Churna (Bhaishajya Ratnāvali) contains Śveta chandana heart wood with 17 plant drugs, all in equal proportions, and calx iron in twice the proportion to all herbs combined. Used for jaundice, chronic fever, and urinary disorders.

Chandanādi Taila (Yogarātnākara, sixteenth century) contains Sveta chandana heart wood with 30 other plant drugs, all in equal proportions. Used as a massage oil for burning syndrome, skin diseases, bleeding disorders, and wasting diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

As an anti-bacterial and spasmolytic drug, German Commission E recognizes the uses of White sandalwood for the adjuvant therapy of infections of the lower urinary tract (10–20 g drug, 1–1.5 g essential oil). Isolated oil is to be used in an enteric coated form. Contraindicated in diseases of the parenchyma of the kidney.⁸

Saraca asoca (Rosc.) De Wilde Syn. *Saraca indica* Linn.

Aśoka

BOTANICAL SOURCE(S)

Saraca asoca (Rosc.) De Wilde
Syn. *Saraca indica* Linn.
(Fam. Leguminosae)

Saraca indica auct. non-Linn.³²

Jonesai asoca Roxb.

Saraca indica sensu Baker.⁵

Polyalthia longifolia Benth. & Hook. f., an ornamental roadside tree, is wrongly called Ashoka.³ Its bark is the most common adulterant of Ayurvedic Ashoka bark.³⁶

Bark of *Rhododendron arboreum* is also adulterated with Ashoka bark.^{2(c)}

PHARMACOPOEIAL AYURVEDIC DRUG

Aśoka (Stem bark).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Kaṅkeli.

Hemapushpa, Tāmrapallava.^{16(c)}

HABITAT

Central and Eastern Himalayas, Western Ghats and Deccan, wild or cultivated.

Found as an ornamental and avenue tree throughout tropical India.

Saraca: 11 species in the Indo–Malesian region;¹
2 species in India: *S. asoca* and *S. declinata* (Jack) Miq.

REGIONAL LANGUAGE NAMES

Eng: Asok Tree;

Assam: Ashoka;

Beng: Ashoka;

S

Guj: Ashoka;
 Hindi: Ashoka;
 Kan: Ashokadamara, Ashokamara, Kankalimara;
 Kash: Ashok;
 Mal: Asokam;
 Mar: Ashok;
 Ori: Ashoka;
 Punj: Asok;
 Tam: Asogam, Asogu, Asokam;
 Tel: Ashokapatta.

CONSTITUENTS

Tannins and a crystalline glycoside.

Bark yields alkanes, esters and primary alcohols; re-octacosanol, tannin (6%), catechin, (+)-catechol, (-)-epicatechin, (-)-epicatechol, leucocyanidin, leucopelargonidin, procyanidin derivatives and methyl- and ethyl-cholesterol derivatives.⁷

Pure phenolic glucoside (P2) isolated from stem bark is oxytocic, similar in nature to pitocin and ergometrine.³² (See also Reference 25.)

THERAPEUTIC AND OTHER ATTRIBUTES

Asṛgdara, Apacī, Dāha, Raktadoṣa, Śoṭha.

Used for metrorrhagia, menorrhagia, chronic lymphadenitis, burning syndrome, blood disorders, and inflammation (therapeutic uses based on a sixteenth century text).

Sushruta (1000 BC) included Ashoka in the Rodhrādi group of herbs, which were specific for ailments of the female genital tract.

A bark decoction was used for menstrual disorders including metrorrhagia. (Vṛndamādhava, eighth century; Shodhala Nighantu, twelfth century; Bhāvaprakasha, sixteenth century).^{3,16(a,c)}

Stem bark extracts were tested for their anti-bacterial and anti-fungal activities. The methanolic extract exhibited the strongest activity.²⁰⁷

IMPORTANT FORMULATION/ APPLICATIONS

Ashokārishta (Bhaishajya Ratnāvali, seventeenth century), contains Ashoka stem bark as the main plant drug with 12 supporting herbs. Used for leucorrhea, menorrhagia, metrorrhagia, dysmenorrhagia and amenorrhagia.

Ashoka Ghrita (Bhaishajya Ratnāvali) contains Ashoka stem bark and a decoction of three plant drugs with 20 supporting herbs. Used as a uterine and nervine tonic for urinogenital disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–30 g of the drug for decoction.

Further research is required to validate the use of *S. asoca* bark in menorrhagia due to uterine fibroids.

S

Saussurea lappa C.B. Clarke

Kuṣṭha

BOTANICAL SOURCE(S)

Saussurea lappa C.B. Clarke
 (Fam. Compositae)

Saussurea lappa (Dence) C.B. Clarke
 Syn. *S. costus* (Fale.) Lipsch.¹⁹

Kuth, commonly known as costus in the trade, has no connection with the botanical genus *Costus*.^{2(a)}

Kustha is used as a substitute of Pushkar-mula (*Inula racemosa* Hook. f.)^{4,3} and Tagara (*Valeriana wallichii* DC.).³

Accepted source of Pushkar-mula in Kerala is *Psilanthus travancorensis* Leroy. Syn. *Coffea travancorensis* Wt. & Arn.⁵

In Unani medicine, Qust-e-Arabi (sweet var., Orris root) and Qust-e-Hindi (bitter var., *S. lappa*) are used.

PHARMACOPOEIAL AYURVEDIC DRUG

Kuṣṭha (Root).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Āmaya, Pūkala.

Gada, Rug, Ruk.³

Rogāhvyā, Vāpya, Kauvera.⁴

HABITAT

Kashmir, at an altitude of 2500–3600 m.

Found growing wild only in Jammu and Kashmir in the Kishenganga valley and the higher elevations of the Chenab valley. It may occur sporadically in adjoining tracts in Kashmir and elsewhere. Cultivated in Lahul (Himachal Pradesh) and Garhwal.^{2(a)}

Saussurea: more than 400 species are found in Eurasia; 250 in China and 9 in Europe.¹ About 47 species are found in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Assam: Kud, Kur;

Beng: Kudo;

Guj: Upleta, Kath;

Hindi: Kutha;

Kan: Chungal Kustha;

Kash: Kuth;

Mal: Kottam;

Mar: Upleta, Kustha;

Ori: Kudha;

Punj: Kuth;

Tam: Goshtam, Koshtham, Kottam;

Tel: Chungalva Koshtu;

Urdu: Qust.

Eng: Kuth.

CONSTITUENTS

Essential oil, alkaloid (saussurine) and bitter resin.

Essential oil 1.5%; resinoids 6% and alkaloids 0.05%.^{2(a)}

Roots yielded 22-dihydrostigmastrol. The Punjab variety gave costunolide, dehydrocostus lactone, costic acid, palmitic and linoleic acids,

beta-sitosterol and alpha-cyclocostunolide. The Kashmir variety additionally gave alantolactone, beta-cyclocostunolide and *iso*-alantolactone.³²

Amino acids, sesquiterpene adducts and saussureamines A, B, and C have also been isolated from the root.^{2(c)}

(See PMID 19673381 abstract for the chemical constituents isolated in China.)

THERAPEUTIC AND OTHER ATTRIBUTES

Vātarakta, Visarpa, Kuṣṭha, Kāsa, Svāsa

Used for gout, erysipelas, obstinate skin diseases, cough and asthma (therapeutic uses based on texts from 1000 BC to sixteenth century).

Kustha was a member of *Elādi gaṇa* (the Cardamomum group) of Sushruta (1000 BC), specific for toxicosis, urticaria and for promoting complexion. Raja Nighantu (fourteenth century) included it in *Sarv-aushadhi gaṇa*, specific for psychosomatic and neurological disorders, fevers and skin diseases.

A decoction of the root or its powder was prescribed for anemia, toxicosis, colic, and cardiac disorders; roots soaked in ox bile were used externally for skin diseases (Charaka Samhitā, 1000 BC).²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Koṭṭam Chukkādi Taila, Kuṣṭha-shunṭhyādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains Kustha and 8 other plant drugs including dried ginger (one, Kartotitta, has been identified with himsrā). Used as a massage oil for rheumatic afflictions and muscularis.

Agastya Rasāyana (Charaka Samhitā, 1000 BC) contains Kuṣṭha among 12 main herbal drugs. Used for cough, cold, chronic bronchitis, and asthma (not quoted in the API).

Bioactive constituents of Kuṣṭha exhibit the root's efficacy in bronchial asthma, particularly of the vagotonic type; root oil is used in chronic skin diseases, as well as in rheumatism.³²

DOSAGE/USAGE/CAUTIONS/COMMENTS

0.2–1.0 g of the drug in powder form.

Dehydrocostus lactone enhanced gastro-intestinal motility and showed anti-tumor and anti-mutagenic activities.^{2(c)}

Costunolide showed chologogic, anti-ulcer and anti-mutagenic activities. Saussureamines A, B, and C showed anti-ulcer effects.^{2(c)}

An aqueous extract of the root showed anti-anginal properties.^{2(c)}

Costunolide and dehydrocostus lactone show suppressive effects on the hepatitis B surface antigen in human hepatoma Hp3B cells.^{2(d)}

Scindapsus officinalis Schoott.

Gajapippali

BOTANICAL SOURCE(S)

Scindapsus officinalis Schoott.
(Fam. Araceae)

In Kerala, sliced and dried inflorescence of *Balanophora indica* Wall. and pieces of the stem (not the fruits) of *Scindapsus officinalis* are sold as Gajapippali.³

Gajapippali was used as a substitute of *Piper longum* Linn. (Pippli) root.³

Hindi: Gajapeepal;
Kan: Adkebeeluvalli;
Mai: Attipali;
Mar: Gajapipalee;
Punj: Gajapeepal;
Tarn: Anaitippalee;
Tel: Enugopippal.

PHARMACOPOEIAL AYURVEDIC DRUG

Gajapippali (Fruit).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Gajakṛṣṇa, Hastipipali.

Gajāhvā, Gajākaṇā, Karkaṇā.³

Fruits of Chavikā were mentioned as Gajapippali,³ while *Piper retrofactum* Vahl., Chaba or Chavikā are different drugs.

HABITAT

A long climber found all along the sub-Himalayan tract between an altitude of 330–1000 m, and in West Bengal, Orissa, Andhra Pradesh and the Andaman Islands.

REGIONAL LANGUAGE NAMES

Beng: Gajapeepal,
Guj: Motopeepar;

CONSTITUENTS

Glucosides viz. Scindapsin A & Scindapsin B, Sugars and fixed oil.

Glucosidic coloring substances scindapsin

A and B on hydrolysis yield the aglucones scindapsindin A and B, respectively.^{2(a)}

The hydroxy fatty acid, 1 l-hydroxy-cw-5, 8-tetracosadienoic acid, and cyclopropenoid fatty acids have been isolated from the seeds.

THERAPEUTIC AND OTHER ATTRIBUTES

Śvāsa, Kṛmīroga, Atisāra, Kaṇṭha roga.

Used for asthma, worm infestations, diarrhea, and throat diseases (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Powdered dry fruits: used internally for edema, piles, indigestion, colic, and intestinal catarrh;²⁷ powdered and suspended in warm water for bleeding after child birth; as an ingredient of medicated treacle in chronic dysentery and loss of appetite; as a medicated *ghrita* internally in asthma; and as an ingredient of a hot poultice for goiters (Charaka and Sushruta Samhitā, 1000 BC).²⁸

In folk medicine, a decoction of the fruit is used as a bronchodilator.

The aqueous extract or decoction of dried fruits showed significant analgesic and anti-diarrheal activity in albino rats.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

None of the quoted compounds represent the therapeutic activity of Gajapippali. It is not just an aromatic adjunct to other herbs in indigenous medicine.^{2(a)}

As an herb, it is credited with stimulant, diaphoretic, carminative, and anthelmintic properties.

A decoction of the fruit is used as an expectorant in asthma and as an astringent in diarrhea. The fruit exhibits hypoglycemic and anti-protozoal activities. Fruit pulp is applied externally for the treatment of rheumatism.^{2(a)} Chavika (*Piper chaba*) and Gajapippali possess properties of the Pippali (*Piper longum*) root. Gajapippali is more expectorant than Chavikā.⁴

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–5 g in extract (Phant) form.

The decoction of dried fruits did not exhibit any toxicity up to 10 mg/kg in albino rats.^{2(c)}

Scirpus kysoor Roxb.

Kaśeru

BOTANICAL SOURCE(S)

Scirpus kysoor Roxb.
(Fam. Cyperaceae)

Syn. *S. grossus* Linn. f.
S. articulatus Linn. is equated with Laghu Kasheru.
S. tuberosus Desf. is Rāja Kasheru.

PHARMACOPOEIAL AYURVEDIC DRUG

Kaśeru (Rhizome).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Kaśeruka.

Svalpa-kanda.⁴
Rāja kasaruka (bigger variety).⁴

HABITAT

A weed commonly found on the margins of ponds and swampy places throughout India, up to an altitude of 700 m.

Scirpus: about 40 species occur in India.^{2(a)}

There are more than 35 sub-cosmopolitan species; 18 exist in North America.¹

REGIONAL LANGUAGE NAMES

Eng: Water chestnut;
Assam: Kaheru;
Beng: Keshura;
Guj: Kasela, Kasola;
Hindi: Kaseru;
Kan: Kasure gadd, Kaseruva, Kothigadde;
Mal: Kazhi Muthanga;
Mar: kasara, Kachera, Kachora;
Ori: Kasaru Kawda, Kasaru Kanda;
Punj: Kaseru;
Tam: Gundatigagaddi;
Tel: Guntatungagaddi;
Urdu: Kaseru.

Eng: Rush nut.²⁸

CONSTITUENTS

Starch, saponins, sugars and progesterone.

The tubers contain (dry basis): carbohydrates 77.1%; fat 0%–6%; protein 8.8% and minerals 4.0%. Essential amino acids of the protein: isoleucine, leucine, lysine; methionine,

phenylalanine, threonine, tyrosine and valine. Fatty acid composition: palmitic 22.1%, oleic 12.6%, linoleic 11.6%, lauric 10.5%, pentadecanoid 7.1%, caprylic 9.1%, capric 6.1% and myristic acids 6.8%. Minerals (defatted tuber): Ca 0.582 g/100 g; Mg 0.362 g/100 g; Fe 0.082 g/100 g; Mn 0.012 g/100 g; Cu 0.002 g/100 g; Zn 0.006 g/100 g; Pb 0.0011 g/100 g; Co 0.0041 g/100 g.^{2(d)}

Small amounts of progesterone.³²

The digestive enzyme amylase has been reported in the tuber.²⁶

Bigger variety (*S. tuberosus*) yield beta-sitosterol, betulin and betulic acid.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Netraroga, Aruci, Atisāra, Sukrakṣya, Stanyaksaya, Daurbalya.

Used for burning syndrome, diseases of the eye, tastelessness, diarrhea, oligospermia, lactic deficiency and debility (therapeutic uses based on a text of the sixteenth century).

Paste of Kaseru, Shṛṅgātaka (*Trapa natans*) and lotus root, boiled with milk, was prescribed

for treating threatened abortion (Sushruta Samhitā, 1000 BC).

A paste of the tuber, internally and externally, was given for rheumatism, hemothermia, and wasting diseases (Charaka Samhitā, 1000 BC).²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Saubhāgya Shuṇṭhi (Bhaishajya Ratnāvali, seventeenth century). Main drug is dried ginger; Kaśeru root tuber is among 22 supporting herbs. Also contains iron and mica calx. Tonic for post-delivery problems, impaired lactation, oedema, body pain.

Saubhāgya Shuṇṭhi (Rasaratna Samhitā) of South India dose not contain Kaśeru and mineral drugs.⁶

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g of the drug in powder form.

The pulp of the tuber is used raw, as well as after roasting or boiling. A syrup is prepared after grinding the tuber in rose water.

Selinum candollei DC.

Murā

S

BOTANICAL SOURCE(S)

Selinum candollei DC.

Syn. *S. tenuifolium* Wall, ex DC.

(Fam. Apiaceae)

Selinum Linn. (Umbelliferae) = *Cnidium* Juss.¹

S. tenuifolium is collected and supplied in the Garhwal region as Bhūtakeshi.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Murā (Root).

API, Part I, Vol. II.

Murā is an aromatic drug, which is used as an ingredient of incenses. Shati (*Hedychium spicatum* Ham. ex Smith) and Karchura (*Curcuma zedoaria* Rose.) were used in its place.^{3,30}

AYURVEDIC SYNONYMS

Surabhi, Daitya, Gandhakuti, Gandhavati.

Known as Bhūtakeshi in Kashmir and Murr in Garhwal.

In classical texts, the root was addressed as Gandhavati, Bhūrigandhā and Surabhi gandhini.

HABITAT

The Himalayas from Kashmir to Nepal at an altitude of 1800–42000 m.

REGIONAL LANGUAGE NAMES

Beng: Musamansi;
Hindi: Mura;
Kan: Halukoratige, Haggoratige;
Mal: Muramanchi;
Mar: Mura;
Ori: Muramansi;
Tam: Mural;
Tel: Mura.

CONSTITUENTS

Dihydropyrano-coumarins (identified as Isopteryxin and Anomalin), Sucrose and Mannitol.

Roots yielded furanocoumarins bergapten and heraclenol, and a mixture of imperatorin and 8-geranyloxypsolaren; two more furano-coumarins, angelicin, and xanthotoxol, are present, along with a mixture of long-chain saturated fatty acids.

Volatile oil from the roots contain the acetylenic compound 3, 5-nonadiyne.²⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Dāha, Bhrama, Mūr̥chha, Svāsa, Tr̥ṣṣā

Used for fever, burning syndrome, vertigo, syncope, asthma and morbid thirst (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

The powdered rhizomes are used for treating mental disorders in Lahaul and the Spiti valley.^{2(d)}

IMPORTANT FORMULATION/ APPLICATIONS

Arvindāsava (Bhaishajya Ratnāvali, seventeenth century) contains 28 plant drugs, including Murā, all in equal proportions. Used as a restorative, carminative and general tonic for children.

Karpurādyārishta (details could not be traced; not in the AFI).

Karpurāsava of Bhaishajya Ratnāvali and Sahasrayoga do not contain Murā. Used specifically for dysentery.

Quoted compounds are not used for mental disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

Selinum vaginatum C.B. Clarke

Bhūtakeśī

S

BOTANICAL SOURCE(S)

Selinum vaginatum C.B. Clarke
(Fam. Apiaceae)

Selinum Linn. (Umbelliferae) = *Cnidium* Juss.¹
Bhūtakeśhi (roots covered by hair-like fibers): several species of *Nardostachys*, *Selinum* and *Corydalis* have similar appearances and are likely to be called Bhūtakeśhi, Putankeshi and Jatilā.³⁰
The roots of *S. vaginatum* are frequently mixed with those of *Seseli sibricum* and sold in Jammu as a cheap substitute of the *Nardostachys jatamansi* rhizome.

PHARMACOPOEIAL AYURVEDIC DRUG

Bhūtakeśī (Fruit).

API, Part I, Vol. VI.

Bhutakesi (rhizome).

API, Part I, Vol. VI.

Bhūtakeśhi is equated with *Seseli sibricum* by the National Academy of Ayurveda for its use in sleep disorders, high blood pressure and mental diseases.²⁹

AYURVEDIC SYNONYMS

Fruit: Ākāśamāṁsī, Murā, Bhurigandhā, Gandhamādanī.

Rhizome: Rochana tagara, Māṁsi- viśeṣha. Ākāśamāṁsi, Māṁsi-viśeṣha and Rochana tagara are misleading synonyms as these are used to justify the adulteration of *Selinum* spp. in Jatāmāṁsi and Tagara (*Valeriana wallichii* DC.).

HABITAT

The Himalayas from Kashmir to Kumaun between altitudes of 1800 to 3900 m.

Selinum monnieri Linn. occurs in East Bengal, Bhutan, and Assam (its fruits are used in China as an aphrodisiac and sedative).

REGIONAL LANGUAGE NAMES

Ben: Bhutakesi;
Hindi: Bhutakesi, Muramaansi;
Kan: Mura;
Mai: Moramamsi;
Mar: Mura;
Ori: Bhutakesi;
Pun: Pushwari;
Tel: Bhutakesi.

CONSTITUENTS

Fruit: essential oil and coumarins.

Rhizome: coumarins: vaginatin, selinidin, vaginol, vaginidin and archangelone.

Fruits of *Selinum monnieri* Linn. contain benzo-furans, cnidioside A and B, cnidiol B, cnidioside C and cnidiol C; cnidiosides A and B and cnidiol B are used for the treatment of psychological disorders.^{2(a)}

A cytotoxic principle, othal, has also been isolated from the fruit.^{2(d)}

Rhizomes contain coumarins—angelicin, oroselol, lomatol, selinidin, vaginidin and vaginol—and a new flavone derivative, selinone, and a new sesquiterpene, vaginatin. Roots gave an aromatic oil 1.54%, alpha-pinene 45.5%, limonene

25.3%, camphene 5.7%, beta-phellandrene 5.2%, alpha-thujene 1.2%, fenchyl alcohol 3.2%, terpineol 3.8% and a ketone 2.6%. Pinene and fenchone are also reported. The oil is hypotensive, sedative and analgesic.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Fruit, also rhizome: Apasmāra (epilepsy), Bhrama (vertigo), Jvara (fever), Kṣaya (phthisis), Śvāsa (asthma), Mūrcchā (syncope), Raktagata vāta (hypertension), Raktapitta (bleeding disorders), Trṣṣā (thirst) and Vātavyādhi (diseases due to Vata dosa).

Quoted text of Dhanvantari Nighantu refers to Māṁsidvya (two varieties of Māṁsi): *Nardostachys grandiflora* DC., syn. *N. jatamansi* Auct. and *Valeriana jatamansi* Jones, syn. *Valeriana wallichii* DC.¹⁹

IMPORTANT FORMULATION/ APPLICATIONS

Fruit: Quoted compound, Chandanādi Taila (Yogarātnākara, sixteenth century) does not contain Bhutakesi fruit (AFI).

Rhizome: used as a single drug.

The rhizome is an adulterant of *Nardostachys jatamansi*. The *S. vaginatum* rhizome is used for fumigation to ward off ghosts and evil spirits (a common superstition in hilly regions).²⁰⁸

The rhizomes are used for the preparation of liquors and for treating patients with mental disorders in Lahaul and the Spiti valley.^{2(d)}

Fruits are not used.

In folk medicine, the fruits of *S. monnieri* are used as a sedative.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Fruit: Curna (powder): 1 to 3 g.

Rhizome: curna (powder): 3–6 g.

Semecarpus anacardium Linn. f.

Bhallātaka

BOTANICAL SOURCE(S)

Semecarpus anacardium Linn. f.
(Fam. Anacardiaceae)

S. kurzii Engler is known as a bigger variety of Bhilawā.
Semecarpus travancorica Bedd. is found in the evergreen forests of Tirunelveli and Kerala up to an altitude of 1200 m.

PHARMACOPOEIAL AYURVEDIC DRUG

Bhallātaka (Fruit).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Aruṣkara, Bhallāta.

Agnika.³
Anala, Bhalli, Vira-vrksha,
Ārushka, Tapana, Agni-mukhi, Danu.⁴

HABITAT

Found in moist deciduous forests all over India.

Found in the outer Himalayas from Sutlej to Sikkim and common throughout the hotter parts of India as far east as Assam.^{2(a)}
The *Semecarpus* genus of trees is distributed in the Indo–Malaysian region, extending to Australia.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Marking nut;
Assam: Bhelaguti;
Beng: Bhela;
Guj: Bhilamu;
Hindi: Bhilawa;
Kan: Bhallataka;
Mal: Chera;
Mar: Bibba;
Ori: Bhollataki, Bholai;
Punj: Bhilawa;

Tam: Tatamkottai; Scramkotati;
Tel: Nallajidi, Nallajidiginga;
Urdu: Baladur, Bhilavan.

CONSTITUENTS

A tarry oil containing Anacardic acid, non-volatile alcohol (cardol).

The fruits (nuts) contain the monoene and diene bhilawanols bhilawanol A and B, biflavanones, semecarpetin, anacarduflavanone, semecarpuflavanone, galluflavanone, jeediflavanone and a dimeric flavonoid nallaflavanone.

A new phenolic glucoside anacardoside has been isolated.^{2(c,d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Anāha, Grahaṇi, Gulma, Arśa, Kṛimi, Kuṣṭha

Used for distention of the abdomen, malabsorption syndrome, abdominal lumps, piles, worm infestations and obstinate skin diseases (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Charaka (1000 BC) prescribed a decoction of the nuts in internal and external prescriptions for obstinate skin diseases, poisoning and as a vitilizer and for rejuvenation.²⁷ Sushruta (1000 BC) gave the nuts internally in hemoptysis, excessive menstruation, vaginal discharges, loss of breast milk, fever, constipation and intestinal parasites.²⁸ *Ghee* cooked with the paste and decoction of Bhallataka nuts, mixed with honey, was given for treating tumors and lumps (Chakradata, eleventh century).

Fruit (nut): cytotoxic. A mixture of closely related pentadecyl catechols exhibited anti-cancer activities.³²

IMPORTANT FORMULATION/ APPLICATIONS

Bhallātaka Rasāyana (Charaka Samhitā, 1000 BC; Ashtāngahridaya, seventh century; Not in the

AFI). Used as an aphrodisiac, rejuvenating and age-sustaining sex tonic.

Bhallātaka Modaka (Bhaishajya Ratnāvali, seventeenth century) contains Bhallataka detoxified fruits, sesamum seeds and Chebulic Myrobalans, in equal proportions, kneaded with jaggery. Used for piles.

Amrt-bhallātaka Leha (Yogaratanākara; not in the AFI); the main drug is Bhallataka detoxified fruits with 30 supporting herbs and 5 minerals. Used for chronic skin diseases and leprosy.

Sanjivani Vati (Shārangadhara Samhitā, thirteenth century) contains Bhallataka detoxified fruits with nine herbal drugs, processed in cow's urine. Used for gastro-enteritis.

DOSAGE/USAGE/CAUTIONS/COMMENTS

1.2 g of the drug in Ksirapaka form.

Internally, Bhallātaka is used after purification. Bhallātaka fruits, after removing the attachment of thalamus, are soaked in cow's urine for 7 days, and thereafter in cow's milk for 7 days. The seeds are then put into a bag containing coarse brick powder, with which they are rubbed for reducing the oil content. Then, the fruits are washed with water and dried in air (AFI, Part I). The fluid in the outer coat of the fruit is very allergenic.³

The fruit extract showed cytotoxic activity against COLO 320 tumor cells.^{2(d)}

Sesamum indicum Linn. Tila

BOTANICAL SOURCE(S)

Sesamum indicum Linn.
(Fam. Pedaliaceae)

Syn. *Sesamum orientale* Linn.

PHARMACOPOEIAL AYURVEDIC DRUG

Tila (Seed).

API, Part I, Vol. IV.

Seeds are of two distinct types: white and black. Black seeds are preferred in Indian medicine.^{3,4}

Charaka and Sushruta (1000 BC) used the black seeds in prescriptions.^{16(a)}

The black variety was used internally, while the oil of the white variety is used in medicinal oils.

AYURVEDIC SYNONYMS

Snehaphala (Charaka).²⁷

Asita-tila, Krishna-tila (black variety).³

HABITAT

Extensively cultivated throughout the plains of India up to 1,200 m.

REGIONAL LANGUAGE NAMES

Eng: Sesame, Gingelly-oil seeds;
Assam: Simmasim;
Beng: Tilagachh;
Guj: Tall;
Hindi: Tila, Teel, Tili;
Kan: Accheellu, Ellu;
Mai: Ellu;
Mar: Tila;
Ori: Til;
Punj: Til;
Tam: Ellu;
Tel: Nuvvulu;
Urdu: Kunjad.

CONSTITUENTS

Fixed oil.

The black seed contains less fat and marginally more proteins, mineral matter and phosphorus than the white variety.^{2(a)} Seeds contain Ca 759.9 mg/100 g, Cu 1.5 mg/100 g, Fe 8.1 mg/100 g, Mn 1.0 mg/100 g, P 509.1 mg/100 g and Zn 2.3 mg/100 g on a dry basis. Calcium 1300 mg/100 g; oxalate 1500 mg/100 g (soluble oxalate 19% of total oxalate).^{2(d)} Lignan glucosides KP 1, 2 and 3 are present as water-soluble

antioxidants; the sesaminol glycosides, besides pinoresinol (a water-soluble natural antioxidant), sesamol and sesaminol. Furthermore, anti-oxidative lignan glycosides, phytic acid 14.37% and tau-tocopherol 27.7 mg/100 g.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Udavarta, Yonisula, Gulma, Udara anaha, Sirah sula, Parsva sula, Amasula, Raktarsa, Guda bhramsa, Kasa, Svasa, Pravahika, Visarpa, Hikka, Pinasa, Vatarakta, Pradara, Asmarai, Nadi vrana, Kustha, Svitra, Granthi, Upadamsa, Vidaraka, Alasa, Khalitya, Palitya, Aksi roga, Pratisyaya, Sankhaka, Sakuni, Graha, Kumara, Pitmesagraha, Atisara, Raktatisara, Ksaya, Krmi, Mutraghata, Dantaroga, Dantaharasa, Vatika mukha-roga, Atidagdha, Trsna, Pliharoga, Galganda, Musika dansa, Karnapali sora. (Based on compounds which contain Tila as a supporting ingredient.)

Charaka (1000 BC): paste of black Tila and one-fifth sugar with milk for diarrhea with blood.
Sushruta (1000 BC): black Tila 80 or 40 g with cold water in the morning for hemorrhoids.^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Seeds are valued for their nourishing, laxative, diuretic, emoluent and demulcent, and antioxidative properties.

Fifteen compounds, quoted in the API, represent the importance of Tila seeds in Ayurvedic formulations.

For males: regular use of black Tila (40 g) with cold water or black Tila mixed with any of the three Myrobalans were used as rejuvenating tonics (Ashtangahridaya, seventh century).
For females: a decoction of Tila, mixed with jaggery, Bhārangi (*Clerodendrum serratum*) and Trikatu (dry ginger, long pepper and black pepper) was prescribed for amenorrhea (Ashtangahridaya, Vrndamādhava, eighth century; Rāja Mārṭṭanda, eleventh century).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Powder 5–10 gm/day

For therapeutic uses of Tila see ref. 4 (pages 246, 247); for Taila, see API, Part I, Vol. VI, page 225.

Cancer-inhibiting triterpenes have been isolated from sesame callus cell cultures. These triterpenes inhibit the activation of Epstein–Barr virus.^{2(d)}

Sesbania bispinosa W.F. Wight

Itkaṭa

S

BOTANICAL SOURCE(S)

Sesbania bispinosa W.F. Wight
(Fam. Fabaceae)

Syn. *S. aculeata* Poir; *Coronilla aculeata* Willd.²⁰⁹
S. cannabina (Retz.) Pars.
Syn. *S. aculeata* Pers. is equated with Jayanti, Itakata.
Uses, more or less, are same as of *S. bispinosa*.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Itkaṭa (Stem).

API, Part I, Vol. V.

Itkaṭa (root).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Vanajayanti, Utkāṭa.

Not properly identified drug of the grass family.³⁰

HABITAT

As a weed in the rice fields or water logged areas in the plains of India.

Sesbania bispinosa is the wild variety, while *S. cannabina* is the cultivated variety. They are native to Australia. They are cultivated during the rainy season almost throughout India as a green manure crop for rice, sugar cane, cotton and coconut crops.^{2(a)}

REGIONAL LANGUAGE NAMES

Beng: Dhanicha, Dhunsha;
Guj: Sasee ikad, Ikad;
Hindi: Ikkada;
Kan: Mullu jinangi;
Mal: Kitamu;
Mar: Raanshevari, Chinchani;
Ori: Tentua;
Punj: Jhanjhan;
Tam: Mudchembai, Nirchembai;
Tel: Ettejangaa.

Common name: Dhaincha.^{2(a)}

CONSTITUENTS

Stem, Root: Amino acids such as lysine, arginine, histidine.

Stem: the hexane extract showed the presence of palmitic and stearic acids; the methanol extract gave poriferasterol, poriferasterol glucoside and pinitol, as well as unsaturated hydroxy acid.²⁰⁹

Root: the hexane extract of the roots contain palmitic, linolenic and oleic acids, along with poriferasterol; the methanol extract gave poriferosterol, poriferasterol glucoside, pinitol and sucrose, along with 14-hydroxytetradec-11(Z)-enoic acid, 16-hydroxyhexadec-13(Z)-enoic acid and 14-hydroxyoctadec-12(Z)-enoic acid.²⁰⁹

THERAPEUTIC AND OTHER ATTRIBUTES

Stem/Root: Kāsa, Pratiśyāya, Jvara, Netraroga, Aśmari, Pittāśmari, Śarkara, Mūtrakṛcchra, Mūtraghāta, Mūtraraja

Used for cough, coryza, fever, diseases of the eye, calculus, bile duct calculus, glycosuria, dysuria, urinary obstructions and painful micturition (therapeutic uses based on texts from 1000 BC to eighth century).

IMPORTANT FORMULATION/ APPLICATIONS

Chandanādya Taila (Charaka Samhitā, 1000 BC), contains 103 cooling plant drugs including red and white varieties of Chandan, grass roots including Itkaṭa, all in equal proportion. Used as a massage oil for fever associated with burning sensation.

Chandanādi Taila (Yogarātnākara, sixteenth century and Bhaishajya Ratnāvali, seventeenth century) did not contain the stem of Itkaṭa.

Sanyajanana Kashāya Churna (Charaka Samhitā, 1000 BC) contains Itkaṭa root as a member of ten grass roots (*Dasha-trnamūla*). Used for breast milk deficiency.

Mūtravirechaniya Churna (not in the AFI).

The *Dasha-trnamūla* group of Charaka (1000 BC) included Ushira, Shālī, Shashtikā, Ikshubālikā, Darbhā, Kusha, Kāsa, Gundra, Itkaṭa and Kattṛna. The *Panch-trnamūla* group is still used in Ayurvedic drugs (see *Saccharum officinarum* root).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Leaves, stem, and roots yielded good concentrations of (+)-pinitol, an anti-diabetic cyclitol.²⁰⁹

Sesbania sesban (Linn.) Merr.

Jayanti

BOTANICAL SOURCE(S)

Sesbania sesban (Linn.) Merr., Syn. *S. aegyptiaca* Pers.
(Fam. Fabaceae)

Jayanti is equated with *Sesbania sesban* in AFI, Part I, page 314, while Jayanti root is quoted as Agnimantha in AFI, Part II, page 284. Mahā-nārāyana Taila of Bhāvaprakāsha (sixteenth century) contained Jayanti bark paste,³ while the same compound incorporated in AFI, Part I, contains Agnimantha root/stem bark. Agnimantha is equated with *Premna obtusifolia* R. Br.^{3,29}

PHARMACOPOEIAL AYURVEDIC DRUG

Jayanti (Leaf).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Jayantī, Jayā, Śūkṣma patra.

Jayantikā.³ Balāmotā.^{16(c)}

Synonyms of Agnimatha: Arani, Jaya (not Jayā), Keśi and Vijayantikā (not Jayantikā).⁴

HABITAT

Cultivated throughout plains of India, up to an altitude of 1,200 m.

Grown as a green manure crop. Ragi, paddy, tea and sugar cane crops are manured with this plant.^{2(a)}

REGIONAL LANGUAGE NAMES

Beng: Jayanti;

Guj: Rajashinganee, Jayanti;

Hindi: Jaita, Jayata;

Kan: Arinintajinamgi, Karijimangai, Arishimajingai;

Mal: Semp, Atti, Itthikkanni;

Mar: Jait;

Ori: Jayantipatra;

Punj: Jainta;

Tel: Sominta, Jalugu, Nelichettu.

Eng: Common sesban, Egyptian rattle pod.^{2(a)}

CONSTITUENTS

Protein, Calcium and Phosphorus.

Leaves (Jammu sample): protein 26.6 mg; calcium 3250 mg; phosphorus 340 mg/100 g. Pods and leaves contain cholesterol, campesterol and beta-sitosterol.³²

A saline extract of the leaves has been reported to exhibit hemolytic activity. Aerial parts contain derivatives of oleanolic acid, including a saponin identified as 3-O-[alpha-L-rhamnopyranosyl-(1 → 3)-beta-D-glucuronopyranosyl]-oleanolic acid. The saponin exhibits molluscicidal activity. The plant contained a rare kaempferol trisaccharide that acts as an anti-tumor promoter.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Galaganda, Mūtrakṛcchra, Viśaroga

Used for goiters, dysuria and disorders due to poison (therapeutic uses based on texts from the fourteenth to sixteenth centuries).

Juice of the fresh leaves is credited with anthelmintic properties. A poultice of leaves promotes suppuration of boils and abscesses, and also alleviates inflammatory rheumatic swellings. The plant is used as a galactagogue.^{2(a)}

Jayā (syn. Jayanti) of Charaka Samhitā (1000 BC) has been identified as *Sesbania aegyptica*. A decoction of the entire plant was used in prescriptions for insanity, epilepsy and strokes.²⁷

IMPORTANT FORMULATION/ APPLICATIONS

Ratnagiri Rasa (Bhaishajya Ratnāvali, seventeenth century), a mercury based mineral drug,

processed with 15 plant juices including Jayanti plant juice. For acute fever.

Vajrakapāta Rasa (Basavarājiyam, period not known), a mercury-based mineral drug, is processed with juices and decoctions of 11 plant drugs, and Jayanti root juice (equated

with Agnimantha, AFI, Part II, page 284) is among them. Used for diarrhea and dysentery.

DOSAGE/USAGE/CAUTIONS/COMMENTS

3-6 g in powder form.

Shorea robusta Gaertn.

Śāla

BOTANICAL SOURCE(S)

Shorea robusta Gaertn.
(Fam. Dipterocarpaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Śāla (Heartwood).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Śāla.

Mārīcha-patraka.⁴
Ashvakarna^{15,27} is a wrong synonym.
Exudate: Sarja, Sarja rasa, Shrikṛta.⁴
Rāla was also a synonym.

HABITAT

Found extensively in parts of North-east and Central India.

REGIONAL LANGUAGE NAMES

Eng: Sal tree, Shaal tree;
Ben: Shaalgaach;
Guj: Shaalvriksh;
Hindi: Saal, Sakhuua, Saakhu;
Kan: Kabba, Saal;
Mal: Saalvriksham, Mulappumarutu;
Mar: Shaalvriksh, Raalechaavriksha;
Ori: Salva, Shaaluaagachha;
Pun: Shala;
Tam: Saalam;
Tel: Guggilam.

CONSTITUENTS

Bergenin, shoreaphenol, chalcone, 4'-hydroxychalcone-4-O-(3-D-glucopyranoside, 12a-hydroxy-3-oxo-olenano-28, 13-lactone.

Heart wood contains a chalcone glycoside-4'-hydroxychalcone-4'-O-beta-D-glucopyranoside, a polyphenol-hopeaphenol, leucoanthocyanidin³² and (+)-5,7,3'4'-tetrahydroxy flavan-3,4-diol.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnidāha (burns), Kaṇḍū (itching), Kṛmi (helminthiasis), Kuṣṭha (Leprosy/diseases of skin), Pāṇḍu (anaemia), Prameha (metabolic disorder), Raktavikāra (disorders of blood), Śoṭha (oedema), Upadāṁśa (Syphilis/soft chancre), Vātavyādhi (disease due to Vata dosa), Viṣavikāra (disorders due to poison), Vidradhi (abscess), Vraṇa (ulcer), Yoniroga (disease of female genital tract), Karṇaroga (disease of ear), Bādhīrya (deafness), Asthibhagna (bone fracture). (Therapeutic uses based on texts, 1000 BC to sixteenth century.)

Burnt wood alkali was used as an astringent and styptic;²⁸ heart wood mixed with cow's urine was prescribed for goiters; powder of heart wood with honey was a drug for anemia (Sushruta Samhita, 1000 BC).^{16(a),28}

IMPORTANT FORMULATION/APPLICATIONS

Ayaskṛti (Ashtāngahridaya, seventh century), contains iron filings, Shala heartwood and 25

other plant drugs with 11 supplementary herbs. A haematinic tonic for anaemia, diabetes, chronic dysentery.

Elādi Ghrita (Ashtāṅgahridaya) contains 16 plant drugs, including Shāla-sāra, in equal proportions. Used for consumption, wasting diseases, anemia, urinary disorders and chlorosis.

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (Powder): 3 to 6 g.

Kvātha (decoction): 50–100 mL.

Exudate/resin: astringent, ³² anti-diarrheal and anti-dysenteric; resin oil: anti-septic for skin diseases; fruits: anti-diarrheal.^{2(a)}

Sida rhombifolia Linn.

Mahābalā

BOTANICAL SOURCE(S)

Sida rhombifolia Linn. (Yellow-flowered variety.) (Fam. Malvaceae)

Syn. *S. rhomboidea* Roxb. ex Fleming³² (white-flowered variety).

While *Sida cordifolia* is a widely used source of Balā in Northern parts of India, Kerala physicians have adopted *Sida rhombifolia* subsp. *retusa* for Balā. *Sida acuta* is also widely used as an adulterant in Kerala.⁵

(Medicinal oils of Balā are prepared mostly in Kerala and Tamil Nadu.)

PHARMACOPOEIAL AYURVEDIC DRUG

Mahābalā (Root). API, Part I, Vol. III.

Two varieties of Balā, Balā and Atibalā, were used together during the period of Charaka and Sushruta (1000 BC). Nāgabālā (*Grewia hirsuta* Vahl), Mahābalā (*S. rhombifolia*) and Rājabalā (*Sida veronicaefolia* Linn.) were added as third, fourth and fifth varieties during later periods. Balā, Mahābalā and Nāgabālā were mentioned as one group that was used in rejuvenating tonics for promoting vitality and longevity.¹⁸

AYURVEDIC SYNONYMS

Atibalā,* Pitapuspi.

Kshetra-balā.³⁶

* Atibala is equated with *Abutilon indicum* Linn.^{3,29}

HABITAT

Throughout India, especially in moist regions, ascending to an altitude of 1,800 m in the Himalayas.

REGIONAL LANGUAGE NAMES

Eng: Country mallow;

Beng: Pitabedela, Kheriti;

Guj: Mahabala;

Hindi: Pitabala, Pitabariyar;

Kan: Kisangihettutti-gida;

Mai: Anakkuruntotti;

Mar: Mahbala;

Punj: Khurunti;

Tarn: Kurunthotti;

Tel: Gubatada, Pedda mutheera pulagum.

CONSTITUENTS

Alkaloids (Vasicinone and Vasicine).

Roots contain alkaloids beta-phenethylamine, N-methyl-beta-phenethylamine, vasicinol, vasicinone, vasicine, choline and betaine (also present in aerial parts).

Roots also contain alkaloids S-(+)-N-methyltryptophan methyl ether and hypaphorine methyl ester.

Alkaloids ephedrine, w-z'-ephedrine and cryptolepine are reported from the aerial parts.³²

Roots contain 0.054% of alkaloids, one of which is ephedrine.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śukraṣaya, Kṣata, Kṣaya, Visamajwara, Daurbalya, Vātavyādhi, Vātarakta, Raktapitta, Sopha

Used for oligospermia, wounds, phthisis, intermittent fever, weakness, neurological disorders, gout, bleeding disorders and edema (therapeutic uses based on texts from the fourteenth to sixteenth centuries).

The root of while-flowered Mahābalā was prescribed with powdered root of *Achyranthes aspera* and milk for mental diseases (Bangasena, eighteenth century); the root, pounded with cow's milk, was given for promoting fertility (Chakradaṭa, eleventh century).^{16(a)}

Balā Rasāyana (Sushruta Samhitā, 1000 BC) was a rejuvenating and nervine tonic.^{16(a)}

Medicinal oils of Balā were prescribed for rheumatism, gout, hemiplegia, neurological affections, muscular atrophy and torticollis.¹⁸

IMPORTANT FORMULATION/ APPLICATIONS

Mahāvishagarbha Taila (Bhaishajya Ratnāvali, seventeenth century), contains Balā, Atibalā, Nāgabalā and Mahābalā with 44 other herbal drugs and 26 herbomineral constituents. For diseases of the nervous system and inflammatory conditions.

Rājamrganka Rasa (Rasendra sāra sangraha) does not contain Mahābalā or Balā (AFI).

Ksheerbalā Tailam (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) is prescribed internally as well as externally for acute and chronic rheumatism, general paralysis, paraplegia, neuralgia, hemicrania, cephalalgia, epilepsy and hysteria.

Available in various strengths (processed 7 times, 28 times or 101 times).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Toxicity of ephedrine is not recorded, a matter of concern for Ayurveda.

Sisymbrium irio Linn.

Khūbkalān

BOTANICAL SOURCE(S)

Sisymbrium irio Linn.
(Fam. Brassicaceae)

Imported seeds of European species, *Sisymbrium officinale*, are used in Unani medicine.⁶³

The plant is found mainly in temperate Europe, but also grows in Northern Africa and Eastern Siberia.

PHARMACOPOEIAL AYURVEDIC DRUG

Khūbkalān (Seed).

API, Part I, Vol. V.

An Unani drug (seeds are credited with varied medicinal properties in the Unani system of medicine).^{2(c)}

AYURVEDIC SYNONYMS

Khūbkalān, Khubb, Shibbh, Tukhm-e-Shahuha, Khākchi.

(Unani synonyms.)⁶³

HABITAT

Kashmir, Punjab and Haryana and from Rajasthan to Uttar Pradesh, especially on moist soil.

Imported seeds of *Sisymbrium officinale* are used. In India, three species occur in the Himalayan region: *S. alliaria* Scop. (Garlic mustard); *S. altissimum* Linn. (Tumble mustard, Tall rocket); and *S. brassiciforme* C.A. Mey. *S. irio* Linn. (London rocket) is the only species that occurs from Kashmir to Rajasthan.

REGIONAL LANGUAGE NAMES

Eng: Hedge-mustard, London rocket;
Hindi: Khub kalaan, Khaaksee;
Mar: Ranteekhee;
Punj: Janglisarson, Muktrusa, Maktaroosaa;
Urdu: Khubakalan.

CONSTITUENTS

Fixed oil and Isorhamnetin.

Seeds of *S. irio* yielded 18%–20% of a semi-drying oil with palmitic 8.2%, stearic 3.1%, oleic 27.5%, linoleic 35.3%, linolenic 8.3% and erucic acids 17.6%. Seeds contain isorhamnetin.^{2(a)}
Aerial parts yield beta-sitosterol-3-beta-D-glucoside, isorhamnetin and quercetin.^{2(c)}
The plant is highly variable. Triploids, tetraploids and hexaploids also exist in addition to the diploids.^{2(a)}
European species contain cardioactive steroids,¹⁴ as well as a volatile mustard oil allylisothiocyanate and 3-butenylisothiocyanate.¹³

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Kāsa, Vātajanya vikāra, Śvāsa, Svarabheda, Daurbalya, Kaphavikāra

Used for fever, cough, rheumatic disorders, asthma, hoarseness of voice, weakness and disorders of the mucus membrane (therapeutic uses based on a Sanskrita *shloka* composed by a contemporary Ayurvedic scholar).

In European medicine, aerial parts of Hedge mustard are used for laryngitis and pharyngitis, severe hoarseness (even loss of voice), chronic bronchitis and inflammation of the gall bladder.¹⁴

In Indian folk medicine, an infusion of *S. irio* leaves is given for afflictions of the throat and lungs; the seeds are used as a stimulating poultice,^{2(a)} as well as an anti-pyretic and analgesic.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Gojihvādi Kvāth Churna (a recent introduction by a contemporary *vaidya*, Yadavaji Trikamji), contains 7 Unani plant drugs including Khūbakalān, in a compound of 16 plant drugs. Used for coryza, cough, dyspnea and fever due to chest congestion. In the compound, Go-javān of Unani medicine and Gojihva of Ayurvedic texts were merged to form a new identity, “Go-javana Gojihvā” (AFI, Part II, page 69).

(Adding new drugs to a medicinal system is a healthy sign, but drug names need not be changed or renamed.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

S

Smilax china Linn.

Madhusnuhī

BOTANICAL SOURCE(S)

Smilax china Linn.
(Fam. Liliaceae)

Substitutes: *S. ovalifolia* Roxb. syn. *S. macrophylla* Roxb. non-Linn., *S. zeylanica* Linn.

PHARMACOPOEIAL AYURVEDIC DRUG

Madhusnuhī (Tuberous root).

API, Part I, Vol. V.

Ayurvedic drug is Chop-chini or Dvīpāntara Vachā.

Madhusnuhī was the drug of Kerala Materia Medica, Sahasrayoga. It was used as the main drug in Madhusnuhī Rasāyana. Its source was *S. ovalifolia* Roxb., which was distributed in South India. (All other Indian *Smilax* spp. are confined to the Himalayan region.) The Singhalese and Bengali name of *S. ovalifolia*,

Komarikā, indicates that it resembles *Aloe* spp.; the prickly stem resembles *Euphorbia* spp. (Snuhi). On the basis of its morphological features, it was given a Sanskritized name: Madhusnuhi. It was not bitter like *S. china*, which was to be detoxified. The flour of *S. ovalifolia* could be used and its fruits were eaten.

AYURVEDIC SYNONYMS

Dvipāntara Vacā.

In Bhāvaprakāsha, a Sanskritized name, Dvipāntara vachā, was coined. Chop-chini was the common name during that period.³

HABITAT

Imported from China and Japan.

It is reported that *S. china* tubers were first introduced into India by the Portuguese early in the sixteenth century.^{2(c)}

A part of imported China root is believed to have been derived from the tuber of *S. glabra* Roxb,^{2(a)}

S. glabra is found in Garo and Khasi Hills, eastwards to upper Myanmar, Indo-China and South China, known as a bigger variety of Chop-chini.^{2(a),15} Among other Indian species, *S. lanceifolia* Roxb. and *S. zeylanica* (Sikkim Himalayas) are known as Hindi Chop-chini and *S. ovalifolia* Roxb. (almost all over the tropical parts of India) as Jangali Chop-chini.^{2(a),15} It was used in South India as a substitute of *S. china*.

S

REGIONAL LANGUAGE NAMES

Eng: China root;

Beng: Chopcheenee, Kumarika, Shukchin;

Guj: Chopcheenee;

Hindi: Chopcheenee;

Mal: China pairu;

Mar: Chopcheenee;

Tam: Parangichekkai;

Tel: Pirngichekka.

Common name: Chop-chini.

S. ovalifolia: Jangali Ushbā. Ushbā (Jamaican sarsaparilla) is used in Unani medicine.

Bangala, Singhalese: Komarikā;

Tel: Konda tamara;

Tamil: Malaittamara;

Mal: Kaltamara.^{2(a)}

CONSTITUENTS

Saponins, sarsaponin and parallin, which yield isomeric sapogenins, sarsapogenin and smilogenin. It also contains sitosterol and stigmaterol in the free form and as glucosides.

Prosapogenin A of dioscin, dioscin-gracillin,

Me-protagracillin and its 22-hydroxy analog and smilaxin, a furastanol glycoside and isonarthogenin 3-O-alpha-L-rhamnopyranosyl-(1 → 2)-O-alpha-L-rhamnopyranosyl-(1 → 4)-beta-D-glucopyranoside have been reported.^{2(c)}

S. zeylanica: diosgenin is reported from the root.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Vibandha, Ādhmāna, Śula, Kṛmi, Kuṣṭha, Puyameha, Śukravikāra, Vātavyādhi, Phiranga, Unmāda, Apasmāra, Sandhivāta, Kampavāta, Gandamālā

Used for constipation, flatulence, colic, worm infestations, obstinate skin diseases, urine with pus cells, disorders of the semen, diseases of the nervous system, syphilis, insanity, epilepsy, osteoarthritis, paralysis agitans and cervical lymphadenitis (therapeutic uses based on sixteenth to seventeenth century texts and an 1837 text).

In the quoted text, Dvipāntara Vachā and Chop-chini have been mentioned, but not Madhusnuhi.

China root was once considered useful in Europe for venereal and rheumatic disorders in the same way as sarsaparilla. In India, it still continues to be used for venereal diseases, chronic skin afflictions and rheumatism (mostly in combination with mineral drugs).^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Madhusnuhi Rasāyana (Sahasrayoga, a non-Samhitā, Kerala Materia Medica). AFI quoted

compound contains sulphur, guggulu and Madhusnuhi as main drugs with 26 supporting herbs. Used for ulcers, including ulcers of the genitalia, fistula-in-ano and tumors.

Another Sahasrayoga compound does not contain sulphur and Guggulu. It is recommended for harmonizing all body functions (CCRAS text).

Chop-chinādi Churna is actually a single drug (4 g with honey), introduced by Bhavaprakasha (sixteenth century) for the first time in the Ayurvedic literature for syphilis.³ It entered into South India as Madhusnuhi Churna and as a Kvatha Churna containing guduchi, black pepper, mustaka, ajowan and China root (12 g each) for fevers and rheumatic swellings.

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g powder.

S. china root purification process in South India: the cut drug is put in a pot with cow's milk and water (in equal volumes) and boiled. When three-quarters of the liquid is evaporated, the pot is removed from the fire, the drug is washed in cold water and the skin is removed (not in the AFI).

China root is actually a tuber of the shape and size of an elongated potato, 10–15 cm long, 3–5 cm thick; it is peeled and trimmed for market.^{2(a)}

Solanum anguivi Lam.

Bṛhati

BOTANICAL SOURCE(S)

Solanum anguivi Lam. Syn. *S. indicum* L.
(Fam. Solanaceae)

Solanum anguivi Lam. syn. *S. indicum* auct. non-Linn.; *S. sodomeum* Linn. non. ambig.; *S. violaceum* Ortega.¹⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Bṛhati (Whole plant).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Bṛhatkaṇṭakārī, Mahadvyāghrī, Śimhikā, Bhaṇṭākī, Vanavṛntāka.

Bṛhati, Sthula bhantaki, Vishadā, Mahotika, Vṛntaki, Mahati, Sirmhi, Kantaki, Rashtra-nākuli.⁴

HABITAT

Throughout warmer parts up to an elevation of 1500 m.

REGIONAL LANGUAGE NAMES

Eng: Indian Nightshade;
Assam: Tidbhagnri, Tidbaghuri;
Ben: Vyaakud, Byakura;
Guj: Ubhi ringni, Ubhimo ringni;
Hindi: Badi kateri, Kataai, Vanbhantaa;
Kan: Kirigulia, Heggullu;
Mal: Cheru vazhuthina, Putiri chunda;
Mar: Dorli, Ringani;
Ori: Lavyaankudi, Dengaabheji, Bryhoti;
Pun: Kandwaari vaddi;
Tam: Pappar mulli, Cheru vazhuthalai, Mullamkatti;
Tel: Telia mulaka;
Urd: Badi kateli.

Eng: Poison berry.¹⁵
Indian nightshade.³²

CONSTITUENTS

Steroidal saponins: Protodiscin saponin C, indioside A, B, C, D and E; solafuranone.

Plant contains solasonine, diosgenin, beta-sitosterol, lanosterol, solamargine, solasodine and tomatidenol;³² gitogenin, tigogenin and tomatidenol (fruits, leaves and roots); maltase, melibiase and saccharase (fruits).¹⁵

Dioscin, methyl protodioscin, protodioscin, methyl protoprosapogenin A7 dioscin, demissidine, jurjubidine, leptinidine, neotigogenin, paniculidine, solanidine, solacongestine, soladulcidine, solafloridine, tomatidine and yamogenin are also reported.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Āmadosa (products of impaired digestion and metabolism), Agnimāndya (digestive impairment), Aruci (tastelessness), Chardi (emesis), Hṛdroga (heart diseases), Hikkā (hiccup), Jvara (fever), Kṛmi (worm infestation/helminthiasis), Kāsa (cough), Kuṣṭha (Leprosy/diseases of skin), Netraroga (diseases of the eye), Pratiśyāya (rhinitis), Śvarabheda (hoarseness), Śvāsa (Asthma), Śula (pain).

Whole plant and root: carminative and expectorant; used in asthma, dry cough, colic, dysuria, chronic fever and flatulence; relieves pain due to difficult parturition.
Leaves: juice mixed with that of fresh ginger is given as an anti-emetic.
Root: diaphoretic and stimulant; used in catarrhal afflictions (rarely used alone).

Seeds: decoction in dysuria.¹⁵

IMPORTANT FORMULATION/ APPLICATIONS

All *Dashamūla* formulations need revalidation due to change in plant parts.
(See changes in AFI, Part I, second revised edn., 2003.)

The original *Dashamūla* group of Ayurveda is now extinct.
The Bṛhati, Agnidamani (Kantikāri) and Duḥsparshā (Dhanvayāsa) group was known as *Trikantaka* and *Kantaka-tryayam* (Rāja Nighantu, fourteenth century). This group is also extinct.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g. Kvatha (decoction): 40 to 80 ml.
Plant exhibited anti-cancer activity. (Central Institute of Medicinal and Aromatic Plants, Ref. 32.)

Solanum indicum Linn.

Bṛhati*

BOTANICAL SOURCE(S)

Solanum indicum Linn.
(Fam. Solanaceae)

HABITAT

Throughout warmer parts of India up to an elevation of 1500 m.

PHARMACOPOEIAL AYURVEDIC DRUG

Bṛhati (Root).
API, Part I, Vol. II.

REGIONAL LANGUAGE NAMES

Assam: Tilabhakuri;
Beng: Byakud;
Guj: Umimuyaringani, Ubhibharingani, Ubhibhuyaringa;
Hindi: Vanabharata, Badikateri;
Kan: Kirugullia, Heggulla, Gulla;
Mal: Cheru vazhuthina, Putirichunda;
Mar: Dorli, Chichuriti, Dorale,
Ori: Dengabheji;

AYURVEDIC SYNONYMS

Śanhika.
(Simhikā).³
kantakāri: Kaṇṭārikā, Kaṇṭakini, Kaṇṭāri, Nidighikā, Duḥsparshā, Dhavani, Kshudrā, Vyāghri, Duḥsparshini.⁴

* Black Nightshade.^{2(a)}
Bṛhti of Kerala.²⁹

Punj: Kandiarivaddi;
 Tam: Papparamulli, Chiru vazhuthalai,
 Mullamkatti;
 Tel: Telia mulaka;
 Urdu: Kateli.

CONSTITUENTS

Steroidal alkaloids and steroids.

Beta-sitosterol, lanosterol, solamargine and solasodine are reported in the leaves, stem and roots.²⁵

The root is no longer used in the revised formulations of the AFI. The plant has been incorporated.

Leaves afforded solasonine, solanine and diosgenin.²⁵

Air-dried leaves contain 0.32% of total alkaloids.

Plants growing in Jammu and Kashmir bear fruits with high alkaloid contents (crude glycoalkaloids 4.8% and total alkaloids 1.8%).^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Hṛdroga, Jvara, Śvāsa, Śula, Agnimāndya

Used for heart disease, fever, asthma, colic and digestive impairment.

Charaka (1000 BC) prescribed the entire plant and fruits of Kantakāri (Vyāghri) for misperistalsis, dysuria and rejuvenation.²⁷

Berries used in chest pain, asthma, cough, sore throat, rheumatism and dropsy; decoction used as an anti-pyretic.

Root used as an appetizer and digestive, and to relieve labor pain.¹⁵

A poultice of the roots is used for cuts, wounds and severe bruises.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Dasshmūla Ghrita, Dahsmūlārishta.

All *Dashmūla* formulations need revalidation due to changes in plant parts. (See changes in AFI, Part I, Second revised edn., 2003.) The original *Dashmūla* group of Ayurveda is almost extinct.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g of the drug for decoction.

Capsimine, isolated from the fruits of *S. indicum* Linn., showed strong cytotoxic activity against human PLC/PRF/5 and KB cells *in vitro*.^{2(c)}

Khasianine, dihydrosolasodine, capsimine and capsimine-3-O-beta-D-glucoside showed strong activity against liver damage.^{2(c)}

Solanum nigrum Linn.

Kākamācī

S

BOTANICAL SOURCE(S)

Solanum nigrum Linn.
 (Fam. Solanaceae)

Diploid: each form differs from the other.

Tetraploids closely resemble *S. luteum* Mill.

Hexaploid: mostly occur in temperate parts, rarely in warmer regions.^{2(a)}

Solanum americanum Linn. syn. *S. incertum* Dunal;
S. rubrum mill. is also treated as *S. nigrum*.⁵²

Solanum nigrum Auct. non-Linn. syn. *S. americanum* Mill. is equated with Kākamācī

in South India.⁵ *Geophilla repens* (Linn.)

I. M. Johnson, syn. *G. reniformis* D. Don

(Fam. Rubiaceae) is used as Karintakāli (Kākamācī in Kerala).³ Leaves of *S. nigrum* sometimes occur as an adulterant of Indian belladonna.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kākamācī (Whole plant).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Dhvankṣamācī.

(Dhvānksha māchi).

Kāmāttā, Kākāhvā.³⁰

Māchi, Kūmabija, ghanephalā, Rasāyana-varā,

Sarva-tiktā, Kākini.⁴

HABITAT

Throughout India in dry parts, quite common in cultivated lands, roadsides and gardens.

REGIONAL LANGUAGE NAMES

Eng: Garden night shade;

Assam: Kakamachi, Pitkachia, Datkachu;

Beng: Gudakamai;

Guj: Piludi;

Hindi: Makoya;

Kan: Ganikayeagida, Ganikegida, Ganike,

Ganikesopu, Kage hanninagids;

Mal: Karinthakkali, Manatakkali, Manjathakkali;

Mar: Kamoni;

Ori: Lunlunia, Lunilunika;

Punj: Mako;

Tam: Manarthakkali, Manaththakkali,

Manitakkali, Maniththakkali;

Tel: Kamanchi;

Urdu: Makoh.

Eng: Black nightshade.³ Common name: Makoya.

CONSTITUENTS

Alkaloids and Saponins.

Total alkaloid content of (immature) fruits and leaves: 1.101% and 0.431%, respectively.^{2(a)}

Plant contains steroidal glycoalkaloids solasoline, alpha- and beta-solamargine, alpha- and beta-solanigrine, tigogenin and diosgenin. Uttronin A, an oligo-spirostanoside, uttrosides A and B and two oligo-furostanosides have been isolated from the stem and roots.^{2(d)}

Green unripe fruits contain glycoalkaloids and are toxic. Ripe fruits contain very few alkaloids.

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Kandu, Arśa, Prameha, Śoṭha, Hṛdroga, Jvara, Hikkæ, Chardi, Netraroga

Used for obstinate skin diseases, pruritus, piles, urinary disorders, edema, heart disease, fever, hiccup, vomiting and diseases of the eye (therapeutic uses based on texts from 1000 BC to sixteenth century).

Fresh extract of the plant is considered hepatoprotective and is used in the treatment of cirrhosis of the liver. Small doses of infusions or decoctions increase cardiac activity and large doses decrease cardiac activity, and affect the rate and amplitude of respiration.^{2(a)}

Crushed leaves are applied to boils, sores and chronic skin diseases^{2(c)} and are rubbed on depigmented areas of the body;^{2(a)} a paste is used as a poultice in gout and rheumatic joints.¹⁵ Leaf powder with buttermilk is given for jaundice.^{2(c)}

Ripe berries are diuretic and cathartic and used in piles, anasarca, cardiac problems, diarrhea and fevers.

A decoction of berries and flowers is used for cough and cold.^{2(a,c)}

IMPORTANT FORMULATION/ APPLICATIONS

Mahāvishagarbha Taila (Bhaishajya Ratnāvali, seventeenth century), contains 46 plant drugs, including Kākamāchi plant, all in equal proportion, with 20 supplementary herbs, 5 salts and a mineral, blue vitreol. Used as a massage oil for diseases of the nervous system and inflammatory conditions.

Rasarāja Rasa (Bhaishajya Ratnāvali) used for paralytic afflictions; Hṛdayārṇava Rasa (Rasendra sāra Sangraha) used for heart disease due to *kapha* imbalance.

Both are mercury-based mineral drugs.

Kākamāchi plant juice is used with other plant juices while preparing the drugs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 ml. of the drug in juice form.

The methanolic extract of the plant exhibited cytotoxic activity against tumor cells in culture systems.^{2(c)}

Solanum surattense Burm. f.

Kaṇṭakāri

BOTANICAL SOURCE(S)

Solanum surattense Burm. f.,
syn. *Solanum xanthocarpum* Schrad. & Wendl.
(Fam. Solanaceae)

Syn. *S. virginianum* Linn.^{5,52} *S. jacquinii* Willd.³²
White-flowered variety of *S. xanthocarpum*
was used as a substitute of Lakshmanā
of Ayurvedic medicine.³⁰ (A number
of other herbs have been suggested for
Lakshmanā.)³

PHARMACOPOEIAL AYURVEDIC DRUG

Kaṇṭakāri (Plant).

AFI, Part I, Vol. I.

AYURVEDIC SYNONYMS

Vyāghrī, Nidigdhikā, Kṣudrā, Kaṇṭakārikā,
Dhāvanī, Nidigdhā, Duṣparśā.

Laghu kaṇṭakāri: Kaṇṭārika, Kaṇṭakini,
Kaṇṭakāri, Nidigdhika, Duṣparshā, Dhāvani,
Kshudrā, Duhpradharṣini.⁴

Shveta kaṇṭakāri: Sita-kshudrā, Chandrahāsyā,
Lakshmanā, Kshetra-dūtikā.⁴

HABITAT

A very prickly diffused herb of waste land found
throughout India.

REGIONAL LANGUAGE NAMES

Eng: Febrifuge plant;
Assam: Katvaedana, Kantakar;
Beng: Kantakari;
Guj: Bharingani;
Hindi: Katai, Katali, Ringani, Bhatakataiya,
Chhotikateri;
Kan: Nelagulla, Kiragulla;
Mal: Kantakari chunda;
Mar: Bhauringani, Kataringani;
Ori: Bhejibaugana, Ankarati, Chakada Bhoji;
Punj: Kandiarī;
Tam: Kandangatri, Kandankatri, Kandanghathiri;

Tel: Nelamulaka, Pinnamulaka, Mulaka,
Chinnamulaka, Vakudu.

Eng: Yellow-berried nightshade.^{2(a)}

CONSTITUENTS

Glucoalkaloids and sterols.

Dried whole plant contains steroidal alkaloid
solasodine at about 0.2% and solamargine,
beta-solamargine and solasonine; sterols cyclo-
artenol, norcarpsterol, cholesterol and their
derivatives.⁵²

Leaves, roots and fruits yielded coumarins, scopo-
lin, scopoletin, esculin and esculetin.²⁵

Fresh, ripe and unripe berries contain three
glycobases: solasonine, solamargine and
solasurine.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śvāsa, Kāsa, Jvara, Aruci, Pinasa, Parsvasula,
Svarabheda

Used for asthma, cough, fever, tastelessness,
chronic rhinitis, sinusitis, intercostal neu-
ralgia and hoarseness of voice (therapeutic
uses based on texts from 1000 BC to sixteenth
century).

A decoction of Kaṇṭakāri, Gudūchi (*Tinospora
cordifolia*) and Shunthi (dry ginger), added
to powdered Pippali (*Piper longum*), was the
prescription of choice for cough, asthma,
chronic coryza, hoarseness of voice, indigestion
and fever (Sharangadhara Samhita, thirteenth
century).^{16(a)}

Powdered whole plant (1 g, two to three times/
day) for 1 month in 305 patients with chronic
bronchial asthma exhibited complete relief in
50% patients without showing any side effects
(CCRAS).²⁶

IMPORTANT FORMULATION/ APPLICATIONS

Kaṇṭakāryāvaleha (Shārangadhara Samhitā,
thirteenth century), contains Kaṇṭakāri plant

as the main drug with 16 supporting herbs.
Used for asthma and cough.
Vyāghri Haritaki (Bhaishajya Ratnāvali, seven-
teenth century) is also prescribed for cough,
asthma and chronic rhinitis.
Pancha-tikta Ghrita (Bhaishajya Ratnāvali) con-
tains Kantakāri plant among five main drugs
with *Triphalā*.

Used internally for obstinate skin diseases and as
a blood purifier.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–30 g of the drug for decoction.

Hot water extract could be toxic at 200 mg/kg
in rats.⁵²

Sphaeranthus indicus Linn.

Muṇḍitikā

BOTANICAL SOURCE(S)

Sphaeranthus indicus Linn.
(Fam. Asteraceae)

S. africanus Linn. is used as Mahāmundi.
In Kerala, *Sphaeranthus indicus* is equated with
Hapushā (*Juniperus communis* Linn.); red and
white varieties of Hapusha are equated with
S. indicus and *S. africanus* Linn., respectively.⁵
This is not acceptable to other schools of
Ayurveda.³
(In *The Wealth of India*, Vol. X, page 4, Hapushā
and Shveta Hapusha are included among
the synonyms of *S. indicus* and *africans*,
respectively.)^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Munditikā (Whole plant).
API, Part I, Vol. IV.

Munditikā (leaf).
API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Mundi, Śrāvaṇi, Bhumikadamba.

Kadamba, Puṣpikā, Alambustā (Alumbushā).
Shrāvaṇi, Mahashravani, Munditika, Bṛhat
munditika, Alumbusha, Kadambapushpi,
Bhumi-kadamba.

Shravani and Mahashravani were included
among the 18 *divya* (divine) herbs of Sushruta
Samhita.
(See analysis in Therapeutic and other attributes.)

HABITAT

In damp places throughout India, ascending to an
altitude of 1,500 m in the hills.

Especially found as a weed in rice fields.
S. africans commonly occurs in marshy locations
all along the coast from West Bengal to Kerala
and Maharashtra.^{2(a)}

REGIONAL LANGUAGE NAMES

Assam: Kamadarus;
Beng: Surmuriya, Mudmudiya;
Guj: Gorakhmundi;
Hindi: Mundi, Gorakhmundi;
Kan: Mudukattanagida, Karande;
Mal: Manni;
Mar: Mundi, Gorakhmundi;
Ori: Bhuikadam;
Punj: Gorakhmunda;
Tam: Karandai;
Tel: Bodasarumu badataramu;
Urdu: Mundi.

CONSTITUENTS

Whole plant: Essential oil, Sterols and Alkaloids.

Essential oil contains *d*-methylchavicol, alpha-ionone, *d*-cadinene, and *p*-methoxycinnamaldehyde as major constituents.

The herb yields the alkaloid sphaeranthine; beta-sitosterol, stigmasterol, beta-sitosterol beta-D-glucoside, and hentriacontane were obtained from the capitulum comprising the inflorescence.³²

A sesquiterpene lactone, 7-hydroxy frullanolide, four 7-hydroxyeudesmanolides along with 2-hydrocastic acid, beta-eudesmol, ilicic acid and the sesquiterpenoids cryptomeridiol and 4-epi-cryptomeridiol have been isolated from the plant.^{2(d)} (Also see Reference 15.)

THERAPEUTIC AND OTHER ATTRIBUTES

Apāu, Mutrakrcichra, Krmi roga, Vātarakta, Pāndu, Yoni roga, Amātisara, Kāsa, Slipada, Apasmāra, Pliharoga, Medoroga, Gudā roga, Prameha, chardi (Whole plant.)

Used for scrofula, dysuria, worm infestations, bleeding disorders, anemia, diseases of the female genital organs, diarrhea due to indigestion, cough, filariasis, epilepsy, diseases of the spleen, obesity, ano-rectal diseases, urinary disorders/polyuria, and emesis (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Mundi of Unani medicine was different from the classical Ayurvedic drug Munditikā. When Mundi entered into Ayurvedic medicine

during the medieval period, its classical sources were searched and Ayurvedic scholars equated it with Shrāvani and other synonyms of Munditikā. Shravani was a latex-bearing plant (*Payaswani*, Sushruta, Chapters 30/32), while Mundi does not bear latex.^{16(b),18}

IMPORTANT FORMULATION/ APPLICATIONS

Mundi of Unani medicine was specific for putrefaction of blood, while Munditika of classical Ayurvedic medicine was used for hemothermia, gout, rheumatism, polyuria, and as a nourishing and rejuvenating tonic.¹⁸

S. indicus: 7-hydroxy frullanolide isolated from the plant and sphaerindicin isolated from the root showed anti-microbial activities.

Sphaeranthanolide isolated from flowers is immunostimulating.^{2(c)} A decoction of the plant is diuretic; the roots are anthelmintic; the fruits are digestive.^{2(d)}

Even Mundi's equation with *S. indicus* may be incorrect, as Mundi during the medieval period was used for promoting intellect and treating goiters, cervical adenitis, dysuria, parasitic infections, pain in the genital tract, and anemia.⁴

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 ml swarasa.

Leaf: 3–6 g of the drug.

S

Spondias pinnata Linn. f. Kurz.

Āmrāta

BOTANICAL SOURCE(S)

Spondias pinnata Linn. f. Kurz.
Syn. *S. mangifera* Willd. *S. acuminata* Roxb.
non-Gamble
(Fam. Anacardiaceae)

S. macrophylla Wall. ex Hook. f.
Mangifera pinnata Linn. f.¹⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Āmrāta (Stem bark).
API, Part I, Vol. II.

Āmrāta (stem).
API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Āmrātaka, Markaṭāmra, Kapitana.

Druphala, Kapi.⁴

HABITAT

Wild or cultivated almost throughout India, ascending up to an altitude of 1,500 m in the Himalayas, also distributed in Andamans.

Also found in Java and the Philippines.⁵

S. mombin: native of tropical America. Introduced in India for its edible fruits.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Indian Hog Plum, Wild mango;

Beng: Amada, Amra;

Guj: Ambeda, Ambado, Ranamba, Jangali Ambo, Ranambo;

Hindi: Ambada, Amra, Jangli Aam;

Kan: Ambate, Amvara;

Mal: Mampusli, Ambalam, Ambazham, Mampuiti, Ampozham Njettikuzhiyan mavu;

Mar: Ambado;

Punj: Amada;

Tam: Mambulichi amputtai, Ambadam;

Tel: Amratakammu, Anbalamu, Adavimamidi;

Urdu: Jangli aam.

CONSTITUENTS

Tannin and starch.

S

Specific constituents of the stem and stem bark are not available.

Aerial parts contain 24-methylenecycloartanone, stigma-4-en-3-one, beta-sitosterol, lignoceric acid and beta-sitosterol glucoside.^{15,32}

Ethanollic extract (80%) of the leaves and stem of *S. mombin* Linn. gave ellagitannins, geraniin and gallylgeraniin, as well as five gallotannins. Exhibited strong anti-viral activity against poliomyelitis and herpes simplex virus-1, and anti-bacterial activity against *Proteus* and *Enterobacter* spp. The leaves and twigs also gave an anacardic derivative.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Stem bark: Raktapitta, Ksaya, Daha, Kshat.

Bleeding disorders, phthisis, burning sensation and wounds.

Stem: Daha, Ksaya, Rakta vikara, Atisara.

Burning sensation, phthisis, blood impurities and diarrhea.

(Therapeutic uses of the fruit mainly based on classical texts from 1000 BC to sixteenth century.)

The bark is used in folk medicine for its refrigerant and astringent properties. It is given for dysentery and diarrhea and to prevent vomiting. A paste is used as an embrocation for both articular and muscular rheumatism. A decoction is used for gonorrhea.^{2(a)}

Stem bark: CVS and CNS active, hypothermic and diuretic.³² The bark is used in bilious dyspepsia.⁵

The plant is reported to have anti-tubercular activity.^{2(a)}

The root is considered to be useful in regulating menstruation.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Dadhikā Ghrita (Ashtāngahridgaya, seventh century). Neither Āmrāta stem nor stem bark is mentioned in the AFI. Āmrāta fruit juice is among 75 constituents of the compound.

Charaka (1000 BC) prescribed the fruit jelly for fainting, neuralgia, cardiac disorders and painful piles.²⁷ Sushruta (1000 BC) used the fruits as a spermatopoietic agent.²⁸

In Bhāvaprakāsha (sixteenth century), a paste of the root, with five supporting herbs, has been included in a compound; used externally for bone fractures or dislocations.³

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Stem bark: 5–10 g of the drug in powder form for decoction.

Stem: 1–3 g of powder.

Grafting in *Spondias cytherea* Sonn on the stocks of *S. pinnata* is quite common.^{2(a)}

***Stereospermum chelonoides* (L.f.) DC. Patalai, Pātalā**

BOTANICAL SOURCE(S)

Stereospermum chelonoides (L.f.) DC.

API, Part I, Vol. IV.

S. suaveolens DC. = *S. chelonoides* (Linn. f.) DC.

API, Part I, Vol. III.

(Fam. Bignoniaceae).

S. chelonoides (Linn. f.) DC. (now *S. colais* Mabb.) is equated with white-flowered Pātala; Tāmrapātālā (copper-red flowered) with *S. suaveolens* DC.⁵

S. tetragonum DC.

Syn. *S. personatum* is used in Kerala as Pātālā.³

PHARMACOPEIAL AYURVEDIC DRUG

Patalai (Stem bark)

API, Part I, Vol. IV.

(Non-classical name. Valid name is Pātālā.

Different nomenclature in API, Vol. III and IV.)

Pātālā (root).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Stem bark: Patala, Kṛsnvrnta, Madhuduti, Tāmrapuṣpi.

Root: Amoghā, Madhūduti, Kṛṣṇvrnta, Tāmrapuṣpī.

Kāmadūti, Kuberākshi.³

(Kuberāksha is a different drug equated with *Pongamia pinnata* Pierra. The *Caesalpinia bonduc* seed is also known as Kuberākshi.)

HABITAT

Throughout the moist parts of India.

S. colais is distributed throughout India, and is also reported to come from Sri Lanka, Thailand, Indo-China and Malesia.⁵

REGIONAL LANGUAGE NAMES

Stem bark: Eng: Trumpet flower tree, Yellow snake tree;

Beng: Paarul;

Guj: Paadal;

Hindi: Paraal, Paatar, Paadree, Paadhal;

Kan: Hude, Kalludi, Kaala-adri;

Mal: Puppaaṭiri, Paatiri;

Mar: Paadal;

Ori: Patudi;

Punj: Paadal;

Tam: Paadiri, Pumpaadiri, Paadari;

Tel: Kokkosa, Kaligottu.

Root: Eng: Rose Flower Fragrant;

Assam: Parul;

Beng: Parul;

Guj: Podal;

Hindi: Padal;

Kan: Padramora;

Mal: Padiri;

Mar: Padal;

Ori: Boro, Patulee;

Punj: Padal;

Tam: Padari;

Tel: Kaligottu, Kokkesa, Podira.

CONSTITUENTS

Stem bark: Gum and a bitter substance.

Two quinones, stereoehenols A and B, were isolated from a methanol extract of stem bark, in addition to known compounds naphthoquinones sterekunthal B and sterequinone C.²¹⁰ Bark contains specioside, an iridoid glycoside.¹⁵

Root: bitter substances, sterols, glycosides and glyco-alkaloids.

Root bark: *n*-triacontanol.

Root heart wood: lapachol, dehydro-alpha-lapachone, dehydrotectol, beta-sitosterol.

Root: ceryl alcohol and aleic, palmitic and stearic acids.¹⁵

Plant contains various higher carboxylic acids; lapachol and saponins; and stereolensin in the leaves.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Stem bark: Svayathu, Sannipata, Hikka, Vami, Arocaka, Svasa, Adhman, Dagdhavrana, Vrana, Mutraghata, Sotha

Used for edema, high fever, hiccup, vomiting, tastelessness, asthma, flatulence, burn ulcers, ulcers, urinary obstruction, and inflammation.

Root: Śwāsa, Śoṭha, Arśa, Chardi, Hikkā, Tr̥ṣa, Amlapitta, Rakta vikāra, Mutravikāra, Agnidagdha, Vrana ruja, Visphota and Medoroga.

Used for asthma, inflammation, piles, vomiting, hiccup, thirst, hyperacidity, blood disorders, urinary disorders, burn ulcers, ulcers, pustular eruptions, and obesity (Therapeutic uses based on texts from 1000 BC to sixteenth century.)

Pātalā was used as a member *Panchamūla* or *Dashamūla*, which are now almost extinct.

IMPORTANT FORMULATION/ APPLICATIONS

Due to changes in plant parts, and almost extinct composite classical drugs, all the quoted compounds need revalidation before they are accepted as classical Ayurvedic drugs.

A decoction or paste of flowers and leaves was given in prescriptions for fever, toxic conditions, and constipation; bark was used internally as a purgative (Charaka Samhitā, 1000 BC).

Ash (alkali) of Pātalā, decanted seven times, mixed with oil, was given for urinary disorders (Sushruta, 1000 BC; Vrindamadhava, eighth century).^{16(a),27,28}

Mustard oil cooked with decoction and paste of Patala was applied on burns and blisters (Vrindamādhava).

A decoction of Pātalā with Chitraka (*Plumbago zeylanica*), Shatapushpā (*Foeniculum vulgare*) and Hingu (Asafoetida) was prescribed for obesity (Bhāvaprakāsha, sixteenth century).^{16(a)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Stem bark: 3–6 g in powder form.

10–30 g for decoction in separate doses.

Root: 5–10 g (powder); 25–50 mL (decoction).

Streblus asper Lour.

Śākhoṭaka

BOTANICAL SOURCE(S)

Streblus asper Lour.
(Fam. Moraceae)

Syn. *Epicarpurus orientalis* Bl.³²

S

PHARMACOPEIAL AYURVEDIC DRUG

Śākhoṭaka (Stem bark).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Śākhota, Pīṭaphalaka, Bhūtāvāsa, Kharacchada.

HABITAT

The Himalayas from Himachal Pradesh to West Bengal and in hills and plains of Assam and Tripura, ascending to an altitude of 450 m; also

in the peninsular India up to 600 m, especially in drier parts, and in Andamans.

S. indicus (Bureau) Corner, syn. *Pseudostreblus indicus* Bureau is found in Meghalaya and Assam up to an altitude of 1500 m.

Also found in Africa, Madagascar and Indo-Malesian regions to Solomon Islands and Norfolk Island.¹

REGIONAL LANGUAGE NAMES

Eng: Sand paper mulberry;

Beng: Sheoda;

Guj: Sahoda;

Hindi: Sahora, Sihoda, Sihar;

Kan: Mittlamara;

Mal: Pirayan, Pirai;

Mar: Sahod, Karvatee;

Ori: Sahod;

Punj: Shebda;

Tam: Pirayan pirai;

Tel: Barrenka, Barninka;

Urdu: Sehoda.

Eng: Siamese Rough-bush.^{2(a)} Common name: Sahor.³

CONSTITUENTS

Glycosides, Saponins and Sapogenins.

Stem bark (air dried) contains 0.028% glycosides;^{2(a)} alpha-amyrin acetate, lupeol acetate, lupeol and beta-sitosterol;³² and two cytotoxic cardiac glycosides, strebloside and mansonin.^{2(d)}

Root bark yielded cardenolide glycosides—kamalosite, asperosite, strefloside, indroside, lucknoside, cannondimethoside, 16-O-acetyl-glucogitodimethoside, strophalloside, strophanolloside, glucokamalosite, sarmethoside, and glucostrebloside; also, 6-deoxyallose.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Arśa, Ślipada, Apaci, Prameha, Kuṣṭha, Gaṇḍamala

Used for bleeding disorder, piles, filariasis, scrofula, urinary disorders/polyuria, obstinate skin diseases and cervical lymphadenitis (therapeutic uses based on texts from the fourteenth to nineteenth centuries).

According to the quoted text of Shaligarama Nighantu (1896 AD), a decoction of Sākhota bark was given with cow's urine for filaria.

The same procedure for treating filariasis was included in earlier texts: Gadanigraha, twelfth century (4.2/24); Shārangadhara Samhitā, thirteenth century (2.2/127); and Bangasena (Ślipada, 21).^{16(a)}

Oil cooked with Śākhotaka bark was given as snuff for cervical lymphadenitis (Vrindamādhava, eighth century).

For chronic urinary disorders, a few drops of Sakhotaka latex, mixed with fresh cow's milk, was given (Sidhabheshaja Manimālā, eighteenth century).

The latex was used to treat chronic skin diseases, including leprosy (Vaidya Manorama, thirteenth century).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Bṛhan Manjishthādi Kvātha Churna (Shārangadhara Samhitā, thirteenth century), contains 45 plant drugs, including Shakhōṭaka stem bark; all in equal proportion

Used for chronic skin diseases, filariasis, and neurological disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g (Powder). 10–20 g (for decoction).

Overdosing can be toxic.

The Central Drug Research Institute, Lucknow, has developed an effective anti-filarial elephantiasis drug from the crude extract of the stem. The compound (Glycoside-K029) even at low doses is able to kill adult worms in test tubes as well as in infected animals. The glycoside K030, isolated from the plant, caused the death of the bovine filarial parasite, *Setaria cervi*, within 2–3 hours at concentrations of 10 mg/mL (1.7 pM).^{2(c)}

A new cardiac glycoside, vijalosite, together with the well-known cardenolide and asperosite, has been isolated from the roots.^{2(d)}

Strychnos nux-vomica Linn.

Visamusti

BOTANICAL SOURCE(S)

Strychnos nux-vomica Linn.
(Fam. Fabaceae)

Nux-vomica seeds are often adulterated with the seeds of *S. potatorum*^{2(a)} and *S. nux-blanda* A.W. Hill.³⁶

Nux-vomica is a tree, while *S. colubrina* Linn. is a climber of the Deccan peninsula, from Konkan to Cochin. Its roots, seeds, bark and wood contain strychnine and brucine. It is also used as *Nux-vomica*.^{5,2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Visamusti (Seed). (Viṣamuṣṭi)

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Karaskara, Visatindu, Kakatinduka.

Kapilu, Kakendu, Kakaplluka, Vishatinduka, Vishamushti, Kuchila.⁷

Kuchal, Kuchela, Kuchalla, Karkasha.¹⁸

Vishamushti is also a synonym of Vandhya-karkotikā (*Momordica dioica*)⁴; Mahānimbā (*Melia azedarach*) was also known as Vishamushtika.⁴

HABITAT

Throughout tropical parts of India, up to 360 m altitude in the moist deciduous forest.

Occurs to a considerable extent in Uttar Pradesh, Bihar, Odisha, the Coromandel coast, Andhra Pradesh and Karnataka; it is most common in the monsoonal forests along the Western Ghats.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Poison-nut tree, *Nux vomica*;

Assam: Ajraki, Habbul gurab, Kucila;

Beng: Kuchila;

Guj: Konchala, Jher kochla, Kuchla, Zer kochalu;

Hindi: Kuchala, Kuchila, Bish tendu;

Kan: Kanjhemushti, Manjira, Hemmushti, Ittongi, Kasarkayi;

Mal: Kajjl, Kanniram;

Mar: Kajra, Kuchla;

Punj: Kuchla;

Tam: Yettimaram, Kakotee, Ettikottai, Ettikkai;

Tel: Mushti, Mushini;

Urdu: Azaraqi, Kuchla.

Eng: Snake-wood, Strychnine Tree.^{2(a)}

CONSTITUENTS

Alkaloids, Indole Alkaloids, Strychnine & Brucine, Monoterpenoid Glycoside (Loganin), α , β -Colubrine, Vomicine.

The sixteen alkaloids isolated from the seeds are: strychnine, brucine, beta-colubrine, pseudostrychnine (non-toxic), brucine-N-oxide, strychnine-N-oxide, pseudobrucine, 16-hydroxy-alpha-colubrine, 2-hydroxy-3-methoxy strychnine, isostrychnine, isobrucine, isobrucine-N-oxide, isostrychnine-N-oxide, novacine, icajine, and vomicine.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Ardita, Paksaghata, Visucika, Nadi daurbahya, Kuṣṭha, Arāa, Klaibya, Grdhrasi, Kandu, Vrana

Used for digestive impairments, facial palsy, paralysis/hemiplegia, gastro-enteritis, weak nervous system, obstinate skin diseases, piles, impotency, sciatica, pruritus and ulcers (therapeutic uses based on texts from 1000 BC to sixteenth century).

IMPORTANT FORMULATION/ APPLICATIONS

Vishatinduka Taila (Bhaishajya Ratnāvali, seventeenth century). Vishatinduka seed decoction is among 10 plant juices and decoctions with 7 supplementary herbs and 2 salts. Used for rheumatism, gout and inflammatory conditions.

Mahavishagarbha Taila (Bhaishajya Ratnāvali) contains Vishatinduka seeds among 18 supporting herbs. Used as an anti-inflammatory and anti-neuritic massage oil.

Agnitundi Vati (Bhaishajya Ratnāvali), a mercury-based herbo-mineral compound, contains Vishamushti seeds as the main drug with 17 other constituents. Used for digestive impairments and fever due to indigestion.

Quoted mineral drugs are processed in the decoction of Vishamushti seeds (details of Nawajivan Rasa could not be traced).

Vishatinduka Vati (a non-classical drug) is used for sexual debility.

DOSAGE/USAGE/CAUTIONS/COMMENTS

60–125 mg powder of the *Sodhitci* drug.

Seeds are detoxified by soaking and processing in cow's urine. They are also boiled with a decoction of *Amaranthus* roots. Dried seeds are fried in *ghee*.

Strychnine at an oral dose of 0.1 mg/kg body weight reduced ulceration in shay rats.

Complete absence of ulceration was observed at 0.25 mg/kg body weight (LD_{50} was 7.98 mg/kg body weight).

Brucine also exhibited anti-ulcer activity at a dose of 0.25 mg/kg body weight in rats (LD_{50} was 62 mg/kg body weight).

Exhausted *Nux-vomica* seed powder reduced ulceration at a dose of 20 mg/kg body weight.^{2(c)}

Strychnos potatorum Linn.f.

Kataka

BOTANICAL SOURCE(S)

Strychnos potatorum Linn.f.
(Fam. Loganiaceae)

Due to their close resemblance, seeds of *S. potatorum* are used as adulterants of *Strychnos nux-vomica*.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kataka (Seed).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Nirmali, Payah prasādi.

Ambu-prasāda.^{2(a)}

HABITAT

Deciduous forests in most of the parts of India up to 400 m.

West Bengal, Central and South India up to 1200 m.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Clearing nut;

Beng: Nirmali;

Guj: Nirmali;

Hindi: Chillikavi;

Kan: Katakam, Tetramabaral;

Mai: Katakam;

Mar: Nirmali;

Punj: Nirmali;

Tam: Kottai;

Tel: Chilla.

Eng: The Clearing Nut Tree.^{2(c)}

CONSTITUENTS

Alkaloids.

Seeds, leaves, and trunk bark gave diabolin (major alkaloid) and acetyldiabolin;²¹¹ as well as angustine.^{2(c)}

Seeds also gave brucine, strychnine, novacine, icajine, oleanolic acid, and its glycoside.

Leave and bark gave isomotioli, stigmastrol, campesterol, and sitosterol.²¹¹

Diabolin exhibits hypotensive activity. Seeds showed anti-arthritis activity in a rat model;²¹¹ it also prevented ulcer formation by decreasing acid secretory activity and increasing mucin activity in rats.²¹²

THERAPEUTIC AND OTHER ATTRIBUTES

Mutrakrcchra, Mutrasmarī, Krmi, Aruci, Trsna, Sula, Netra roga, Sarkara meha, Rakta abhisyanda, Prameha, Vrschika visa, Apasmara

Used for dysuria, urolithiasis, worm infestations, thirst, colic, diseases of the eye, gravel in the urine, conjunctivitis, urinary

disorders/polyuria, scorpion bites and epilepsy (therapeutic uses based on texts from 1000 BC to sixteenth century).

Seeds are given to treat stammering and whooping cough; an infusion is given for diarrhea.^{2(c,d)}

Experimentally exhibited anti-arthritic and anti-ulcer properties,^{211,212} as well as hypocholesterolemic and anti-viral activity against herpes simplex HSV1.^{2(d)}

Fruits are used as a substitute for ipecac in the treatment of dysentery and bronchitis.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Dashmūlārishta: due to changes in plant parts, the classical product needs revalidation.

Nirurardi (correct spelling is Nīruryādi) Gutikā (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Kataka with 16 plant drugs. Used for urinary disorders and polyuria (not in the AFI, CCRAS text) (Kṛṣṇa Kāmboji is the Niruri of Kerala).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

1–3 g. 6g emetic.^{16(c)}

During the classical period, the seeds were used as collyrium for eye diseases, particularly conjunctivitis (Sushruta Samhitā, 1000 BC; Chakradatta, eleventh century; Sharangadhara Samhitā, thirteenth century).^{16(a)} It is no longer in use, even in folk medicine.

Swertia chirata Buch. Ham.

Kirātatikta

BOTANICAL SOURCE(S)

Swertia chirata Buch. Ham.
(Fam. Gentianaceae)

Swertia chirayita (Roxb. ex Flem.) Karst. syn.
S. chirata (Wall.) Cl.; *S. tongluensis* Burkill;
Gentiana chirayita Roxb. ex Flem.; *G. chirata* Wall.¹⁵

Substitution of (Himalayan) Kirātatikta by other species of *Swertia* (*S. angustifolia* Buch.-Ham. and *S. alata* Royle)³⁶ and *Andrographis paniculata* Nees is generally practiced to such an extent that they are passed on in the drug market as Chirayatā.³⁰

PHARMACOPOEIAL AYURVEDIC DRUG

Kirātatikta (Plant).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Kirāta, Kirātaka, Bhūnimba, Kirātatikta.

HABITAT

The temperate Himalayas at an altitude between 1200-3000 m from Kashmir to Bhutan and Khasia Hills in Meghalaya.

Swertia: distributed in mountainous regions of tropical Asia, Europe, America and Africa.
About 40 species are recorded in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Chireta;
Assam: Chirta; Beng: Chirata;
Guj: Kariyatu, Kariyatun;
Hindi: Chirayata;
Kan: Nalebevu, Chirata Kaddi, Chirayat;
Kash: Lose, Chiraita;
Mal: Nelaveppu, Kirayathu, Nilamakanjiram;
Mar: Kiraita, Kaduchiraita;
Ori: Chireita;
Pun: Chiretta, Chiraita;
Tam: Nilavembu;
Tel: Nelavemu;
Urdu: Chiraita.

CONSTITUENTS

Xanthones, xanthone glycoside and mangiferine (Flavonoid)

Bitter principles: amarogentin at about 0.04% and amaroswerin at about 0.03%.⁵²

Iridoids include amarogentin (Chiratin), amarogenin, chiratinin, gentiopicrin, gentiorucin, swertiomin, amaroswerin, and sweroside; xanthone derivatives include decussatin, mangiferin, swerchirin, swertianin, isobellidifolin, and chiratol; triterpenes include beta-amyryn, lupeol, and kairatenol; alkaloids include gentianine, gentiocrucine, and enicoflavone.³¹

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Trsna, Daha, Sotha, Kustha, Vrana, Krmiroga, Kandu, Meha

Used for fever, thirst, burning syndrome, inflammation, obstinate skin diseases, ulcers, worm infestations, pruritus, and urinary disorders/polyuria (therapeutic uses based on a text of the sixteenth century).

Charaka and Sushruta (1000 BC) gave the entire plant as a paste or decoction, or cooked as a pot herb, internally, for the purification of vitiated blood, chronic skin diseases, poisoning, edema, fevers, cough, intrinsic hemorrhage, and malabsorption syndrome.^{27,28}

Throughout the classical period, Kiratatikta remained the drug of choice for chronic skin diseases and intermittent fever.

IMPORTANT FORMULATION/ APPLICATIONS

Sudarshana Churna (Bhaishajya Ratnāvali, seventeenth century), contains 44 plant drugs including Kirātatikta, all in equal proportion. Used for fever, intermittent fever, chronic fever and liver and spleen enlargement.

Sudarshan Churna of Shārangadhara Samhitā (thirteenth century) contains 52 plant drugs in equal proportions and *Chirata* at 50% of their combined quantities.

Chhinodbhavādi Kvātha Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica); the Kirātatikta plant is a supporting herb in a compound of seven herbal drugs. Used for high fever.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

20–30 g of the drug for decoction.

Total extract of the herb is anti-leprotic *in vitro*. Swerchirin showed anti-malarial activity in rodents.³¹

Swerchirin showed hypoglycemic properties^{2(c)} and lignan, (–)-syringaresinol hepatoprotective activity.

Mangiferin is immunomodulatory and a nervine tonic.

Whole plant is a febrifuge and a blood purifier.^{2(d)}

S

Symplocos racemosa Roxb.

Lodhra

BOTANICAL SOURCE(S)

Symplocos racemosa Roxb.
(Fam. Symplocaceae)

In Bhāvaprakāsha, two varieties are mentioned: Shāvara and Pattikā (thick bark).³

Shāvara Lodhra is equated with *S. racemosa* and Pattikā Lodhra with *S. crataegoides* Buch.-Ham.

In Kerala, *S. cochinchinensis* (Lour.) S. Moore (= *Symplocos spicata* Roxb.) is used as Lodhra.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Lodhra (Stem bark).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Rodhra, Paṭṭikā lodhra, Śābara lodhra, Tirīṭa.

Kānina, Tilvaka, Santarodbhava.⁴

Synonyms of another variety: Ghana, Tvakasāra, Akshi-bheshaja.⁴

HABITAT

Throughout plains and lower hills in India.

Indigenous to South and Southeast Asia.¹

Symplocos: more than 260 species in the tropics.¹

About 68 species in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: *Symplocos* bark;

Assam: Mugam;

Beng: Lodha, Lodhra;

Guj: Lodhar;

Hindi: Lodha;

Kan: Lodhra;

Mal: Pachotti;

Mar: Lodha, Lodhra;

Punj: Lodhar;

Tam: Vellilathi, Vellilothram;

Tel: Lodhuga;

Urdu: Lodh, Lodhpathani.

CONSTITUENTS

Alkaloids (loturine and colloturine) and red colouring matter.

Bark gave colloturine, harman (loturine), and loturidine.¹⁵

Stem bark gave proanthocyanidin-3-monoglucufuranoside of 7-O-methyl- and 4'-O-methyl-leucopelargonidin;^{32,15} also alpha-amyrin, acetyloleanolic acid, beutin, betulinic, ellagic, and oleanolic acids, flavanglycoside, (–)-epiafzelechin and its 7-beta-D-glucopyranoside (symposide), and beta-sitosterol.^{2(c),15}

The glucoside 3-monoglucufuranoside of 7-O-methyl-leucopelargonidin is highly astringent and is responsible for the medicinal properties of the bark.^{18,2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Atisara, Sotha, Pradara, Netraroga

Used for bleeding disorders, diarrhea, inflammation, excessive vaginal discharges, and diseases of the eye (therapeutic uses based on a sixteenth century text).

In a study, the aqueous extract on oral administration to immature female Sprague–Dawley rats significantly stimulated the serum FSH level ($P < 0.016$), along with the rises in the serum LH level ($P < 0.001$). The study revealed folliculogenesis.²¹³

In another study, the ethanolic extract showed potential cytotoxic effects on an HT29 cell line (colon cancer), moderate effects on an MCF7 cell line (breast cancer), and lesser effects on an HepG2 cell line (liver cancer).²¹⁴

IMPORTANT FORMULATION/ APPLICATIONS

Rodhrāsava (Lodhrāsava, Ashtāngahridaya, seventh century), contains Rodhra stem bark with 29 other plant drugs, all in equal proportion. For excessive vaginal discharges and other uterine disorders.

Pushyānuga Churna (Bhaishajya Ratnāvali, seventeenth century) contains Lodhra stem bark with 25 other plant drugs, all in equal proportions. Used for leucorrhea and menorrhagia.

Bṛhat Gangādhara Churna (Shārangadhara Samhitā, thirteenth century) contains 14 plant drugs, including Lodhra stem bark, all in equal proportions. Used for diarrhea and dysentery.

(Gangādhara Churna contains only six plant drugs, including Lodhra bark.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–5 g of the drug in powder form.

20–30 g of the drug for decoction.

Synantherias sylvatica Schott

Aranya-sūraṇa

BOTANICAL SOURCE(S)

Synantherias sylvatica Schott Gen. Aocja (Fam. Araceae).

Syn. *Amorphophallus sylvaticus* (Roxb.) Kunth.

Synantherias sylvatica (Roxb.) Schott.

Arum sylvaticum Roxb.

Brachyspatha sylvatica (Roxb.) Schott.²¹⁵

Surana is equated with *Amorphophallus paeoniifolius* var. *campanulatus* (Decne) Sivad.; Aranya Surana with *Amorphophallus paeoniifolius* var. *paeoniifolius*, syn. *Arum paenoiifolium* Dennst. (now scarce).

Only var. *campanulatus* is used in Kerala.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Aranya-sūraṇa (Tuber).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Vajrakanda, Sitasūraṇa.

Vajrāṇḍi.³

Surana and Vajrakanda were synonyms.⁴

Wild variety was called Chitra dandaka.⁴

Bhūkanda was toxic.⁴

HABITAT

Forest borders in the states of Tamil Nadu, Kerala and Karnataka.

Also found in Maharashtra and Gujarat.²¹⁵ (Vajramuli of Maharashtra.)^{2(a)}

REGIONAL LANGUAGE NAMES

Ben: Ola-kochu;

Guj: Godasurana;

Hindi: Vanasurana;

Mal: Jangali-ola;

Tam: Kattu- karunaikizhangu;

Tel: Mancha kanda.

CONSTITUENTS

Constituents, not quoted in API. Also not included in any other standard work.

Vajraprokta of Sushruta Samhita was identified as Vajarakanda,^{16(b)} which was equated with the root of *Euphorbia spurge*. Now, it is identified as a wild variety of Surana (*Amorphophallus* sp.), which is scarce. The cultivated variety of *Urgenia indica* Kunth. bulb is also being suggested as Vajrakanda^{16(b)} (it is known as Vajjura kanda in Madhya Pradesh). Vajrandi of Bhavaprakasha³ is also proving to be an obscure drug.

THERAPEUTIC AND OTHER ATTRIBUTES

Granthiśoṭha (lymphadenitis), Arbuda (tumor), Vicarcikā (eczema), Udararoga (diseases of abdomen), Slipada (Filariasis), Arśa (piles).

Used as a single drug.

Sūraṇa (*Amorphophallus campanulatus* Blume) was also used for all of these ailments.

The cooked Sūraṇa (by the closed heating process of Ayurveda) was given with oil and salt for hemorrhoids. Its paste with *ghee* and jaggery was topically used for tumors. The paste of the Surana tuber, mixed with honey and *ghee*, was applied to alleviate filaria.^{16(a)}

Synantherias sylvatica (common name:

Vajramūla) is suspected to be poisonous to human beings and livestock. Its fruits and seeds are crushed into a paste and used for toothache and bruises; it is also used in the treatment of glandular enlargement.^{2(b)}

IMPORTANT FORMULATION/ APPLICATIONS

Sūraṇa tuber, firmly closed inside the well-kneaded clay, is cooked by a specific Ayurvedic heating process. The clay is removed after the baking is over and the tuber is recovered, a medicinal ash is prepared.

The ash is prescribed with oil and salt for hemorrhoids (Ashtāngahridaya, seventh century; Vrindamādhava, eighth century; Sharangadhara Samhitā, thirteenth century). The ash, mixed with clarified butter and jaggery, was applied on tumors (Harita Samhitā, seventh century). A paste of the Sūrana tuber mixed with honey was applied to alleviate filaria.^{16(b)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (powder): 5 to 10 g after Sodhana.
The Sūrana tuber is detoxified after boiling in tamarind juice, or its ash is used.

***Syzygium aromaticum* (Linn.) Merr. & L.M. Perry**
Lavaṅga

BOTANICAL SOURCE(S)

Syzygium aromaticum (Linn.)
Merr. & L.M. Perry
Syn. *Caryophyllus aromaticus* Linn.
Eugenia caryophyllata Thunb.
E. aromatica Kuntz
(Fam. Myrtaceae)

Caryophyllus aromaticus L.¹⁰⁽²⁾

PHARMACOPOEIAL AYURVEDIC DRUG

Lavaṅga (Flower-bud).
API, Part I, Vol. I.
International Pharmacopoeial name: Caryophylli flos.⁸

AYURVEDIC SYNONYMS

Devapuspa.
Lavaṅgaka.²⁷
Shrī.²⁸
Chandana pushpaka, Shrī-pushpa, Deva kusuma, Vāri-sambhava.⁴

HABITAT

Cultivated South India.
Native to some islands of the Malay archipelago, especially Molucus. Cultivated in Zanzibar, Mauritius and Sri Lanka. In India, it is found in Tamil Nadu and Kerala.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Clove;
Assam: Lavang, Lan, Long;
Beng: Lavang;
Guj: Lavang, Laving;
Hindi: Lavanga, Laung;
Kan: Lavanga;
Kash: Rung;
Mai: Karampu, Karayampoovu, Grampu;
Mar: Lavang;
Ori: Labanga;
Punj: Laung, Long;
Tam: Kirambu, Lavangam;
Tel: Lavangalu;
Urdu: Qarnful, Laung.

CONSTITUENTS

Essential oil (Eugenalacetate and caryophyllene).
(Eugenyl acetate.)
Essential oil (up to 20%) is composed of eugenol (70%–90%), eugenyl acetate (aceteugenol) (up to 17%) and alpha- and beta-caryophyllene (5%–12%); flavonoids include aglycones of kaempferol, rhamnetin, quercetin, kaempferide and myricetin; ellagitannins; triterpenes include oleanolic acid (1%), crataegolic acid (0.15%); sitosterol, stigmasterol and campesterol.^{10(2),14,34(2)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kāsa, Śvāsa, Hikkā, Kṣaya, Ādhmāna, Trṣṇā, Chardi, Amlapitta

Used for cough, asthma, hiccup, phthisis, acute flatulence, morbid thirst, vomiting, and hyperacidity (therapeutic uses based on a sixteenth century text).

Charaka (1000 BC) prescribed dried flowers alone or in medicinal oils for cough, hiccup, vomiting, inflammatory conditions of the mouth and throat and in halitosis.²⁷

Clove water was given for nausea during gastroenteritis (Vrindamādhava, eighth century).

Paste of Lavanga, pounded in warm water, was applied for pain (Vaidya Manorama, sixteenth century).

In folk medicine, the clove oil is commonly used as an external application in toothache.

IMPORTANT FORMULATION/ APPLICATIONS

Lavangādi Churna (Bhaishajya Ratnāvali, seventeenth century), a herbomineral drugs,

contains 4 mineral drugs and 20 plant drugs including Lavanga, all in equal proportion.

Used for diarrhea and dysentery.

Lavangādi Vati (Lolambarāja, Vidya Jivanam, period not known) contains Babbūla stem bark and Khadira heart wood extract as the main drugs, with Lavanga as a supporting herb.

Used for cough and asthma.

Avipattikara Churna (Bhaishajya Ratnāvali, not quoted in the API) contains Lavanga equal to the quantity of all the 11 supporting herbs. Used for hyperacidity and constipation.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

0.5–2.0 g of the drug in powder form.

Clove inhibited the release of beta-hexosaminidase from the basophilic leukemia cell line RBL-2H3, indicating its anti-allergic ability.^{2(c)}

The eugenol and acetyleugenol components of the oil inhibit arachidonate-, adrenalin- and collagen-induced platelet aggregation.^{2(c)}

Syzygium cuminii (Linn.) Skeels

Jambū

BOTANICAL SOURCE(S)

Syzygium cuminii (Linn.) Skeels

Syn. *Eugenia jambolana* Lam. *E. cuminii* Druce. (Fam. Myrtaceae)

Ayurvedic texts mention several types of Jambū trees: Māhajambū, Rāja jambū, Bhumi jambū and Kshudra jambū.

In practice, only two varieties are recognized: *Syzygium cumini* and *S. caryophyllatum* (Linn.) Alston.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Jambū (Seed).

API, Part I, Vol. II.

Stem bark.

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Mahājambū, Ksudrajambū.

Jambula, Mahājambū, Rājajambū, Kākājambū.²⁷

HABITAT

Throughout India up to an altitude of 1,800 m.

S. cumini: Jamun of North India, Nāvala of South India, throughout India.

S. cerasoides (Roxb.) Chatterjee & Kanjilal f. (Rai jāmun): Uttar Pradesh, Bihar, Odisha, Assam, and Western Ghats.

S. hemisphericum (Wt.) Alston (Vellai naval, Tamil): Peninsular India.

S. jambos (L.) Alston (Gulāb jamun): cultivated in many parts of India.

S. caryophyllatum (Nārā, Kerala): West coast and Western Ghats.

REGIONAL LANGUAGE NAMES

Eng: Jambul tree,

Beng: Badjam, Kalajam;

Guj: Gambu, Jamun;

Hindi: Jamuna;

Kan: Nerale beeja, Jambu nerale;

Mal: Njaval;

Mar: Jambul;

Ori: Jam kol, Jamu kol;

Punj: Jaamun;

Tam: Naval;

Tel: Alia nereduchettu, Neredu chettu;

Urdu: Jamun.

Eng: Java plum, Jambolan, Black plum.⁷

CONSTITUENTS

Seed:

Glycoside (jamboline), tannin, ellagic acid and gallic acid.

Stem bark: tannins (about 19%).^{2(a)}

3,4'-di-O-methyl- and 3,3',4'-tri-O-methyl-ellagic acids, caffeic and ferulic acids, corilagin, guaiacol, resorcinol dimethyl ether, veratrole, myricyl alcohol, quercetin; 1- and 3-galloyl glucose, 3, 6-hexahydroxydiphenoyl glucose and its isomer, 4, 6-hexahydroxydiphenoyl glucose.¹⁵

Stem bark: tannins (10%–12%).^{2(a)} Friedelin, 3-friedelinol, kaempferol-3-O-glucoside, beta-sitosterol and its D-glucoside; myricetin, quercetin; ellagic and gallic acids, betulinic acid, 3,4'-di-O-methyl- and 3,3',4'-tri-O-methyl-ellagic acids.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Seed: Madhumeha, Udakameha Diabetes, polyurea.

Stem bark: Atisāra, Raktapitta, diarrhea, and bleeding disorders (therapeutic uses

baed on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) prescribed the leaves and stones of the fruits in decoctions, and the bark in prescriptions for nausea, consumption, diarrhea, and as an astringent.²⁷

Sushruta (1000 BC) gave fruits internally in obesity, vaginal discharges, and menstrual disorders, and for adhesion of fractured bones.²⁸

Juice of stem bark, mixed with equal quantities of goat's milk, was given to children for malabsorption syndrome; seeds and bark were included in compounds for diarrhea, diarrhea with blood, intrinsic hemorrhage, and vomiting (Charaka Samhitā, Sushruta Samhitā, 1000 BC; Vrindamādhava, eighth century; Chakradāṭa, eleventh century; Shārangadhara Samhitā, thirteenth century).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Pushyānuga Churna (Bhaishajya Ratnāvali, seventeenth century), contains 26 plant drugs including Jambu endosperm; all in equal proportion.

Used for leucorrhea and menorrhagia.

Ushirāsava (Bhaishajya Ratnāvali) contains 21 plant drugs, including Jambu stem bark, all in equal proportions. Used for bleeding disorders.

During the last phase of the classical period (sixteenth century, Yoga Ratnākara, Bhāvaprakāsha), Jambu stem bark was included in Nyagrodhādi Churna, which contained 28 plant drugs in equal proportions. Used for dysuria and polyuria and diabetic carbuncle.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Stem: 3–6 g of the drug in powder form.

Stem bark: 10–20 g of the drug for decoctions.

In clinical trials (12 g powdered seeds, divided in three doses), initial fasting sugar was 163 mg dL, after 1 month 129.61 mg dL and after 3 months 130.11 mg dL; after Glucose Tolerance Test (2 hours), initial blood sugar

was 304.67 mg dL, after 1 month 249.00 mg dL and after 3 months 226.00 mg dL.²¹⁶
In another clinical trial, fruit pulp (120 g) raised fasting blood sugar (178.00 mg dL) to 216.00 mg dL after 2 hours and 232.00 mg dL after 3 hours.²¹⁷
Glycoside jambolin was found to control the conversion of starch into sugar, ellagic

acid lowered blood pressure and flavonoids exerted a protective effect on anti-oxidant enzymes.²¹⁸
Gallo- and ellagi-tannins of the stem bark were found to be responsible for its astringent property.²¹⁸

BOTANICAL SOURCE(S)

Tamarindus indica Linn.
(Fam. Fabaceae)

Tam: Puli, Aanvilam;
Tel: Chint, Chinta;
Urdu: Imli.

PHARMACOPOEIAL AYURVEDIC DRUG

Ciñcā (Fruit pulp).

API, Part I, Vol. IV.

In Charaka Samhitā (1000 BC), four types of Amlikā are mentioned: *āma* (fresh), *śuṣṣka* (dry), *grāmya* (cultivated), and *aṛanya* (wild). (The red and common pulp gave different values for acids and sugars. See constituents.) Amlikā *kanda* was a separate plant that was used as a vegetable.¹³⁰

AYURVEDIC SYNONYMS

Amlikā, Tintidika.

Tittidi, Chukrika, Chinchā.⁴

Amlikā and Chukrā were also synonyms of Chāngeri (*Oxalis corniculata* Linn.).⁴

HABITAT

Cultivated throughout India, also planted as avenue trees.

A native of tropical Africa. Found naturalized almost throughout the plains and sub-Himalayan tracts of India, particularly in the South.

REGIONAL LANGUAGE NAMES

Eng: Tamarind tree;
Assam: Tamar, Teteli;
Beng: Tetula, Tentul, Ambli;
Guj: Anvali;
Hindi: Imli;
Kan: Hunisemale;
Mal: Puli, Amlam;
Mar: Chinch;
Ori: Koina, Omlika;
Punj: Imli, Aml;

CONSTITUENTS

Inorganic acids, Sugars, Saponin and bitter principle- Tamarindinca.

Bitter principle: tamarindineal, C₆H₆O₃.^{2(c)}

Fruits contain tartaric acid (3%–10%), malic, citric and lactic acids; invert sugars (25%–30%);¹⁴ 70% glucose, 30% fructose.^{2(a)}

Pulp yielded amino acids serine, beta-alanine, proline, pipecolinic acid, phenylalanine and leucine.³² Minerals 2.9%; calcium 170 mg/100 g, phosphorus 110 mg/100 g and iron 10.9 mg/100 g. Vitamins riboflavin 0.07 mg, niacin 0.7 mg and vitamin C 3.0 mg; carotene 60 µg/100 g. Pectins and pentosans are also present.^{2(a)}

Red and common cleaned pulp, respectively, contain tartaric acid (free) 6.6% and 9.8%; tartaric acid combined 11.4% and 6.7%; invert sugars 36.4% and 38.2%; and pectin 4.4% and 2.4%.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Udararoga, Agnimandya, Arocaka, Paktisula, Trsna, Klama, Srama, Bhranti, Krmi, Karnasula, Nadivrana

Used for diseases of the abdomen, digestive impairments, tastelessness, duodenal ulcers, morbid thirst, tiredness without exertion, lethargy, mental fatigue, worm infestations, earache, and sinusitis (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) included ripe fruits in prescriptions for diarrhea, dysentery and edema, and as an appetizer, digestive and stimulant.²⁷

Pulp of ripe fruit was prescribed as an adjunct to other purgatives. It was used with dates, figs, cloves and cardamoms in atony of the liver, stomach and intestines.

In South India, the fruit pulp, sweet or sour, is considered cooling, cerminative, digestive, laxative, anti-scorbutic, and anti-bilious.⁵

**IMPORTANT FORMULATION/
APPLICATIONS**

Quoted mineral compounds do not represent the therapeutic value of Chinchā fruit pulp; contain alkaline ash of Chinchā (stem bark).

Chinchyādi Lehya (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains the seedless fruit pulp of Chinchā as the main plant drug with calx of iron and 12 supporting herbs. Used as an appetizer and hematinic tonic for anemia, jaundice, and digestive disorders (Not in the AFI).

Hinguvachādi Churna (Ashtāngahridaya, seventh century) contains 20 plant drugs,

including Tintidika fruit pulp, and 5 alkaline substances, all in equal proportions. Used for acute and chronic digestive disorders.¹⁸

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

4–10 g of the drug.

A bitter principle, 5-hydroxy-2-oxohexa-3,5-dienal and beta-sitosterol have been isolated from the pulp; it was found to be a potent fungicide to cultures of *Aspergillus niger* and *Candida albicans*, as well as exhibiting bactericidal activity towards cultures of *Bacillus subtilis*, *Staphylococcus aureus*, *E. coli*, and *Pseudomonas aeruginosa*.^{2(c)}

***Taxus baccata* Linn.**

Sthaṇṇeya

BOTANICAL SOURCE(S)

Taxus baccata Linn.
(Fam. Taxaceae)

Taxus baccata Linn. is European yew. Himalayan yew is *T. wallichiana* Zucc. syn. *T. baccata* Linn. subsp. *Wallichiana* (Zucc.) Pilgoe; *T. baccata* Hook. f. non-Linn.^{2(c)}

In AFI (Part I, page 327), *Abies webbiana* Lindl. is equated with Tālīshā. *A. pindrow* Spach. and *Taxus baccata* Linn. have been recognized as its substitutes. In South Indian compounds, *T. baccata* is used as Tālispatra.

PHARMAPOEIAL AYURVEDIC DRUG

Sthaṇṇeya (Leaf).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Śukapuṣpa, Vikarṇa.

Barh-chūḍa, Shuka-parṇa, Shuka-chhada.⁴

HABITAT

The temperate Himalayas at altitudes between 1800-3300 m and in the hills of Meghalaya and Manipur at an altitude of 1500 m.

REGIONAL LANGUAGE NAMES

Eng: Himalayan yew;
Beng: Birmi, Birmie, Talish patra, Bhada getela;
Guj: Gethela barmi;
Hindi: Thuner, Talispatra bhed;
Kan: Sthaṇṇeyak;
Mal: Thuriangam, Tuniyankam;
Mar: Sthaṇṇey barmi;
Ori: Talisabhed, Chalisa patra;
Punj: Birmi;
Tam: Talispatri-bhedam;
Tel: Taleesa patri bhedamu;
Urdu: Birmi, Zarnab.

Zarnab (Telispattar) of Unani medicine is equated with *Flacourtia cataphracta* Roxb., and also with *Cinnamomum tamala* Nees.³⁷

CONSTITUENTS

Alkaloids – Taxine, Ephedrine, Glycoside, Tannins, Resins, Reducing sugars and Formic acid.

Himalayan yew: the ethanol extract of the roots, stem and needles gave diterpenoid alkaloids taxol, cephalomannine, 10-deacetyltaxol, and 10-deacetyl cephalomannine.

Taxol content ranges from 0.045% to 0.130% (taxol is an exceptionally promising cancer chemotherapeutic agent). Needles also gave 10-deacetyl baccatin III, a non-alkaloid diterpenoid and starting material for the synthesis of anti-cancer compounds, taxol or paclitaxol and textotere or docetaxel.

(For chemical constituents of European and Himalayan yew, see Reference 2(c). There are separate entries for *T. baccata* Linn. and *T. wallichiana* Zucc.)

THERAPEUTIC AND OTHER ATTRIBUTES

Rakta vikāra, Tr̥ṣṇā, Tila kalaka, Daha, Kuṣṭha, Kṛmi roga, Piḍika, Arbuda (Karkāṭa)

Used for blood disorders, morbid thirst, moles, burning syndrome, worm infestations, pimples, and tumors (therapeutic uses based on texts from 1000 BC to sixteenth century).

Sthañeya belonged to Elādi *varga*, Karpurādi *varga* and Chandanādi *varga* during the classical period of Ayurveda.

Its substitute was Kushtha (*Saussurea lappa* C.B. Clarke), and Kushtha was a substitute

of Pushkar-mula (*Inula racemosa* Hook, f.), as well as of Tagara (Valerian spp.) (Bhāvaprakāsha, sixteenth century).³

Sthañeya, now equated with *Taxus baccata*, should be taken as a new plant drug of Ayurveda, and its classical therapeutic uses should be revalidated. Simply adding “arbuda (karkāṭa)” is not enough.

IMPORTANT FORMULATION/ APPLICATIONS

Mahānārāyana Taila (Bhaishajya Ratnāvali, seventeenth century), contains 9 main plant drugs and 41 supporting herbs including Sthañeya stem bark, in equal proportion. For rheumatic and neurological affections.

Balā Taila (Ashtāngahridaya, seventh century) contains Sthañeya leaf among 46 supporting herbs, in equal proportions. Used internally for cough, asthma, nervine disorders and epilepsy. Sthañeya and Tālisha were two different drugs. Sthañeyak of Charak Samhitā and Sushruta Samhita is equated with *Clerodendrum infortunatum* Linn. by a scientist of the Indian National Science Academy.^{27,28}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g of the drug in powder form.

The drug was not used in powder form during the classical period.

Tecomella undulata (Sm.) Seem.

Rohitaka

T

BOTANICAL SOURCE(S)

Tecomella undulata (Sm.) Seem.
(Fam. Bignoniaceae)

Syn. *Tecoma undulata* G. Don; *Bignonia undulata* Sm.³²

Amoora rohituka Wight & Arn., syn.
Aphanamixis polystachya (Wall.) Parker.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Rohitaka (Stem bark).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Dāḍima puṣpa, Dāḍimacchada

Rohi, Plighna.⁷

Rohita, Ruhita, Rohina, Kuṭa.
Shālmali, Plihāri, Raktaghna, Pārijātaka.⁴

HABITAT

In the drier parts of the Northwest and Western India, ascending to an altitude of 1,200 m in the outer Himalayas and often cultivated in gardens.

Amoora rohituka: usually found in the forests of Assam, Western peninsula, South India, and Andaman Islands.¹⁵

REGIONAL LANGUAGE NAMES

Eng: Rohituka tree;
Ben: Harinahada, Roda rayana;
Guj: Rohido;
Hindi: Roheda;
Kan: Mullumuntala;
Mal: Chemmaram;
Mar: Rohida; Pun: Rohira;
Tam: Malampulvan;
Tel: Rohitaka.

Eng: Rohida tree,³² Desert teak.^{2(c)}

CONSTITUENTS

Tecomin (veratroyl β-D-glucoside), *n*-triacontane, *n*-heptacosane, *n*-nonacosane, *n*-triacontanol, *n*-octacosanol, beta-sitosterol are present.

The bark contains iridoid glucosides, tecomelloside, tecoside and undulatin, along with chromone glycosides, undulatoside A and B;^{2(d)} alkanes *n*-heptacosane, *n*-nonacosane and triacontane; *n*-dotriacontanol; beta-sitosterol.³²

For *Amoora rohituka* stem bark, see Reference 15, Vol. 3.

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma (abdominal lump), Kṛmi (helminthiasis), Kāmalā (Jaundice), Karṇaroga (disease

of ear), Kuṣṭha (Leprosy/diseases of skin), Medoroga (obesity), Netraroga (diseases of the eye), Plihodara (splenomegaly), Prameha (metabolic disorder), Raktavikāra (disorders of blood), Śūla (pain/colic), Svetapradara (leucorrhoea), Vibandha (constipation), Vraṇa (ulcer), Yakṛtroga (liver disorders).

(Therapeutic uses based on texts from 1000 BC to sixteenth century.)

The bark is used as a constituent of hepatoprotective preparations.

A decoction is used for fomentation in pains.^{2(d)} The bark is reportedly useful in cancer and swellings.^{2(c)} It is a febrifuge and anti-syphilitic.³²

IMPORTANT FORMULATION/ APPLICATIONS

Rohitakārishta (Bhaishajya Ratnāvali, seventeenth century), contains Rohitaka stem bark as the main drug with 12 supporting herbs. For jaundice, diseases of liver and spleen, inflammations, malabsorption syndrome and other disorders.

Rohitaka Lauha (Bhaishajya Ratnāvali); calx of iron is the main drug with ten supporting herbs, including Rohitaka stem bark. Used for diseases of the liver and spleen and edema.

Yakṛtashūla vināshini Vatika (Bhaishajya Ratnāvali) contains sal ammoniac, rock salt and five plant drugs, including Rohitaka stem bark. Used for diseases of the liver and spleen.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g.

Kvatha (decoction): 50 mL to 100 mL.

Tectona grandis Linn. f.

Śāka

BOTANICAL SOURCE(S)

Tectona grandis Linn. f.
(Fam. Verbenaceae)

PHARMAKOPOEIAL AYURVEDIC DRUG

Śāka (Dried Heartwood).

API, Part I, Vol. III.

Śāka was a confusing synonym,⁴ as Śāka *varga* contained vegetables.

In Sushruta Samahitā, leaves and fruits were used.

For miscarriage, calculus and gravel, fruit seeds were used in prescriptions.^{16(a)}

AYURVEDIC SYNONYMS

Bhūmisaha, Dwāradāru, Kharacchada.

Sāka.⁴

Varadāru.³

(Dwāradāru should not be confused with Devadāru or equated with *Cedrus deodara* [Roxb.] Loud.)

Some commentators equated the tree with Shakhota (*Streblus asper* Lour.).^{3,29}

HABITAT

Peninsular region and Madhya Pradesh extending to parts of Rajasthan, Southern Uttar Pradesh and Orissa also in plantations.

REGIONAL LANGUAGE NAMES

Eng: Indian teak;

Assam: Chingjagu sagun;

Beng: Segunagachh;

Guj: Sagwan, Sag, Saga;

Hindi: Sagwan, Sagauna, Sagu;

Kan: Tegu, Sagawani, Thega;

Mal: Thekku;

Mar: Sagwan;

Ori: Saguana, Sagan, Sagun;

Punj: Sagwan;

Tam: Tekku;

Tel: Teku, Pedda;

Urdu: Sagwan.

Eng: Teak tree.³

CONSTITUENTS

Resin, Essential oil, Fatty oil and Tectoquinone.

On blazing, the wood gave 9%–11% of an oleo-resinous substance. On steam distillation, the wood yields 0.15% of an oily product, identified as tectoquinone.^{2(a)}

The wood is rich in anthraquinones and terpenoids.

The heart wood contains tectoquinone; anthraquinone, naphthoquinone and their derivatives; lapachol, dehydro-alpha-lapachone, tectol and dehydrotectol; fatty acids; and carbohydrates.^{15,32}

Free volatile fatty acids include formic, acetic, propionic, butyric, corotonic, and acrylic acids.^{2(a)}

Bark contains 7.14% tannins.⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Raktapitta, Mūtraroga, Pāṇḍu, Prameha, Medoroga, Dāha, Śrama, Trṣṇā, Kṛmiroga, Garbhasrāva, Garbhapātana.

Used for obstinate skin diseases, bleeding disorders, urinary disorders, anemia, polyuria, obesity, burning syndrome, fatigue, morbid thirst, worm infestations, threatened abortion, and abortion (therapeutic uses based on texts from the seventh to sixteenth centuries). Specific reference of heart wood is inconspicuous.

Alkali of burnt wood was used as an astringent and styptic by Sushruta (1000 BC).

Ash of the wood was used in inflammations and internally in dyspepsia.³²

IMPORTANT FORMULATION/ APPLICATIONS

Ayaskṛti (Ashtāngahridaya, seventh century), contains Śāka heartwood among 23 main plant drugs;

24 supporting herbs and iron filings used for anemia, diabetes, and chronic dysentery.

In Bhāvaprakāsha, Pāshāṇabhedadi Ghrita and Yoga-Sharkara contained a decoction of the fruit of Saka; Yoga-garbhini chikitsa contained the paste of the seed.³

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g. of the drug in powder form.

30–60 g of the drug for decoction.
Lapachol, a naphthoquinone from the wood shavings, has been found to possess a significant uterotrophic effect at a daily dose of 20 mg/kg for 3 days in mice.^{2(d)}
Lapachol showed contact eczema sensitivity.³²

Teramnus labialis Spreng.

Māṣaparnī

BOTANICAL SOURCE(S)

Teramnus labialis Spreng.
(Fam. Fabaceae)

Māṣaparni is also equated with *Atylosia goensis* Dalg.^{33(a)}
In Kerala, *Vigna radiata* var. *sublobata*, *Vigna dalzelliana*, *Vigna mungo*, *Vigna umbellata* and *Rhyncosia nummularia* are used as Māṣaparni.⁵

PHARMACOPEIAL AYURVEDIC DRUG

Māṣaparnī (Whole plant).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Mahāsahā, Sūryasani, Kāmboj, Paṇḍutomaśa paṣṇī.

Kṛṣṇa vṛntā, Kāmboji, Haya pucchikā,
Mamsa-mashā.
Simhamukhi, Svādu māshā, Mahā sahā.⁴

HABITAT

Throughout India.

A climbing or wide-spreading hairy herb found from Punjab eastwards to Bengal and southward into the peninsula.

REGIONAL LANGUAGE NAMES

Eng: Vogel-Tephrosis;
Beng: Mashance, Bankalaai, Mashani;

Guj: Banudad, Janglee adad;
Hindi: Mashvan, Banvdad, Mashoni;
Kan: Kadu uddu;
Mal: Katu ulandu;
Mar: Ran udid;
Punj: Jangali urad;
Tam: Kattu-ulandu;
Tel: Karuminum, Mashperni.

CONSTITUENTS

Glycosides.

Vitexin, bergenin, daidzin and 3-O-methyl-D-chiro-inositol have been reported as anti-inflammatory principles. Vitexin exhibited moderate anti-oxidant activity.
The aqueous alcoholic extract yielded fraxidin, an anti-hyperglycemic principle.²¹⁹

THERAPEUTIC AND OTHER ATTRIBUTES

Atiśara, Pravahikā, Vatapittajwara, Śukralpāta, Raktapitta, Raktavikāra, Dāha, Śoṭha, Śirahśula

Used for diarrhea, dysentery, fever with upset stomach and body pain, premature ejaculation, bleeding disorders, blood disorders, burning syndrome, edema, and headache (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Mudagaparni and Māṣaparni belong to the Kākolyādi group of herbs of classical Ayurveda, which was used specifically for alleviating hyperacidity, digestive and hematic disorders and was considered vitalizing, nourishing and aphrodisiac.

IMPORTANT FORMULATION/ APPLICATIONS

Mudagaparni and Māshaparni are invariably used together as a composite drug in most of the Ayurvedic oils, *ghee* and *avaleha* compounds. Quoted compounds, except Dhanvantara Ghrita (Ashtāngahridaya, seventh century),

contain both of them for their stimulating properties.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g of the powder.

Terminalia arjuna W. & A.

Arjuna

BOTANICAL SOURCE(S)

Terminalia arjuna W. & A.
(Fam. Combretaceae)

Bark of *Terminalia alata* Heyne ex Roth syn. *T. tomentosa* W. & A. is the most common adulterant.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Arjuna (Stem bark).

API, Part I, Vol. II.

AYURVEDIC SYNONYMS

Kakubha, Pārtha, Śvetavāha.

Dhananjaya.²⁷

Ārtagala.²⁸

Indra vr̥ksha, Virataru, Vira-vr̥ksha.³

HABITAT

Throughout the greater parts of India.

Common along rivers, streams, ravines, and dry watercourses. Rarely found in Karnataka, but reasonably plentiful in Tirunelveli and on the West coast. Found northwards to the sub-Himalayan tract. Extensively planted in avenues or parks.^{2(a)}

REGIONAL LANGUAGE NAMES

Assam: Arjun;

Beng: Arjuna;

Guj: Sadad, Arjuna, Sajada;

Hindi: Arjuna;

Kan: Matti, Bilimatti, Neermatti, Mathichakke, Kudare kivimase;

Mal: Nirmasuthu, Vellamaruthi, Kellemasuthu, Mattimora, Torematti;

Mar: Arjuna, Sadada;

Ori: Arjuna;

Punj: Arjon;

Tam: Marudam;

Tel: Maddi;

Urdu: Arjun.

CONSTITUENTS

Tannins.

The bark contains the flavone, arjunolone; the terpenes and their glycosides, arjungenin, friedelin, arjunin, arjunctine, arjun glucoside I (arjunic acid 3-O-beta-D-galactoside), II and III, arjunoside II, arjunolic acid, oleanolic acid, arjunic acid and (+)-leucodelphinidin, in addition to ellagic acid, oxalic acid, glucotannic acid, catechol, epicatechol, (+)-gallo catechol, pyrocatechol, and tannins (19%).

Arjunolic acid diglycoside (arjunolitin) has also been isolated from the bark.^{2(c)} (See also Reference 15.)

THERAPEUTIC AND OTHER ATTRIBUTES

Hṛdroga, Kṣataksaya, Medoroga, Prameha, Vṛana, Tṛṣa, Vyanga

Used for cardiac disease, emaciation due to injury, hyperlipidemia, urinary disorders/polyuria, ulcers, morbid thirst, and hyperpigmentation

of the skin (therapeutic uses based on texts from the eighth to sixteenth centuries).

Bark extract (500 mg every 8 hours) showed significant reductions in angina and improved diastolic function.^{17,220} The effect was similar to isosorbide mononitrate 40 mg daily in patients with chronic stable angina. The bark extract reduced the frequency of angina and improved treadmill exercise test.^{17,221}

Brachial artery endothelial dysfunction was improved after 2 weeks in young male smokers.^{17,222} The ethanol fraction exhibited hypolipidemic and anti-oxidative effects at 175 and 350 mg body weight in albino Wistar rats.²²³

IMPORTANT FORMULATION/ APPLICATIONS

Pārthādyarishta/Arjunārishta (Bhaishajya Ratnāvali, seventeenth century), contains Arjun stem bark extract in self-generated alcoholic medium.

Used for cardiac diseases, lung diseases, emaciation in children, and oligospermia.

Arjun Ghrita (Bhaishajya Ratnāvali) contains the juice of Arjun stem bark as a single drug. Used for cardiac diseases.

Nāgārjunābra Rasa (Bhaishajya Ratnāvali) contains calx of mica processed in a decoction of Arjun bark. Used for cardiac diseases, bleeding disorders, edema, and emaciation due to injury.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Casuarinin, a hydrolysable tannin isolated from the bark, exhibited anti-herpes simplex virus type 2 activity by inhibiting viral attachment.^{7,224} It also showed anti-proliferative activity in human breast adenocarcinoma MCF-7 cells.²²⁵

LD₅₀ of the aqueous extract is 250 mg/kg (animal studies).²⁶

Terminalia chebula Retz.

Haritakī

BOTANICAL SOURCE(S)

Terminalia chebula Retz.
(Fam. Combretaceae)

T. chebula Retz. var. *tomentella* Kurt.¹⁰⁽⁴⁾

In Ayurvedic texts, seven varieties (now treated as synonyms) have been mentioned: Jivanti (golden in color); Pūtanā (bears bigger stones, for external use); Vijayā (longish); Abhayā (has five pieces); Rohini (round in shape); Chetaki (has three pieces); and Amritā (three fruits in a bunch).^{4,5}

Haritaki (seasonal variety) was prescribed as a single drug during summer with jaggery, during the rainy season with rock salt, during autumn with purified sugar candy, in the beginning of winter with dry ginger and in latter part of winter and the spring season with honey.⁴

PHARMACOPOEIAL AYURVEDIC DRUG

Haritakī (Pericarp of mature fruit).

API, Part I, Vol. I.

International Pharmacopoeial name: Fructus chebulae.¹⁰⁽⁴⁾

AYURVEDIC SYNONYMS

Abhayā, Kāyastha, Śivā, Pathyā, Vijayā (Not Bhaṅgā).

Shivā, Chetaki, Prapathyā, Pramathā, Amoghā, Prāṇadā, Amṛtā, Jivaniyā, Haimavati, Pūtanā, Vayasthā, Nandi, Shreyashi, Rohiṇi.⁴

Vijayā is also a synonym of Bhaṅgā (*Cannibis sativa*, leaf).

HABITAT

Throughout India, chiefly in deciduous forests and areas of light rainfall, but occasionally also in slightly moist forests, about 1500 m elevation.

Found in sub-Himalayan tracts from the Ravi eastward to Bengal and Assam, ascending up to an altitude of 1500 m in the Himalayas.

Native to India, Cambodia, China, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Thailand, and Vietnam.¹⁰⁽⁴⁾

REGIONAL LANGUAGE NAMES

Eng: Myrobalan;
Assam: Shilikha;
Beng: Haritaki;
Guj: Hirdo, Himaja, Pulo-harda;
Hindi: Harre, Harad, Harar;
Kan: Alalekai;
Kash: Halela;
Mal: Katukka;
Mar: Hirda, Haritaki, Harda, Hireda;
Ori: Harida;
Punj: Halela, Harar;
Tam: Kadukkai;
Tel: Karaka, Karakkaya;
Urdu: Halela.

Eng: Chebulic myrobalan.¹⁸

CONSTITUENTS

Tannins, anthraquinones and polyphenolic compounds.

Major constituents of the fruits are hydrolysable tannins and their components, including chebulagic acid, chebulinic acid, chebulanin, corilagin, gallic acid, gallic acid methyl ester, punicalagin, terechebulin, and terminalic acid.

Flavonoids include quercetin, isoquercitrin, and rutin (WHO).¹⁰⁽⁴⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Vibandha, Aruci, Udavarta, Gulma, Udāraroga, Arṇa, Pāṇḍu, Śoṭha, Jirṇajvrara, Viṣamajvara, Prameha, Śīrōroga, Kāsa, Tamaka śvāsa, Hṛdroga

Used for constipation, tastelessness, tympanites, abdominal lumps, diseases of the abdomen, piles, anemia, inflammation, chronic fever, intermittent fever, urinary disorders, diseases of the head, cough, bronchial asthma, and cardiac diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

Experimental studies confirmed anti-allergic, anti-microbial, anti-hyperlipidemic, anti-oxidant, anti-ulcer, and cardiac tonic properties of the fruit extracts.¹⁰⁽⁴⁾

The extract of the fruit (concentration range 30–500 µg/disc) was active against human pathogenic Gram-positive and Gram-negative bacteria.¹⁰⁽⁴⁾

IMPORTANT FORMULATION/ APPLICATIONS

Haritaki was the main plant drug in Abhayārishta; Agastyaharitaki Rasāyana; Brahma Rasāyana (with Āmalaki); Chitraka Haritaki (with Āmalaki, Guduchi and *Dashamūla*); Dantiharitaki (with Danti = *Baliospermum montanum* root and Chitraka = *Plumbago zeylanica* root); Dashamūla Haritaki (with *Dashamūla*); Brahma Rasāyana (with Āmalaki and *Dashamūla*); Triphalā Churna (with Bibhitaki and Āmalaki); Triphādi Taila (as a *Triphala* member with 6 other plant drugs).

In Abhaya Lavana, Haritaki is the main plant drug, with 8 supporting herbs, cow's urine and a concentrated decoction of 17 plant ashes. Used for diseases of the liver and spleen.

Pathyādi Lepa is a paste of Haritaki and seven other plant drugs, prepared with cow's urine. Used for leprosy.

(Details of all compounds in AFI, Part I.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

3–9 g of crude drug for decoction in separate doses.¹⁰⁽⁴⁾

Dietary administration of the fruit to rats at 25% of the diet produced hepatic lesions that included centrilobular vein abnormalities and centrilobular sinusoidal congestion. Marked renal lesions were also observed.

The LD₅₀ of a 50% ethanol extract of the fruit was 175.0 mg/kg body weight i.p. (WHO).¹⁰⁽⁴⁾

Extract of the fruit: anti-mutagenic.¹⁰⁽⁴⁾

Terminalia bellirica* Roxb.*Bibhītaka****BOTANICAL SOURCE(S)***Terntinalia belerica* Roxb.

(spelt wrongly)

(Fam. Combretaceae)

Correct botanical name: *Terminalia bellirica*.**PHARMACOPOEIAL AYURVEDIC DRUG**

Bibhītaka (Fruit).

API, Part I, Vol. I.

International Pharmacopoeial name: *Terminalae billericæ fructus*.**AYURVEDIC SYNONYMS**

Vibhīta, Akṣa, Akṣaka.

Bhaibhita, Bibhita, Bibhitaki, Kali, Kalidru.³Kaṣṣha phala, Būta vāsa, Vāsanta, Vindhya-jātaḥ, Saṁvarta, Tila-pushpaka, Kalidruma.⁴Mrga lindika, Saṁvartaka.³⁰**HABITAT**

In plains and forests up to 900 m elevation.

Not found in arid regions.^{2(a)}Indigenous to the Indo-Malesian region.¹**REGIONAL LANGUAGE NAMES**

Eng: Beleric Myrobalan;

Assam: Bhomara, Bhomra, Bhaira;

Beng: Bayada, Baheda;

Guj: Bahedan;

Hindi: Bahera;

Kan: Tare kai, Shanti Kayi;

Kash: Babelo, Balali;

Mal: Tannikka;

Mar: Baheda;

Ori: Baheda;

Punj: Bahera;

Tam: Thanrikkai;

Tel: Thanikkaya;

Urdu: Bahera.

Belliric Myrobalan

CONSTITUENTS

Gallic acid, tannic acid and glycosides.

Fruits gave beta-sitosterol; gallic and ellagic acids; ethyl gallate, galloyl glucose and chebulagic acid; and bellericoside, a cardiac glycoside bellaricanin.³²Fruits contain chromium 3.12 µg/g, zinc 25.08 µg/g, and copper 80.24 µg/g.^{2(d)}Fleshy fruit pulp contains tannins 21.4% and water extractables 44.0%.^{2(a)}**THERAPEUTIC AND OTHER ATTRIBUTES**

Svarabheda, Netraroga, Kāsa, Chardi, Kṛmiroga, Vibandha

Used for hoarseness of voice, eye diseases, emesis, helminthiasis, and constipation (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta (1000 BC) used dried pericarp alone or in prescriptions for cough, irregular fever, cardiac afflictions, gradual loss of vision, deficient lactation, urinary diseases, skin diseases, and as a purgative.^{27,28}Bibhitikā powder (10 g) with honey was prescribed for cough, dyspnea and asthma (Ashtāngahridaya, seventh century; Chatradaṭa, Rāja Mārṭanda, eleventh century).^{16(a)}The half-ripe fruit is considered purgative, and the ripe and dried fruit as an astringent.^{2(c)}**IMPORTANT FORMULATION/ APPLICATIONS**Triphala Churna (Bhāvaprakāsha, sixteenth century), contains Harikati (*Terminalia chebula*), Bibhitaki and Amlaki (*Emblica officinalis*), collectively known as *Triphalā* the Three Myrobalans.Used as an astringent, aperient, anti-flatulent, anti-acid, laxative, anthelmintic, and anti-bacterial.^{2(c)}Triphalādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains the Three Myrobalans with 8 other main herbal drugs and 24 supporting herbs. (One drug, Anjana, is equated with *Berberis aristata* bark in the AFI,

while in South India, black antimony is used.)
Used for treating baldness and hair graying.
Lavangādi Vati (Vaidyajivanam) contains
Akshaphala as a supporting herb. Used for
cough and asthma.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drag in powder form.

Standardization basis marker compound of fruit
pericarp: ellagic acid-NLT 0.3% w/w, gallic
acid-NLTO 0.75% w/w (IP).
Extracts of the fruit: anti-bacterial against
Micrococcus pyogenes var. *aureus* and
E. coli.^{2(a)}

Thespesia populnea (L.) Soland. ex Correa Kapītana

BOTANICAL SOURCE(S)

Thespesia populnea (L.) Soland. ex Correa
Syn. *Hibiscus populneus* Linn.
(Fam. Malvaceae)

Ficus arnottiana Miq. or *Ficus rumphii* Blume is
also used as Pārisha. *Thespesia populnea* is not
a latex-bearing (*kshiri*) tree. Latex is found only
in its fruits.³

PHARMACOPOEIAL AYURVEDIC DRUG

Kapītana (Stem bark).

API, Part I, Vol. V.
Belongs to the “Pancha-vaikal” group of
Ayurvedic medicine.

AYURVEDIC SYNONYMS

Pārīṣaḥ, Kandarala, Phaliśāḥ, Gardabhāṇḍaḥ.

Pārshvapippala.^{7,3} Kapītana is a controversial
name.²⁹

HABITAT

Distributed throughout coastal forests of India,
grown as a roadside tree.

Coastal regions of West Bengal, Kerala, Karnataka,
Tamil Nadu and Andaman Islands.³²

REGIONAL LANGUAGE NAMES

Eng: Portia tree, Umbrella tree;
Beng: Gajashundi, Paraasapipula;

Guj: Paaraspipalo; Hindi: Paaraspipal;
Kan: Huvarasi;
Mal: Punavasū, Pupparrutti;
Mar: Parasa pimpala;
Tam: Chilanti, Punarasu;
Tel: Ganyaraavi, Munigangaraavi.

Eng: Indian tulip tree, False rosewood.^{2(a)}

CONSTITUENTS

Flavonoids, steroids and sesquiterpenoidal quinines.

In one study, the alcoholic extract of the stem bark
contained carbohydrates, glycosides, flavo-
noids, tannins, proteins, amino acids, sterols,
triterpenoids, and fixed oils.

Alkaloids were absent; three compounds, TpF-1,
TpF-2 (might be flavonoids) and TpS-2 (might
be a sterol), were isolated and tested for anti-
psoriatic activity.²²⁶

In another study, the residue fraction showed
the presence of gums and mucilage, which
exhibited anti-diarrheal activity.²²⁷

The presence of large amounts of total phenolics
(10.11%) w/w, calculated as gallic acid, is also
reported.²²⁸

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Prameha, Raktavikāra, Yoniroga,
Dāha, Trṣā, Medoroga, Vṛṇa, Śoṭha, Tvakroga,
Bālavisarpa, Pāmā, Kaṇḍu, Dadru

Used for bleeding disorders, urinary disorders/polyuria, blood disorders, uterine disorders, burning syndrome, thirst, obesity, ulcers, inflammation, skin diseases, infantile erysipelas, eczema, pruritus, and ringworm (therapeutic uses based on texts from 1000 BC to sixteenth century).

The bark is used in hemorrhoids and chronic dysentery. Powdered bark, boiled in coconut oil, is used against psoriasis and scabies.^{2(c)}

Capsules and a compound oil of the bark are used in urethritis and gonorrhea.^{2(a)}

IMPORTANT FORMULATION/APPLICATIONS

Nyagrodhādi Kvātha Churna (Ashtāngahridaya, seventh century), contains stem barks the “Five *kshiri vrksha*” with stem barks of 14 other trees, all in equal proportion. For

malabsorption syndrome, bleeding disorder, piles, uterine disorders, ulcer, obesity.

Nyagrodha, Udumbara, Ashvattha, Pairsha and Plaksha are called “*Kshiri vrksha*” of Ayurveda (trees having milky latex). The bark of these five trees taken together is called “*pañch valkala*”.

“*Pañch valkala*” as a composite drug was used for ailments of the female genital tract, ulcers, adiposity, erysipelas, edema, blood disorders, and for promoting complexion. It was a cooling drug.

DOSAGE/USAGE/CAUTIONS/COMMENTS

50–100 ml kvatha.

The methanolic extract of the stem bark showed radical scavenging activity, including inhibition of lipid peroxidation, comparable to alpha-tocopherol.²²⁸

Tinospora cordifolia (Willd.) Miers.

Gudūcī

BOTANICAL SOURCE(S)

Tinospora cordifolia (Willd.) Miers.
(Fam. Menispermaceae)

Two varieties are mentioned in reference works: Amṛtā and Kanda-amṛtā or Kanda-gudūchi. Padma-guduchi, which has been equated with *T. sinensis* (Lour.) Merr., is often used as a substitute of *T. cordifolia*.⁵

Tinospora malabarica (Lam.) Miers. and *T. crispa* Hook. f. & Thorns are common adulterants.³⁶

Kuṇḍali, Chhinnā, Vyasthā, Amṛtavallārī, Jvara vinānishini, Chandrahāsā, Jīvati, Chakra lakshmanā.⁴

Starch: Guduchi-sattva. Yield: 48% on fresh and 1.2% on dried stem weight.^{2(a)}

HABITAT

Throughout Tropical India.

Tinospora: 32 species are found in the tropics and the Old World.¹ Three species exist in India.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Gudūcī (Stem).

API, Part I, Vol. I.

International Pharmacopoeial name: *Tinosporae caulis*.

AYURVEDIC SYNONYMS

Amṛtavallī, Amṛtā, Madhuparṇī, Gudūcikā, Chinnodbhavā.

REGIONAL LANGUAGE NAMES

Assam: Siddhilata, Amarlata;

Beng: Gulancha;

Guj: Galac, Garo;

Hindi: Giloe, Gurcha;

Kan: Amrutaballi;

Kash: Amrita, Gilo;

Mal: Chittamrutu;

Mar: Gulvel;

Ori: Guluchi;

Punj: Gilo;
 Tam: Seendal, Seendil kodi;
 Tel: Thippateega;
 Urdu: Gilo.

Common name: Gloya.

CONSTITUENTS

Terpenoids and alkaloids.

The stem contains five furan glycosides, cordifolioside A, B, C, D, and E, isolated as their tetraacetates. Palmatosides C and F, ecdysterone, makisterone A, tinosporone and tinocordioside have also been isolated.

Cordifolioside A and B are immunopotentiating. The extract of the stem yielded diterpene glycoside cordioside, its derivatives, a diterpenoid furanolactone together with tinosporaside and syringin and its apiosyl glycoside, columbin. The stem also yielded salviarin, floribundic acid, fibleucin and a sterol 20 beta-hydroxy ecdysone.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Kuṣṭha, Vātarakta, Jvara, Kāmalā, Pāṇḍu, Prameha

Used for obstinate skin diseases, gout, fever, jaundice, anemia, and urinary disorders/polyuria (therapeutic uses based on texts from 1000 BC to sixteenth century).

Guḍūchi was included in more than 90 compound formulations of Bhavaprakasha (sixteenth century).

The plant extract exhibited *in vitro* anti-malarial activity against *Plasmodium berghei*.^{2(c)}

In one study, the dried stem produced significant anti-inflammatory effects in both acute and subacute models of inflammation.²²⁹

Hepatoprotective action has also been reported in experimented studies.²²⁹

IMPORTANT FORMULATION/ APPLICATIONS

Amṛtārishta (Bhaishajya Ratnāvali, seventeenth century), contains Amṛtā stem as the main plant drug, *Dashmūla* and 11 supplementary herbs.

Used for all types of fevers. (The original *Dashmūla* is now extinct.)

Guḍūchyaadi Taila (Bhāvaprakāsha, sixteenth century) contains Guḍūchi as the main plant drug, with 33 supporting herbs. Used as a massage oil for gout, muscular pain, facial paralysis, and skin diseases.

Guḍūchyadi Churna (Bhaishajya Ratnāvali) used for anemia, fever and liver and spleen disorders. Guḍūchi Satva (Yogarātnākara, sixteenth century) used for wasting diseases, phthisis, and chronic fever. Also used for chronic diarrhea and dysentery.

Amṛtottara Kvātha Churna and Chhinnodbhāvādi Kvātha Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) are used for high fever and chronic fever.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

20–30 g of the drug for decoction.

Standardization basis marker compound: cordifolioside A-NLT 0.02% w/w (IP).

The plant extract showed *in vitro* inactivating activity in hepatitis B surface antigen over 48–72 hours.^{2(c)}

T

Toddalia asiatica (L.) Lam.

Kaṭugulma

BOTANICAL SOURCE(S)

Toddalia asiatica (L.) Lam.
 Syn. *Toddalia aculeata* Pers.
 (Fam. Rutaceae)

Toddalia asiatica var. *obtusifolia* is found in Nilgiris; var. *floribunda* Gamble, syn. *T. floribunda* Wall. is reported from Andhra Pradesh, Tamil Nadu, Karnataka, and Kerala.^{2(c)}

PHARMACOPOEIAL AYURVEDIC DRUG

Kaṭugulma (Whole plant).
API, Part I, Vol. VI.
(Non-classical.)
(Toddali was a better choice.)

AYURVEDIC SYNONYMS

Hemamūlā.
(Non-classical.)

HABITAT

Almost all parts of peninsular India.
In South India, the shrub is very common in the Nilgiri and Palani hills, as well as in the shrubby jungles of Odisha.

REGIONAL LANGUAGE NAMES

Eng: Wild orange tree, Lopez tree, Forest pepper;
Ben: Kada-todali;
Hindi: Jangli- kalimirsch, Dahan, Kanja;
Kan: Kaadumenasu, Mullumastige;
Mal: Kaka toddali;
Mar: Limri, Manger;
Ori: Tundpora;
Tam: Milagaranaï, Kattumilagu, Milagu, Charanaï;
Tel: Mirapagandra.

Eng: Forest pepper. (Ripe fruits are as pungent as black pepper.)

CONSTITUENTS

Alkaloids; toddaline, toddalinine, skimmianine and berberine. Other constituents include citric acid, an oil, resin, pectin and starch.
Quinoline alkaloids, integriquinolone, 4-methoxy-2-methylquinolin-2-one, N-methyl flindersine and toddacoumalone have been isolated from the plant.
Nilgiris var. *obtusifolia* gave coumarins, todda- none, skimmianine and chlorocoumarin.
The extract of air-dried and powdered plant of var. *floribunda* yielded dihydrofistidin diometin, diosmin and hesperidin.^{2(c)}
For chemical constituents of Japanse, Formosan and Sri Lankan spp., see Reference 2(c).

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya (digestive impairment), Kaphavātavyādhi (disorders due to kapha and vāta dosa), Āṅgamarda (bodyache), Atisāra (diarrhoea), Jvara (fever), Kṛmi (worm infestation), Kuṣṭha (Leprosy/diseases of skin), Viṣamajvara (intermittent fever).
Used as a single drug. (Classical reference not quoted.)
Whole plant: febrifuge.
Leaves (fresh): useful in colic.
Root bark: anti-periodic, anti-pyretic, diaphoretic, stimulant and stomachic; the infusion is beneficial in amenorrhoea, debility during convalescence, diarrhoea, and fever.¹⁵
An oil prepared with unripe fruits and roots is a stimulating liniment for rheumatism.^{2(a)}
Roots and leaves are used for fungal infections.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Aerial parts exhibit diuretic activity. Alcoholic extract of roots exhibits diuretic activity comparable to chlorothiazide. Toddaculine, isolated from the root, exhibits protective action against ultraviolet rays. Roots contain an antimalarial compound, nitidine, which showed 50% inhibition against various chloro- quinine susceptible and choloquinine resistant strains of *Plasmodium falciparum*.
The plant coumarin (naphthoquinone dimer todd- acoumaquinone) showed weak activity against HSV-1 and HSV-2, and no activity against HIV-1.^{2(d)}
The stem distillate of the roots and leaves exhibited anti-fungal activity comparable with benlate.^{2(c)}
The aerial parts of var. *floribunda* exhibit spasmo- lytic activity.^{2(d)}
Essential oil of the leaves (0.8 mL/kg) showed anti-inflammatory activity.^{2(d)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 0.5 to 2 g.
Chlorocoumarin can be used as an alternative for papaverine obtained from the poppy, which is under restricted cultivation.^{2(c)}

Trachyspermum ammi (Linn.) Sprague ex Turril

Yavānī

BOTANICAL SOURCE(S)

Trachyspermum ammi (Linn.) Sprague ex Turril
syn. *Carum copticum* Benth & Hook. f.
Ptychotis ajwan DC.
(Fam. Umbelliferae)

The seeds are sometimes adulterated with *Seseli diffusum* Roxb. ex Sm. or *Apium graveolens* (L.) Sprague.^{2(c)}

PHARMACOPOEIAL AYURVEDIC DRUG

Yavānī (Fruit).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Dīpyaka, Yamānī, Yamānikā, Yavānikā.

Dīpyaka is also a synonym of Ajmodā (*Apium graveolens* Linn.).³
Trachyspermum roxburghianum (DC.) Wolf.
syn. *Carum roxburghianum* Benth. and Hook. f.
is also equated with Ajmoda and Dipyaka.³⁶

HABITAT

Cultivated.

Trachyspermum: 15 species are found in the tropics and from Northeast Africa to Central Asia.¹
Found from India to Japan. Four species exist in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Bishop's weed;
Assam: Jain;
Beng: Yamani, Yauvan, Yavan, Javan, Yavani, Yoyana;
Guj: Ajma, Ajmo, Yavan, Javain;
Hindi: Ajwain, Jevain;
Kan. Yom, Omu, Oma;
Mal: Omam, Ayanodakan;
Mar: Onva;

Ori: Juani;
Tam: Omam;
Tel: Vamu.

Eng: Ammi, Lovage, Carum, Ajowan.³²

CONSTITUENTS

Essential oil and fixed oil.

Essential oil 2%–4% (principal source of thymol).

Fatty oil 11.3% from exhausted fruits and 14.8% from original fruits.^{2(a)}

Constituents from a sample of essential oil from Pakistan: thymol 45.20%–48.50%; *p*-cymene 20.80%–23.78%; gamma-terpinene 18.70%–20.35%; carvacrol 4.50%–6.80%; beta-pinene 1.24%–1.56%; alpha-pinene 0.33%–0.60%; camphene 0.56%–0.63%; delta-3 carene 0.42%–0.80%; and limonene 0.25%–2.25%.^{2(c)}

Seeds contain a phenolic glucoside, 2-methyl-3-glucosyloxy-5-isopropylphenol,³² and quercetin-3- rutinoside.²⁵ Sulfur has been isolated from the seeds.²⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Adhmāna, Anāha, Udararoga, Gulma, Kṛmiroga, Sula

Used for flatulence, constipation, diseases of the abdomen, abdominal lumps/chlorosis, helminthiasis, and colic (therapeutic uses based on a text from the sixteenth century).

Charaka and Sushruta (1000 BC) included Yavānī dried seeds in prescriptions for indigestion, anemia, piles, alcoholism,²⁷ colic pain, diarrhea, and abdominal swelling.²⁸ Buttermilk with Yavānī powder and black salt is used as an appetizer and carminative.^{16(a)} Buttermilk with Yavānī and Chitraka (*Plumbago zeylanica*) is used for piles.^{16(a)}

The seeds are also used in prescriptions for amebiasis and helminthiasis.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Yavānī Shaṇḍava (Yavānyādi Churna, Ashtāngahridaya, seventh century), contains black pepper and long pepper as main herbal drugs with Yavani and 5 other digestive and carminative herbs and 5 additional supporting ingredients.

Used for constipation and malabsorption syndrome. Fruits are included to activate the digestive enzyme amylase.^{2(c)}

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g of the drug in powder form.

Standardization basis marker compound: thymol NLT 1.05 w/w (IP).

Essential oil (Ajowan oil) exhibits potent spermicidal activity against human spermatozoa. Its anti-microbial activity has been equated with chlorophenicol; anti-fungal activity against human ringworm the fungus, *Trichophyton mentagrophytes*, has been reported.^{2(c)}

A calcium channel blocker-like constituent “found” in plant, thymol,^{2(d)} should be investigated.

Tragia involucrata Linn.

Vrścikālī

BOTANICAL SOURCE(S)

Tragia involucrata Linn.
(Fam. Euphorbiaceae)

In Kerala, *Tragia involucrata* is used as *Durālabhā*,⁵ and *Heliotropium indicum* is used as Vrschikālī.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Vrścikālī (Whole plant).

API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Dakshināvartī (belonging to South India) Mesha shringī was known as Vrścikālī and Vishāṇikā.⁴ In AFI, Part I, page 61, Vrschikali is equated with Meshashringī.

According to Charaka (*shloka*, quoted in API, Vol. IV, page 327), Vrścikālī was “*Kerala duralabhā nāmnā*”, *Durālabhā* of Kerala. (Kerala was not mentioned in the text of Charaka. “Dakshnāvarta” expression for the herb belonging to the southern part of India was used.)

HABITAT

Throughout India from Punjab and Lower Himalayas eastwards to Assam and Meghalaya, southwards to Kerala.

REGIONAL LANGUAGE NAMES

Eng: Scorpion tail plant;
Beng: Shedha songi;
Guj: Vichaati;
Hindi: Vahanta, Vrishi-kali;
Kan: Haligilu;
Mal: Terkkada;
Mar: Vrischikali;
Tam: Thai kodukkuppoondu.

Eng: Indian stinging-nettle.^{2(a)}

CONSTITUENTS

Constituents not quoted in API.

The chloroform extract of the plant tested positive for terpenoids, flavones, quinones, alkaloids, sterols, and proteins.

Ar-tumerone, 9, 10-anthracenedione 1, 8-dihydroxy-3-methyl, and friedelane-3-one have been reported.

Vinyl hexylether, shallol, 2, 4-dimethyl hexane, 2-methyl-nonane and 2, 6-dimethyl heptane, isolated from the leaf, were studied *in vitro* for anti-bacterial activity.²³¹

Ar-turmerone was already reported from *Curcuma longa* and possesses anti-bacterial and wound-healing activities.²³⁰

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Vibandha, Arocaka

Used for bleeding disorders, constipation, and tastelessness (therapeutic uses based on texts from 1000 BC to fourteenth century).

In South India and Odisha, the drug is sold as *duh-sparshā*. The leaf ash, mixed with oil, is applied topically on chronic and non-healing ulcers.^{2(d)}

Leaf: anti-cephalalgic. Fruit: paste used topically in baldness. Root: decoction is diaphoretic, alterative and febrifuge, and used for dry cough and leprotic afflictions. Aerial parts: diuretic.³²

Vṛschikāli was an ingredient of a medicinal *ghee* of Charaka (1000 BC), which was given internally as an aid to memory, intellect and growth of young children.²⁷

Sushruta (1000 BC) prescribed the plant in respiratory problems, consumption, abdominal

swelling, parasitic worms, and skin diseases; the roots were used as a purgative.²⁸

IMPORTANT FORMULATION/ APPLICATIONS

Vidāryādi Kvātha Churna (Ashtāngahridaya, seventh century), contains 20 plant drugs including Vṛschikāli (Meshashringi) plant, all in equal proportion.

Used for abdominal lumps, cough, dyspnea, phthisis, cachexia, and emaciation.

Vidāryādi Ghrita (Ashtāngahridaya) contains 20 plant drugs, including the Vṛschikāli plant, all in equal proportions. Used for malabsorption syndrome, anemia, abdominal lumps, fever, cough, dyspnea, and splenic disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Trapa natans Linn. var. *bispinosa* (Roxb.) Makino. Srṅgātaka

BOTANICAL SOURCE(S)

Trapa natans Linn. var. *bispinosa* (Roxb.) Makino.
syn. *T. bispinosa* Roxb.
T. quadrispinosa Wall.

PHARMACOPOEIAL AYURVEDIC DRUG

(Fam. Trapaceae)

Srṅgātaka (Dried seed).

API, Part I, Vol. IV.

Red and white varieties of kernels gave different values (see Constituents).

AYURVEDIC SYNONYMS

Śrṅgāta, Jalaphala, Trikoṇaphala.

Śrṅgātikā, Srṅgāti, Trikantakaphalā.³⁰
Jala-kanda, Trikoṇa, Trikata, Trikah.⁴

HABITAT

Aquatic herb occurring throughout the greater part of India in lakes, tanks and ponds and also cultivated.

REGIONAL LANGUAGE NAMES

Eng: Water chestnut;
Beng: Paniphal, Singade, Jalfal;
Guj: Shingoda, Singoda;
Hindi: Singhara, Singhade;
Kan: Singade, Gara, Simgara, Simgoda;
Mal: Karimpolam, Vankotta, Jalaphalam,
Karimpolam;
Mar: Shingoda;
Ori: Paniphala, Singada;
Punj: Singhade, Gaunaree;
Tam: Singhara;
Tel: Kubyakam, Singada;
Urdu: Singhara.

CONSTITUENTS

Starch and Protein.

Starch isolated from the flour of the dried fruits consists of 15% amylose and the rest is amylopectin. The biological value of the proteins was found to be higher than that of the proteins in wheat (protein efficiency ratio at 7% level: *singhara* 1.8%; wheat 1.1%).

The flour of the red and white varieties, respectively, contain phosphorus 45 and 48 mg/100 g; sulfur 122.81 and 130.16 mg/100 g; calcium 60 and 20 mg/100 g, magnesium 200 and 160 mg/100 g; sodium 100 and 80 mg/100 g; potassium 1800 and 1760 mg/100 g; iron 145.16 and 129.02 ppm; and manganese 18.93 and 11.36 ppm.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Dāha, Garbha sṛāva, Sopha (external), Mūtrakṛchra, Asthibhagna, Vātavyādhi, Prameha, Visarpa, Trsna

Used for bleeding disorders, burning syndrome, threatened abortion, external edema, dysuria, bone fractures, diseases of the nervous system, urinary disorders/polyuria, erysipelas and morbid thirst (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) gave shelled nuts alone or in prescriptions for impotency, dysuria, polyuria, cough, consumption, intrinsic hemorrhage, after debilitating illnesses, for stabilizing the fetus, and for preventing abortion.^{27,16(a)}

A confection of the flour and milk is prescribed in diarrhea, dysentery, bilious afflictions, piles,

leucorrhea, and menorrhagia. Preparations of the flour are served after fasts.

IMPORTANT FORMULATION/ APPLICATIONS

Saubhāgya Śhunṭhi (Bhaishajya Ratnāvali, seventeenth century), contains dried ginger as the main plant drug with 22 supporting herbs including Śrngātaka fruit, all in equal proportion, and calx of iron and mica. For post-delivery problems and impaired lactation.

Pūgākhanda (Bhaishajya Ratnāvali) contains Pūgā, Shatāvri and Āmalaki as the main plant drugs with 26 supporting herbs, including the Śrngātaka kernels, all in equal proportions.

Amṛtaprāsha Ghrita contains 32 supporting herb, including the Śrngātaka kernels, all in equal proportions. Main drugs include a soup of goat's meat.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 mg of the dry in powder form.

T. natans var. *japonica* is used as an astringent for pyrogenic infections. The ethanolic extract of the seed is used for the promotion of skin collagen biosynthesis and the preparation of cosmetics. Dentrifrices containing collagenase inhibitors extracted from the seed extract are used for periodontal disease control.

The collagenase inhibitor also exhibits anti-inflammatory activity and can be incorporated into skin lotions and creams.^{2(d)}

T

Trianthema decandra L.

BOTANICAL SOURCE(S)

Trianthema decandra L.

(Fam. Ficoidaceae/Aizoaceae)

Zaley decandra (L.) Burm.¹

Laghupatra Varṣābhū

PHARMACOPOEIAL AYURVEDIC DRUG

Laghupatra Varṣābhū (Whole plant).

API, Part I, Vol. VI.

(Kṣudra varshābhū is the classical name.)⁴

AYURVEDIC SYNONYMS

Dvijāyāṅgī.

Kruraka, Varshaketu, Shivātikā.⁴

(Synonyms of the smaller variety of Vashābhū.)

HABITAT

Annual herb occurring as a weed all over peninsular India.

In South India and the Deccan peninsula, Gujarat, Rajasthan and Uttar Pradesh, extending to Haryana.^{2(a)}

Distributed in warm climates. Six species occur in India. *T. decandra* and *T. portulacastrum* are known as Gadabani, small-leaved and broad-leaved, respectively.

T. govindia Buch.-Ham. ex G. Don., syn.

T. pentandra auct. non-Linn. (*T. pentandra* Linn. is an African plant) is known as Biskhaprā (a syn. of Varshābhū in Punjab).

REGIONAL LANGUAGE NAMES

Ben: Gadabani, Goda-cani;

Hindi: Gadabani;

Kan: Bilikomme, Gaija soppu;

Mal: Vellutha thazhuthama;

Mar: Tultuli;

Ori: Puruni saga;

Tam: Vellai caranai;

Tel: Tellagalijeru.

CONSTITUENTS

Saponins and alkaloid punarnavine.

Alkaloids punarnavine 1 and 2 are reported from *Boerhaavia diffusa* Linn.²⁵

Trianthema portulacastrum Linn. contains an alkaloid trianthemine and not punarnavine, as previously reported.^{2(a)}

The plant contains a phenolic content of 680.23 ± 3.03 mg/g; the presence of alkaloids, amino acids, carbohydrates, saponins, glycosides, and volatile oils has been reported.²³²

The plant is a good source of zinc (1077 ± 0.188 mg/100 g) and copper (0.416 ± 0.0057 mg/100 g).^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Amavāta (rheumatism), Apasmāra (epilepsy), Ardhāvabhedaka (migrain/ hemicrania), Hrdayaroga (heart disease), Kāmalā (jaundice), Kāsa (cough), Pāndu (anaemia), Sotha (oedema), Svāsa (asthma), Urahksata (chest wound), Vrana (ulcer).

Used as a single drug. (Classical reference not quoted.)

The juice of Biskhapra was used as a snuff for alleviating epilepsy.^{16(a)}

In folk medicine, the juice of the leaves is dropped into the nostrils to relieve partial headache.^{2(a)}

The root is used in hepatitis and asthma. A decoction of the root is credited with aperient properties. The root is ground with milk and given in orchitis.^{2(a)}

In Andhra Pradesh, the root is used in veterinary medicine for eye injuries and eye diseases of cattle.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

A decoction of herb is used as a vermifuge; also an antidote to alcoholic poison. It is given in rheumatism.

The leaves are used to treat edema.²³⁴

In African countries, the plant is a popular remedy for skin diseases, wound healing, burns, fever, and toothaches.²³⁴

The bitter roots are used for curing bacterial infections.²³⁴

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (powder): 3 to 6 g.

The ethanolic and aqueous extracts of *T. decandra* were screened for anti-oxidant activities using the nitric oxide scavenging activity method.²³²

***Trianthema portulacastrum* Linn.**

Varsābhu

BOTANICAL SOURCE(S)

Trianthema portulacastrum Linn.
Syn. *T. monogyna* Linn.
T. obcordata Roxb.
(Fam. Aizoaceae)

Varshābhu (*T. portulacastrum*) is a rainy season annual, while Punarnavā (*Boerhaavia diffusa*) grows in other seasons as well. Both are to be treated as different herbs. Varshābhu, being an adulterant, shared the name Punarnavā. Both the species bear white and red flowers.^{3,30,34}

PHARMACOPOEIAL AYURVEDIC DRUG

Varsābhu (Root).
API, Part I, Vol. IV.

AYURVEDIC SYNONYMS

Swetamula, Sothaghni, Vrshoheev.
(Vṛścīva.)
Dirgha-varshābhu and Sveta-mula were synonyms.⁴
Shothaghni has been equated with *Boerhaavia diffusa* Linn. (AFI, Part I, page 325) and Vṛścīva with *Boerhavia verticillata* Poir. (AFI, Part I, page 330).

HABITAT

A post-monsoon annual herb, found almost throughout India as a weed in cultivated and waste lands.
Two forms are reported: a red-colored form in which the stem, leaf margin and flowers are red; and a green-colored form, which has a green stem and white flowers.^{2(a)}
Investigations have shown that Rakta-Punarnava^{3,30} and Shveta-Punarnava are species of *Boerhaavia*.^{2(a)} *Trianthema* is used as an adulterant of the roots of *Boerhaavia diffusa*.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Hoase purslane;
Beng: Sabuni;
Hindi: Saphed punarnava, Bish kharpra, Pathar;
Kan: Muchchugane, Sihi punarnava;
Mal: Thazhuthama, Jamizhama;
Mar: Sweta punarnava;
Ori: Sweta puruni, Gothapurni;
Punj: Sanaya;
Tam: Saranai, Mukuruttai;
Tel: Galijeru;
Urdu: Bishkhopra.

CONSTITUENTS

Glycoside.
Principal constituent is ecdysterone,²³³ a potential chemosterilant.^{2(a)}
Flavonoid leptorumol (5, 7-dihydroxy-6, 8-dimethylchromone) and a new flavonoid, C-methylflavone, 5, 2'-dihydroxy-7-methoxy-6, 8-dimethylflavone; alkaloid trianthemine; a tetraterpenoid, trianthenol, 5-hydroxy-2-methoxy benzaldehyde, 3-acetyl aleuritolic acid, *p*-methoxy benzoic acid and *p*-propoxy benzoic acid; beta-cyanin and 3, 4-dimethoxy cinnamic acid.²³³

THERAPEUTIC AND OTHER ATTRIBUTES

Sopha, Pandu, Arsa, Udara roga, Gulma, Jvara, Garvisa, Vasti sula, Hrdroga, Urahksatad, Agnimandya, Ykrt avam Pliha roga
Used for edema, anemia, piles, diseases of the abdomen, abdominal lumps, fever, accumulated poison, pain in the urinary bladder, chest wounds, digestive impairments, and diseases of the liver and spleen (therapeutic uses of Varshābhū, Punarnavā, Kāthillaka, *shveta* and *arun* Punarnavā, based on texts from 1000 BC to sixteenth century, are quoted from classical texts in the API, pages 321–322, for Varshābhu).

Root: cathartic, deobstruent, abortifacient, anti-inflammatory, anti-pyretic, analgesic, and spasmolytic.²³³

Leaves: used in edema and dropsy.²³³

Plant: diuretic, hepatoprotective, hypolipidemic, analgesic, anti-nociceptive, hypoglycemic, anti-oxidant, and anti-carcinogenic.²³³

(For studies, see Reference 233.)

IMPORTANT FORMULATION/ APPLICATIONS

Dhanvantara Ghrita (Ashtāngahridaya, seventh century), contains roots of Shveta and Rakta Punarnavā.

Sukumār Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains the Rakta punarnavā plant.

Kumāryāsava (Shārangadhara Samhitā, thirteenth century) contains the roots of Shveta and Rakta punarnavā.

Punarnavāsava (Bhaishajya Ratnāvali, seventeenth century) contains the Shothaghni root.

Sukumāra Taila (not in the AFI, formulation could not be checked).

According to the AFI, the source of Rakta Punarnavā is *Boerhaavia diffusa* (Part I, page 323) and that of Shveta Punarnavā is *Boerhavia verticillata* (Part I, page 326).

Shophaghni (Shothaghni) has been treated as a synonym of Rakta Punarnavā (*Boerhaavia diffusa*) in the AFI (Part I, page 325).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–5 g of the drug in powder form.

Tetraterpenoid trianthenol is anti-fungal (*in vitro*) against a number of human and plant pathogens (inhibition was moderate).²³³

The whole plant gave ecdysterone, a chemo-sterone with possibilities for utilization as an insect molting hormone in third-generation insecticides.²³³

Tribulus terrestris L.

Plant

Gokṣura

BOTANICAL SOURCE(S)

Tribulus terrestris L.
(Fam. Zygophyllaceae)

Results of a 2007 study suggested the existence of one chemotype common to the East, South European and West Asian regions. Due to difference in dominating compounds, Vietnamese and Indian samples were found to belong to other chemotypes that are still to be characterized.²³⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Gokṣura (Whole plant).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Gokṣuraka, Kṣuraka, Trikaṇṭaka, Svādukaṇṭaka, Śvadamṣṭrā.

Trikāṭah, Trikah, Kantakaphala, Go-kaṇṭaka, Bhadra kanta, Vyala damstraka, Sthala śrngāta, Śadanga.⁴

There is controversy about the synonym Trikantaka, as the fruits possess four to six spines.

Actually, Trikantaka was a group of three herbs. The group contained three spiny herbs: bṛhati, kanta-kāri and dhanvayāsa (Rājanighantu, fourteenth century, cited in Dravya Guna Vigyān, PV Sharma, Part I, page 98).

One of the classical name of Gokshuraka was Trikatah,⁴ which was taken as Trikantaka.

In South India, a wild variety bears four thorns, while the country variety bears three pairs of thorns (i.e. six thorns), one at each corner.⁵

HABITAT

A weed chiefly growing in hot, dry and sandy regions throughout India and up to 3,000 m in Kashmir.

Cultivated in the U.S.A. and Bulgaria (sold as an “anabolic”).¹ Widely naturalized.¹ Three species exist in India.^{2(a)}

T. alatus Delile (West Rajasthan and Gujarat) and *T. cistoides* Linn. (West Bengal and Tamil Nadu).

REGIONAL LANGUAGE NAMES

Eng: Small caltrops, Land caltrops, Puncture vine;

Assam: Gokshura, Gokshuraka;

Ben: Gokshur, Gokhuree;

Guj: Nhana gokhru, Bethagokhru;

Hindi: Gokhru, Chhotaagokshru, Hathichikar;

Kan: Neggilumullu, Neglu;

Mal: Nerunji;

Mar: Sarate, Kate gokhru;

Ori: Gakhura, Gokshra, Gokharaa;

Pun: Bhakhada, Bhakhar;

Tam: Nerinzil, Nerunjee;

Tel: Palleru;

Urd: Khar-e-khasak khurd.

Sindh (Pakistan): Tikundi (one long, two smaller spines, others reduced to tubercles).

CONSTITUENTS

Alkaloids: Terrestriamide, tribulusamide A, B; steroidal saponins: terrestrosin C, D, E, F, G, H, I, J and K, terrestroneoside A and F, terreside A and B, terrestroside F; tribulosaponin A and B, tribulosin, protodioscin saponin C, prototribestin, terrestrosin J, isoterrestrosin B; flavonoid glycosides: isorhamnetin-3-gentiotrioside, quercetin-3-gentiobioside-7-glucoside; amide: moupinamide.

(Source could not be traced.)

Samples from Bulgaria, Greece, Serbia, Macedonia, Turkey, Georgia, Iran, Vietnam, and India were analyzed for protodioscin, prototribestin, pseudoprotodioscin, dioscin, tribestin, tribulosin, the flavonoid rutin. Vietnamese and Indian samples lacked prototribestin and tribestin, while tribulosin was present in large amounts. In other samples, protodioscin and prototribestin were the main components.²³⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Āmavāta (rheumatism), Amlapitta (hyperacidity), Āntravṛddhi (Hernia), Aśmarī (calculus), Ardita (facial palsy), Arśa (piles), Hṛdroga (heart

disease), Indralupta (alopecia), Jvara (fever), Kāsa (cough), Mūtrāghāta (urinary obstruction), Mūtrakṛcchra (dysuria), Pakṣāghāta (paralysis/hemiplegia), Pradara (excessive vaginal discharge), Prameha (metabolic disorder), Raktapitta (bleeding disorder), Śūla (pain/colic), Śoṭha (oedema), Svasa (Asthma), Sūtikāroga (puerperal disorders), Śītapitta (urticaria), Vātarakta (Gout).

(Therapeutic uses based on texts, 1000 BC to sixteenth century).

The crude alcoholic extract of the plant showed anti-urolithic activity (60%–80% reduction in the weight of the stone); the chloroform, butanol and aqueous fractions of the extract almost completely inhibited stone formation (in albino rats). The plant extract showed marked diuretic activity. The plant also exhibited hepatoprotective activity.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Dashamūla based compounds: Due to changes in plant parts all the quoted compounds have deviated from the classical roots and need revalidation and repositioning.

The alkaloid content in the plant is too low to cause acute nervous effects, but accumulated compounds may become pharmacologically significant when the plant is ingested over a long period. (The plant is toxic to cattle.)^{2(c)}

An ether and ethanolic extract of both shoots and fruits showed anti-microbial activity against *Staphylococcus aureus*, *E. coli*, and *Candida albicans*.^{2(d)}

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Curna (powder): 3 to 6 g. Kvatha (decoction): 50 to 100 ml.

A pharmaceutical preparation, Tribestan, developed from the Bulgarian plant, contains steroidal saponins of the furastanol type with protodioscine and protograciline as the main components. It has been found to increase the libido and the number and motility of sperm in men; it improves ovarian function in women.^{2(c)}

In a clinical study of 406 cases of angina pectoris, saponin of *T. terrestris* showed improvements in ECG of myocardial ischemia.²³⁶

A polysaccharide isolated from the plant has been found to protect mouse chromosomes

and limit DNA damage induced by cyclophosphamide.^{2(d)}

Tribulus terrestris Linn.

Fruit, root

Gokşura

BOTANICAL SOURCE(S)

Tribulus terrestris Linn.
(Fam. Zygophyllaceae)

Results of a study from 2007 suggested the existence of one chemotype common to the East, South European and West Asian regions. Due to difference in dominating compounds, Vietnamese and Indian samples were found to belong to other chemotypes that are still to be characterized.²³⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Gokşura (Fruit)

API, Part I, Vol. I.

Goksura (root).

API, Part I, Vol. I.

International Pharmacopoeial name: Tribuli fractus (fruit).

AYURVEDIC SYNONYMS

Gokşuraka, Kşuraka, Trikaṇṭaka, Svādukaṇṭaka, Śvadamṣṭrā.

Trikāṭah, Trikah, Kantakaphala, Go-kaṇṭaka, Bhadra kaṇṭa, Vyala damṣṭraka, Sthala srngata, Śadanga.⁴

There is controversy about the synonym Trikantaka, as the fruits possess four to six spines.

Actually, Trikantaka was a group of three herbs. The group three spiny herbs: Br̥hati, Kantakāri and Dhanvāydsa (Rājanighantu, fourteenth century, cited in Dravya Guna Vigyān, PV Sharma, Part I, page 98).

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Cultivated in the U.S.A. and Bulgaria (sold as an “anabolic”).¹ Widely naturalized.¹ Three species exist in India.^{2(a)}
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Beng: Gokshura, Gokhri;
Guj: Be tha gokharu, Nana gokharu, Mithogokharu;
Hindi: Gokhru;
Kan: Sannanaggilu, Neggilamullu, Neggilu;
Kash: Michirkand, Pakhda;
Mai: Nerinjil;
Mar: Sarate, Gokharu;
Punj: Bhakhra, Gokhru;
Tarn: Nerinjil, Nerunjil;
Tel: Palleruveru;
Urdu: Khar-e-Khasak Khurd.

Sindh (Pakistan): Tikundi (one long, two smaller spines, others reduced to tubercles).

CONSTITUENTS

Tribulus terrestris.

Fruit: Potassium nitrate, sterols, sapogenin with pyroketone ring (diosgenin), gitogenin, and hecogenins.
Root: alkaloids and saponins.
Fruits contain the steroidal sapogenins diosgenin and its acetate, chlorogenin, gitogenin, and ruscogenin; kaempferol and its 3-glucoside, 3-rutinoside and 3-beta-D-(6"-p-coumaroyl)-glucoside, glucose, rhamnose, and rutin.¹⁵
According to a WHO monograph, the major constituents of the fruits are gitonin, protodioscin

(0.245%), tribulosaponins A and B, tribulosin and terrestrosins A–K; alkaloids and tribulusamides A and B.¹⁰⁽⁴⁾

Roots contain the phytosterols campesterol, beta-sitosterols and stigmasterols;³² neotigogenin;¹⁵ and amino acids.

THERAPEUTIC AND OTHER ATTRIBUTES

Fruit: Kāsa, Śvāsa, Asmarī, Mūtrakṛcchra, Prameha, Arśa, Śūlaroga, Hṛdroga, Daurbalya.

Root: Kāsa, Śvāsa, Śūlaroga, Hṛdroga, Vātaroga, Mūtrakṛcchra, Arṃari.

(Therapeutic uses based on texts, 1000 BC to sixteenth century).

Fruit/root: cough, asthma, calculus, dysuria, pains and heart disease; urinary disorders/polyuria, piles, weakness (fruit); diseases of the nervous system (root).

The aqueous methanolic fraction (10%) of the ethanolic extract of the fruit provided significant protection against urolithiasis, protected against leucocytosis and elevations of serum urea levels and lowered hyperoxaluria (in albino rats).^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Gokshurādi Guggulu (Shārangadhara Samhitā, thirteenth century), contains the fruit as the

main drug with purified Guggulu and 7 supporting herbs. Used for dysuria, gout, and rheumatic disorders.

Trikantaka Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains the fruit as the main plant drug with 14 supporting herbs in equal proportions. Used for dysuria and other urinary disorders.

Drakshādi Churna (Vaidya Yoga Ratnāvali) contains 24 plant drugs, including the Gokshura fruit, all in equal proportions. Used as a restorative tonic for cough, phthisis, wasting diseases, and vaginal discharges.

(The root, as a member of classical *Dashamūla*, has been replaced by the plant. All quoted compounds containing *Dashmūla* need revalidation as new drugs.)

DOSAGE/USAGE/CAUTIONS/ COMMENTS

Fruit: 3–6 g of the drug in powder form.

Fruit/root: 20–30 g of the drug for decoction.

Standardization basis marker compound of the fruit: diosgenin A-NLT 0.3% w/w (IP).

Trichosanthes bracteata (Lam.) Voigt

Viśālā

BOTANICAL SOURCE(S)

Trichosanthes bracteata (Lam.) Voigt
(Fam. Cucurbitaceae)

Syn. *T. palmata* Roxb.

T. lepiniana (Naudin) Cogn.

T. tricuspidata Lour.^{15,32}

Involucrararia lepiniana Naud.³²

Indravārūni is equated with *Citrullus colocynthis* Schrad. Other sources: *Trichosanthes bracteata* and *Cucumis trigonus* Roxb.³

Two varieties of Indravārūni and Gavādani are mentioned in the texts as quoted in the API, Vol. V, page 361.

PHARMACOPOEIAL AYURVEDIC DRUG

Viśālā (Root).

API, Part I, Vol. V.

Vishālā is equated with Rakta Indravārūni (AFI, Part I, page 82) and Rakta Indravārūni with *T. palmata* Roxb. (AFI, Part I, page 339).

AYURVEDIC SYNONYMS

Mahākālā*, Gavādani.

* Correct synonym is Mākālā, not Mahākālā.³⁰

Gavākshi is a synonym of Rakta-Indravārūni, equated with *Trichosanthes palmata* Roxb. (AFI, Part I, page 312).

Synonyms of Indravārūni: Vishālā, Gavādanī and Aindri.⁴

Gavādini is a different herb equated with blue-flowered *Clitoria ternatea* Linn. (Girikarnikā).⁴

HABITAT

In moist thickets from the Himalayas to the south, ascending up to an altitude of 2,500 m.

REGIONAL LANGUAGE NAMES

Beng: Maakaal;
Guj: Raataan indraayan;
Hindi: Maakaal, Mahar kaundala, Lai indraayan, Mahakaal;
Kan: Avagudehannu;
Mal: Kaakkattonti;
Mar: Kaundal, Kavundal;
Ori: Mahaakaal;
Punj: Kachree, Aankorattai;
Tam: Korattai;
Tel: Erraa chedupucca.

CONSTITUENTS

Saponins, trichosanthin.

Fresh root contains cucurbitacin B, isocucurbitacin B, 3-epi-isocucurbitacin B, 23, 24-dihydrocucurbitacin B, and 23, 24-dihydro-3-epi-isocucurbitacin B; cucurbitacin D, isocucurbitacin D, suberic acid, bryonolic acid, alpha-spinasterol and its 3-O-beta-D-glucopyranoside, stigmast-7-en-3 beta-ol and its 3-O-beta-D-glucopyranoside, methyl palmitate, palmitic acid, glyceryl-1-palmitate, glyceryl-1-stearate, and D-glucose.^{2(c)} (PMID 2760813, Kitajima et al., original in Japanese.)

THERAPEUTIC AND OTHER ATTRIBUTES

Jvara, Āmadoṣa, Prameha, Antarvrddhi, Kuṣṭha, Stanapiḍā, Kāmalā, Ślīpada, Vṛddhi, Plihodara, Svāsa, Kāsa, Gulma, Gaṇḍamaya, Granthi, Vraṇa, Mūḍhagarbha

Used for fever, impaired digestive functions, urinary disorders/polyuria, intestinal inflammation, obstinate skin diseases including leprosy, breast pain, jaundice, filariasis, hydrocele, splenomegaly, asthma, cough, abdominal lumps, cervical lymphadenitis, cysts, ulcers, and malpresentation of the fetus (therapeutic uses based on texts from the seventh to sixteenth centuries).

The root paste was applied topically for breast pain,^{16(a)} inflammations and carbuncles;³² used in veterinary medicine for the treatment of inflammation of the lungs.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Kalyaṅka Ghrita (Ashtāṅgahridaya, seventh century), contains 28 plant drugs including Vishālā fruit (not the root) in equal proportion. For epilepsy, fear-psychosis, used a nervine tonic. South Indian products contain *Citrullus colocynthis*.^{5,6}

Vishālādi Churna (not in AFI, Parts I and II).

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

The plant protein forms a constituent in a pharmaceutical composition that inhibited the growth of HIV-1 virus.^{2(d)}

Trigonella foenum-graecum Linn.

Methī

BOTANICAL SOURCE(S)

Trigonella foenum-graecum Linn.
(Fam. Fabaceae)

Methi is not mentioned in Bṛhatrayī (Charaka, Sushruta and Vāgabhaṭa texts).

In Kerala, Methi is used as Kālānūsārī (a name with more than one meaning), and is locally known as Uluva.³

PHARMACOPOEIAL AYURVEDIC DRUG

Methī (Seed).

API, Part I, Vol. II.

International Pharmacopoeial name: *Trigonellae foenugraeci semen*.^{10,11}

AYURVEDIC SYNONYMS

Methini.

Methikā.³

Vastikā, Selu.⁴

Wild variety: Āhittha.⁴

The wild variety of Methikā (Āhittha) was fed to horses. The cultivated variety entered into Ayurvedic medicine during the later classical period.

Meth (Methi) was the pole to which sacrificial horses were tied. The cultivated variety acquired the new identity as Methikā as this was also given as a feed to horses.

HABITAT

Cultivated throughout India.

Indigenous to the Mediterranean region, China, India, and Indonesia. It is cultivated.

REGIONAL LANGUAGE NAMES

Eng: Fenugreek;

Guj: Methi;

Hindi: Methi;

Kan: Menthe, Mente;

Mal: Uluva;

Mar: Methi;

Punj: Methi;

Tam: Mendium, Ventaiyam;

Tel: Mentulu;

Urdu: Methi.

CONSTITUENTS

Alkaloid, Sapogenins and Mucilage.

The fruit is rich in mucilage (25%–40%), contains a small amount of essential oil (0.01%) and a variety of secondary metabolites, including protoalkaloids, trigonelline (up to 0.37%) and choline (0.05%); saponins (0.6%–1.7%)

derived from diosgenin, yamogenin, tigogenin, and other compounds; sterols include beta-sitosterol; and flavonoids include orientin, isoorientin, and isovitexin.¹⁰⁽³⁾

THERAPEUTIC AND OTHER ATTRIBUTES

Aruci, Jvara, Grahani, Prameha

Used for tastelessness, fever, malabsorption syndrome and urinary disorders/polyuria (therapeutic uses based on texts from the twelfth to sixteenth centuries).

Methikā, Chandraśūra (*Lepidium sativum* L.) and Yavāni (Ajovan) seeds belonged to the *Chaturbija* group, which was used as a composite drug for indigestion, colic, flatulence, rheumatic affections, lumbago, and other nervine disorders (Bhāvaprakāsha Nighantu, sixteenth century). Methika was included as an important ingredient in sweet confections for alleviating puerperal disorders (Bhāvaprakāsha).

IMPORTANT FORMULATION/ APPLICATIONS

Mustakārishta (Bhaishajya Ratnāvali, seventeenth century), contains Mustaka (*Cyperus rotundus*) as the main plant drug. Methi seeds are among 7 supporting herbs, all in equal proportion. Used for constipation, digestive impairments, and malabsorption syndrome.

Mṛtasanjivani Surā (Bhaishajya Ratnāvali) contains Methi seeds as a minor constituent.

Methi is used as an adjunct for the management of hypercholesterolemia and hyperglycemia in cases of diabetes mellitus. Used internally for loss of appetite and externally as a poultice for local inflammations.¹⁰⁽³⁾

In folk medicine, Methi is used as an anti-rheumatic, anti-catarrhal, febrifugal, carminative, galactagogue, and anti-diabetic drug, and as a post-delivery uterine tonic.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

Infusion: 0.5 g of seed macerated in 150 mL cold water for 3 hours; several cups are prescribed.¹⁰⁽³⁾

Seeds 25 g/day were used in clinical trials to assess their effect on serum cholesterol and glucose levels.¹⁰⁽³⁾

For a detailed summary of clinical trials, see Reference 10(3).

Typha australis Schum. and Thonn.

Gundrāḥ

BOTANICAL SOURCE(S)

Typha australis Schum. and Thonn.
Syn. *T. aungustata* Bory and Chaub.
(Fam. Typhaceae)

T. elephantina Grah. non-Roxb.^{2(a)}

Two varieties have been mentioned in the texts:

Gundrā and Gundraka.³

Gundrā has been accepted as a synonym of Bhadramustā (*Cyperus rotundus* Linn. rhizome), which could be used as a substitute of Gundrā.³⁰

PHARMAKOPEIAL AYURVEDIC DRUG

Gundrāḥ (Rhizome and root).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Guṇṭhah, Guṇṭthah.

Gundra.³

Gundrā: Guchhmūla, Guchhpūshpikā.

Guntha: Vṛtta ṛṇa, Shṛṅgaverā-mūlaka.^{16(b)}

Guntha was used as a substitute of Gundrā. The description of Guntha in Dhanvantari and Rāja Nighantu (thirteenth to fourteenth centuries) is similar to that of Gundra in Bhāvaprakāsha (sixteenth century).³⁰

HABITAT

Often growing in fresh water and marshy places, throughout India, up to 1730 m.

In Gujarat, some variations of the plant have been reported.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Lesser Indian reed-mace;
Beng: Hogalap;

Guj: Ghaabaajariyu;

Hindi: Pater, Gondpater;

Mar: Ramban, Paankanis;

Punj: Gundra;

Tel: Jammugaddi, Enugajamu.

CONSTITUENTS

Flavonoids (Quercetin, isorhamnetin-3-O-rutinoside); sterols (β-sitosterol, lanosterol, cholesterol).

The plant contains isorhamnetin, pentacosane, and sterols. A flavone glucoside yielding quercetin on hydrolysis has been reported from the plant.^{2(a),7}

THERAPEUTIC AND OTHER ATTRIBUTES

Raktapitta, Asmari, Sarkara, Mūtraghata, Mūtrakṛcchra, Stanya kṣaya

Used for bleeding disorders, calculus, glycosuria, retention of the urine, dysuria and lactal disorders (therapeutic uses based on texts from 1000 BC to sixteenth century).

Gundra was used for glycosuria, calculus, dysuria and erysipelas.

Gundrā was used for gout.

Gundraka was an ingredient in Pāshānabhedādyā Ghrita, which was specific for calculus.

Rhizome: astringent and diuretic.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Mūtravirechaniya Kashāya Churna (Charaka Samhitā, 1000 BC). Gundrā is included among the Ten Smaller Roots which also include the Five Grass Roots.

Used for uresis and dysuria.

Stanyajanana Kashāya Churna (Charaka Samhitā, 1000 BC); Gundra is included among the “Ten

Small Roots,” which also include the “Five Grass Roots.” Used for lactal disorders as a galactagogue.

DOSAGE/USAGE/CAUTIONS/COMMENTS

3–6 g.
For urinary and lactal disorders, specific groups of grass roots were used in prescriptions for

decoctions. Single drugs were rarely used. See *Saccharum* spp.

Clinical studies in hyperlipidemic patients have shown that the plant and its fat-soluble extracts decreased triglyceride and serum cholesterol and proved to be better than clofibrate.^{2(d),239}

The plant is used in Chinese herbal medicine in an ancient prescription, *Shixiao* powder, for activating blood flow.^{2(d)}

Typha elephantina Roxb. Poṭagala

BOTANICAL SOURCE(S)

Typha elephantina Roxb.
(Fam. Typhaceae)
Typha elephantina Roxb. non-Grah., nec. Schimp. ex Rohrb. syn. *T. angustifolia* Watt, non-Linn.^{2(a)}
Typha elephantina Grah. non-Roxb. is a synonym of *T. australis* Schum & Thonn.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Poṭagala (Root).
API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Erakā.
Patter-bheda.^{16(b)}
Gandha-mūli (Kaiyadeva, 1450 AD).
Gundrā and Pattera (Erakā) were different herbs, though these were described as related species.^{16(b)}
Eraka was only used externally, while Gundrā was used internally as well as externally.^{16(b)}

HABITAT

Throughout plains of India, in stagnant water and the sides of streams and marshes.
Found in Kashmir and from Uttar Pradesh to Assam.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Elephant grass;
Beng: Hogalaa;

Guj: Ghaabaajariyu;
Hindi: Pateraa, Erakaa;
Kan: Apu, Jambuhullu;
Mar: Raamabaan;
Ori: Hogala;
Punj: Boj, Bori, Patiraa;
Tam: Anaikkoria, Anaippul;
Tel: Enugajammu, Jammuguddi.

CONSTITUENTS

β-sitosterol, cholestrol, quercetin and lanosterol.
Phytochemical screening of the root showed the presence of alkaloids, flavonoids, quinones, glycosides, and carbohydrates.²³⁷
The herb contains isorhamnatin, pentacosane, and plant sterols.⁷

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Raktavikara, Vatarakta, Visarpa, Raktapittal Bastiśoṭha, Mūṭrakrcchra, Asmari, Śopha, Śukradaurbalya, Vraṇa
Used for burning syndrome, blood disorders, gout, erysipelas, bleeding disorders, inflammation of the urinary bladder, dysuria, calculus, edema, oligospermia, and ulcers (therapeutic uses based on texts from the fourteenth to sixteenth centuries).
Rhizomes are astringent and diuretic and, in folk medicine, are reported to be employed in dysentery, gonorrhea, and measles.^{2(a),15,32}

Jelly-like paste of rhizomes of *Typha* spp. is used for sores, boils, wounds, burns, scabs, and smallpox pustules.²³⁸
Starchy rhizomes are eaten.

IMPORTANT FORMULATION/ APPLICATIONS

Sukumāra Ghrita (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contain Punarnava

(*Boerhaavia diffusa*) as the main plant drug with *Dashmula* (now extinct) and *Pancha-trna mula*, including Potagala root, as supporting herbs.

Used for edema, gout, lumps, abscesses, and piles.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g for decoction.

Typhonium trilobatum Schott.

Ślīpadārikanda

BOTANICAL SOURCE(S)

Typhonium trilobatum Schott.
(Fam. Araceae)

PHARMAPOEIAL AYURVEDIC DRUG

Ślīpadārikanda (Tuber).

API, Part I, Vol. VI.

(Non-classical Sanskritized version of “The tuber used for treating filariasis”.)

AYURVEDIC SYNONYMS

Classical text not quoted. Used in Siddha medicine of South India.²⁹

HABITAT

In parts of peninsular India, and from Yamuna eastwards to north-eastern states.

Reported to be cultivated in South India for edible tubers. About 16 species of *Typhonium* are recorded in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Ben: Ghetkochu;
Mal: Chenna;*
Tam: Pitikarunai.

Assam: Samakosu;
Ben: Eherkochoo;
Kan: Kandagadde;
Mal: Karunakizhanga;
Tam: Karunai-kizhangu;
Tel: Duradakandagadda;^{2(a)}
Madurai: Chakad.^{2(a)}

CONSTITUENTS

β-sitosterol and unidentified sterols.

The edible portion of the tuber contains mineral matter 1.6%; calcium 35 mg/100 g; phosphorus 20 mg/100 g; iron 1.3 mg/100 g; sodium 9.0 mg/100 g; potassium 237 mg/100 g; thiamine 0.07 mg/100 g and niacin 0.7 mg/100 g; carotene 78 μg/100 g; folic acid 17.5 μg/100 g.

The tubers also contain 0.8 ppm iodine; 3.7 ppm fluorine and 22.85 mg/100 g choline (as choline) on a dry basis.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya (digestive impairment), Arbuda (tumor), Arśa (piles), Raktārśa (bleeding piles), Śoṭha (oedema), Sarpadamśa (snake bite), Ślīpada (Fliariasis), Udararoga (diseases of abdomen).

Used as a single drug.

For therapeutic uses, classical sources could not be quoted. Mentioned in Siddha formulary of India (page 237).²⁹

* Chenna is equated with Elephant’s Foot Yam.^{2(a)}

**IMPORTANT FORMULATION/
APPLICATIONS**

Fresh tuber: very acrid, stimulant, employed as poultice to scirrhus tumors. (The acrid principle is very volatile. The tubers become innocuous on heating or drying.) Cooked tubers are eaten.

The tubers are reported to relax the bowels and provide relief in hemorrhoids; eaten with bananas, they cure stomach complaints.^{2(a),15}

The tubers of *T. divaricatum* Decne possess rube-facient properties and are used for diarrhea. *T. roxburghii* Schott tubers are very irritant and are reported to be used in Java for eruptions on the skin.^{2(a)}

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

Cūrṇa (powder): 5 to 10 g daily dose after Śodhana.

Corm powder exhibited nematocidal activity that was more potent than the seed dust of *Melia azedarach*.^{2(c)}

BOTANICAL SOURCE(S)

Uraria picta Desv.
(Fam. Fabaceae)

Uraria picta (Jacq.) Desv. ex DC. syn. *Hedysarum pictum* Jacq.¹⁵

Uraria lagopodioides Desv. syn. *U. lagopoides* DC. (also equated with Prśniparnī).^{2(a),15}

In Kerala, *Desmodium gangeticum* DC. is used as Prsnaparni and *Uraria picta* as Shāliparnī; however, *Pseudarthria viscida* (L.) W. & A. of the same family is preferred in Kerala, as well as in Tamil Nadu, as Shaliparnī.^{5,6}

PHARMACOPOEIAL AYURVEDIC DRUG

Prśniparnī (Dried whole plant).

API, Part I, Vol. IV.

Usually, Shāliparni and Prśniparni are used together. It makes no difference whether *Desmodium gangeticum* DC. or *Uraria picta* is used for either of the two herbs.³

AYURVEDIC SYNONYMS

Citraparni, Kalasi, Dhavani, Prthakparni, Srgalavinna.

Kroshtu-pucchā, Dhāvani, Kalashi, Guhā, Shrigala viṭ, Vṛtta latā, Parnikā.⁴

Shāliparni: Dhruvā, Saumyā, Triparni, Pītani, Sthirā, Vidārigandhā, Ati guhā, Dirgha-mūlā, Amśhumati.

HABITAT

Throughout India.

Commonly found in dry grasslands, waste places and open forests in the sub-Himalayan tract from Kashmir to West Bengal and Assam, up to an altitude of 1800 m, and all over the plains of India.

REGIONAL LANGUAGE NAMES

Beng: Salpani, Chhalani, Chakule;
Guj: Pithavan;

Hindi: Pathavan, Dabra;

Kan: Murele honne, Onde le honne, Prushniparni;

Mal: Orila;

Mar: Pithvan, Prushniparnee, Shankarjata;

Punj: Detedarnee;

Tam: Oripai;

Tel: Kolakuponna.

CONSTITUENTS

Alkaloids, reducing sugars and sterols.

More than one class of compounds found in the plant include phenolic, flavonoid, sterol, and terpene derivatives.^{2(c)}

U. lagopodioides gave 5-hydroxy-7,4"-dimethoxy flavonol and five other flavonoids.¹⁵

Aerial parts show interferon-like antiviral activity against Ranikhet disease virus.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Jvara, Śāasa, Raktavikāra, Vātaroga, Unmada, Chardi, Kāsa, Raktitisara, Atisara, Vṛṇa, Raktarsa, Kaphaja-madatyayaja, Trṣṇā, Nataprabala, Vātarakta, Ekahikajwara, Pilla (Netra roga), Asthibhagna

Used for burning syndrome, fever, asthma, blood disorders, rheumatic diseases, insanity, emesis, cough, diarrhea with blood, diarrhea, ulcers, bleeding piles, alcoholism, morbid thirst, loss of strength, gout, malarial fever, blepharophimosis, and fractures (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta (1000 BC) prescribed the entire plant in prescriptions for misperistalsis, diarrhea, diarrhea with blood, bleeding piles and hemorrhage, dysentery, cough, consumption, respiratory diseases, lactal disorders, and fever. Powdered root with meat soup was used for promoting the adhesion of fractures and cooked with goat's milk for gout.^{16(a),27,28}

IMPORTANT FORMULATION/ APPLICATIONS

Angamarda Prashamana Kashāya Churna (Charaka Samhitā, 1000 BC), contains 10 plant drugs including the root of *Prśniparni*. For body massage.

Vyaghri Taila (Bhaishajya Ratnāvali, seventeenth century) contains both *Prśniparni* and *Śāliparni* roots among 22 supporting herbs, all in equal proportions. Used as a massage oil for providing relief in fever, asthma, cough, and skin diseases.

Madhyam Nārāyana Taila (Ayurveda Sār Sangraha, a contemporary treatise) contains both *Prśniparni* and *Śāliparni* among

17 supporting herbs. Used as a massage oil for paralysis and nervine disorders.

Other quoted compounds contain classical *Dashamūla*, which is now extinct, and need revalidation.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

20–50 g powder for decoction.

Oxytotic, anti-implantation¹⁸ and abortifacient activity (of *U. lagopodioides*)^{33(a)} should be reviewed. The plant drug was used in a *Garbhini chikitsā* Yoga (prescription for pregnant woman, Bhāvaprakāsha, sixteenth century).³

BOTANICAL SOURCE(S)

Valeriana wallichii DC.

(Fam. Valerianaceae)

Syn. *V. jatamansi* Jones; *Nardostachys jatamansi* (Jones) DC.³²

(*V. jatamansi* auct. non-Jones is equated with *jatamansi*.)³²

In Kerala, *Limnanthemum cristatum* Griseb. (Gentianaceae) is used in certain parts as Tagara.³ In Tamil Nadu, *Nymphoides macro-spermum* Vasudevan (Menanthaceae) is sold in the market as Tagara.⁶ However, *V. wallichii* DC. is preferred.³

Kushtha (*Saussurea lappa* C.B. Clarke [Fam. Asteraceae]) is the substitute of Tagar.^{3,4} For a detailed analysis, see Reference 18.

PHARMACOPOEIAL AYURVEDIC DRUG

Tagara (Rhizome).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Kālānusārī, Kālānusārikā, Nata.

Varhiṇa, Jihm, Chakrāhva, Nahusha, Nata.⁴ (Nata is also a synonym of *Delphinium burnonianum* Royle [Fam. Ranunculaceae]. It has been suggested as the correct source of Tagara.)^{3,16(b)}

Nata and Tagara-pādi were synonyms; Veṇu (*Bambusa bambos*) was its substitute.⁴

Rochanā Tagar of Charaka Samhitā is either the yellow variety of Tagara or possibly *Selinum vaginatum* Wall., and remains unidentified.³⁰

Hribera, Balaka, Udichya, Kalanusari and Nata—none of these Ayurvedic synonyms represent specific therapeutic activities of *V. wallichii*.

HABITAT

Temperate Himalayas from Kashmir to Bhutan (above 3,000 m) and Khasia hills from 1,200–1,800 m.³²

Valeriana: More than 200 species exist in Northern temperate zones.¹ *V. officinalis* belongs to Eurasia.

REGIONAL LANGUAGE NAMES

Eng: Indian valerian;

Assam: Tagar;

Beng: Tagar paduka;

Guj: Tagar ganthoda, Tagar gantho, Ghodawaj;

Hindi: Mushkbala, Sugandhabala;

Kan: Mandibattal, Mandyavanthu, Mandibattalu, Tagar;

Kash: Bala, Mushkbala;

Mal: Thakaram;

Mar: Tagar, Ganthode;

Ori: Tagarapaduka, Jalashiuli;

Punj: Mushkobala, Sugandhbala;

Tam: Tagarai;

Tel: Grandhi tagaramu;

Urdu: Tagar.

CONSTITUENTS

Essential oil.

Essential oil from roots without rootlets contains calarene, beta-bergamotene, valeranone, ar-curcumene, maali oxide, and maaliol.

Main acids present in the oil are isovaleric acid and (+)-beta-methyl valeric acid; other constituents include isovaleryl ester of D(-)-alpha-hydroxyvaleric acid.

Essential oil from roots and rootlets contain beta-sitosterol, patchouli alcohol, and maaliol in traces; maali oxide is absent.

Rhizomes and roots contain cyclopentapyrans, acacetin-7-O-rutinosides, valtrate, linarin *iso*-valerate, valepotriates, and an iridoid ester glycoside valerosidatum.³²

THERAPEUTIC AND OTHER ATTRIBUTES

Apasmāra, Unmāda, Śīroroga, Netraroga.

Used for epilepsy, insanity, cephalopathy, and diseases of the eye (therapeutic uses based on thirteenth to fifteenth century texts).

Tagara of the classical period was used for fever, urinary diseases, poisonous bites,²⁷ skin eruptions, vitiated blood, wounds and ulcer healing.^{28,4} It shared the properties of Kushtha.⁴

V. wallichii: cyclopentapyrans are sedative, tranquilizing and bacterocidal.³² Root: spasmolytic.³²

The monoterpene ester valtrate didrovaltrate (valpotriates) show cytotoxic activity.^{2(c)}

Essential oil of the maaliol chemotype demonstrated weak peripheral and central analgesic action.²⁴⁰

IMPORTANT FORMULATION/APPLICATIONS

Dhanvantarā Taila (Vaidyayoga Ratnāvali, a contemporary treatise), contains Balā (*Sida cordifolia*) root as main plant drug. Tagara is among 31 supporting herbs, all in equal proportion. Needs revalidation due to almost extinct *Dashmūla* components.

Mahānārāyana Tail (Bhaishajya Ratnāvali, seventeenth century); Tagara is among 42 supporting herbs. Needs revalidation due to its *Dashmūla* component.

Devadārvārishta (Bhaishajya Ratnāvali); Tagara is among 18 supporting herbs.

Jātiphalādi Churna (Shārangadhara Samhitā, thirteenth century); *Cannabis sativa* leaf (Bangā) is the main drug. Tagara is among 20 supporting herbs.

Tagara, Kushtha and Jātāmānsi were included in Nārāyana Taila of Shārangadhara Samhitā.¹⁸

DOSAGE/USAGE/CAUTIONS/COMMENTS

1–3 g of the drug in powder form.

The co-occurrence of three cyclopentane-sesquiterpenoids (valerenic acid, acetoxyvalerenic acid and valerenal) is confined to *Valeriana officinalis* L. (sensu lato) and permits its distinction from *V. wallichii* and *V. edulis* (WHO).¹⁰⁽¹⁾

V. wallichii species exist in three chemotypes.

One, the maaliol chemotype (essential oil contains 36.81% maaliol), has been studied.²⁴⁰

Vallisneria spiralis Kuntze

Āsphoṭā

BOTANICAL SOURCE(S)

Vallisneria spiralis Kuntze

Syn. *V. heynei* Spreng.

(Fam. Apocynaceae)

Bhāvamīśra (sixteenth century) equated Āsphoṭā with two drugs—Aparājita (*Clitoria ternatea* L.) and Sārivā (*Hemidesmus indicus* R. Br.). However, modern commentators have identified Āsphoṭā as *V. spiralis* in preference to Sārivā.³

AFI, Part I recognized *Hemidesmus indicus* as a substitute drug (page 308).

In Kerala, *V. spiralis*, *Cryptolepis buchanani* and *Aristolochia bracteolata* are all used in different places as Viśāṇikā.⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Āsphoṭā (Root).

API, Part I, Vol. V.

AYURVEDIC SYNONYMS

Āsphoṭā, Bhadravallī.

Āsphoṭā and Āsphota both appear in the texts and are considered to be Sārivā and Arka (*Calotropis gigantea* [L.] R. Br. ex Ait.), respectively.³⁰

Āsphoṭā was a synonym of Sārivā, as well as of Kovidara (*Bauhinia purpurea* Linn.) during the sixteenth century.⁴

HABITAT

Subtropical Himalayan forests, up to an altitude of 1500 m and on the Konkan coast and further south; cultivated in the gardens.

Native to India and Myanmar, and also found in Sylhet in Bangladesh.

REGIONAL LANGUAGE NAMES

Beng: Haaparmaali;

Hindi: Dudhibel;

Ori: Bonokonerinoi, Haporomoli;

Tel: Nagamalle, Nityamalle.

CONSTITUENTS

Not quoted in API.

The bark contains a mixture of glycosides, 3-beta-O-(alpha-acofriosyl) along with benzyl-2-O-beta-apiofuranosyl-(1 → 2)-beta-D-glucopyranosyl-2 and a potent cardiotonic glycoside, O-acetyl-solanoside (O-acetyl acofreosyl-digitoxigenin).

Seeds yield 33.0% of an unsaturated oil; root bark gave a fixed oil (30%) rich in palmitic (37.8001%), arachidonic acid (42.4008%) and capric, lauric, erucic, caprylic, oleic and linolenic acids in lesser concentrations.²⁴¹

THERAPEUTIC AND OTHER ATTRIBUTES

Aśmari, Śūla, Mūtrakṛcchra, Pūtanāgrahavista (Bālaroga), Kuṣṭha, Grahani, Śāasa, Mūsaka viṣavikāra, Arśa, Vrana

Used for calculus, colic, dysuria, diseases of children, obstinate skin diseases, malabsorption syndrome, asthma, rat bites, piles, and ulcers (therapeutic uses based on 1000 BC texts).

Botanical identification of Āsphota and Āsphotā should be reviewed in light of the quoted attributes and classical compounds.

IMPORTANT FORMULATION/ APPLICATIONS

Vajraka Taila (Ashtāngahridaya, seventh century), contains 20 plant drugs, including Āsphota (not Āsphotā) root, all in equal proportion. Used externally for obstinate skin diseases and non-healing ulcers.

Abhaya Lavana (Bhaishajya Ratnāvali, seventeenth century); consists of alkaline ashes of seventeenth plant drugs, including Āsphota (not Āsphotā), Haritaki, rock salt and 8 secondary herbs, processed in cow's urine. Used internally for spleen and liver disorders, internal abscesses, calculus and cardiac diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

Vateria indica Linn.

Sarja

BOTANICAL SOURCE(S)

Vateria indica Linn.

(Fam. Dipterocarpaceae)

Sarja has been accepted as *Vateria indica*, which is found in Western India, but many tree species that are characterized by resinous exudations, especially those belonging to the families of Dipterocarpaceae and Combretaceae, are

given names such as Laghu-sarja, Maha-sarja, Nadi-sarja, Neela-sarja and Sarjaka. *Shorea robusta* is known as Sarjam in tribal areas of Uttar Pradesh and Bihar.

PHARMACOPOEIAL AYURVEDIC DRUG

Sarja (Exudate).

API, Part I, Vol. IV.
(Sarja-rasa.)

AYURVEDIC SYNONYMS

Karsya, Sasyasumbara, Ajakarna, Devdhupa.

Vateria indica exudate: Rāla, Sarja rasa, Yaksha dhupa, Agni-vallabha, Kshaṇaka, Lākhyā, Āsya lalana, Vara.⁴

Shāla niryas was also a synonym of Sarja rasa.⁴ (Traditionally, Ayurvedic physicians use the gum-resin of *Shorea robusta*; Unani physicians use the gum-resin of *Vateria*.)^{3,30}

Sarja is a specific tree that is different from Ashvakarna, Ajakarna and Shāla.³⁰

HABITAT

Indigenous to the evergreen forests of the Western Ghats from North Kanara to Kerala, also plated as an avenue tree in Karnataka.

REGIONAL LANGUAGE NAMES

Eng: White Dammar Tree, Indian copal tree;

Beng: Shakgachha, Chandras;

Guj: Chandras;

Hindi: Sandras, Safed damar;

Kan: Rala;

Mal: Payin;

Mar: Raal;

Ori: Sava;

Tam: Kungiliyam, Vellai kuntarakam, Vellai kundrakam;

Tel: Tellaguggilamu, Telladamaramu;

Urdu: Sandaras, Raal.

Eng: Piney resin.^{2(a)}

Urdu: Sandrusa.

CONSTITUENTS

Resins.

Resin is a complex mixture of several triterpene hydrocarbons, ketones, alcohols and acids, along with small amounts of sesquiterpenes.

On distillation, oleoresin gave an essential oil^{2(a)} that contained *d*-camphene, alpha- and beta-pinene, limonene, chamazulene,

beta-caryophyllene, *d*-camphor, alpha- terpinol, *d*-borneol, and thymol.³²

The essential oil shows marked anti-bacterial activity against Gram-positive and Gram-negative micro-organisms.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Pandu, Kama roga, Prameha, Kustha, Badhira, Vrana, Atisara, Kandu, Visphota, Medoroga, Grahani, Vata rakta, Ksudraroga, Lippa, Manasa roga, Musika visa, Vidradhi, Dagdhaka, Yoni roga, Rakta dosa, Krmi roga

Used for anemia, ear diseases, urinary disorders/polyuria, obstinate skin diseases, deafness, ulcers, diarrhea, pruritus, pustular eruption, hyperliposis, malabsorption syndrome, gout, venereal disease, *Lippa*, mental diseases, rat bite poison, abscesses, burns, vaginal disorders, blood diseases and worm infestations (therapeutic uses based on texts from 1000 BC to sixteenth century).

In ethnomedicine, used as a styptic and wound-healing drug. It is included in dental powders, in ointments for glandular enlargements, boils, carbuncles and ulcers, in massage oils for gout and rheumatism and as an emollient in plasters.

IMPORTANT FORMULATION/ APPLICATIONS

Karchūrādi Churna Lepa (Sahasrayoga, a non-Samhitā, Kerala Materia Medica). A herbomineral compound contains 30 ingredients including Sarja rasa, all in equal proportion.

Paste to be applied on the head for alleviating headache, high fever, chronic sinusitis, dementia.

(Apara compound does not contain Sarja rasa.)

Pinda Taila (Ashtāngahridaya, seventh century) contains only three plant drugs, including Sarja rasa. Used as a massage oil for gout.

Lavangādi Churna (Bhaishajya Ratnāvali, seventeenth century), a herbo-mineral compound, contains 24 ingredients including Sarjaka, all in equal proportions, processed in the plant juice of *Eclipta alba*. Used for diarrhea and dysentery.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1-2 g internal, external.

The essential oil showed marked activity against *Bacillus subtilis*, *B. pumilis*,

Vibro cholera, *Micrococcus pyogenes* var. *aureus*, *Pseudomonas solanacearum*, *Salmonella typhi*, *Sarcina lutea*, *Shigella dysenteriae*, *Streptococcus faecalis*, and *S. pyogenes*.^{2(a)}
(A promising styptic and wound-healing drug.)

Vernonia cinerea Lees.

Sahadevi

BOTANICAL SOURCE(S)

Vernonia cinerea Lees.
(Fam. Asteraceae)

Kan: Sahadevee, Okarchendhi;
Mal: Poovan kuruntala, Mukkuthaipo;
Mar: Sadodee, Sahdevee;
Punj: Sehdei;
Tam: Naichotte poonde;
Tel: Garita kammi, Sehadevi.

PHARMACOPOEIAL AYURVEDIC DRUG

Sahadevi (Whole plant).

API, Part I, Vol. III.

Sahadevā of Charaka and Sushruta Samhita (1000 BC) was a *Sida* species (*Sida rhombifolia* Linn.).^{3,4,30}

Sahadevi jatā (Charaka Samhitā, 1000 BC) was the root of Sahadevi; when tied to the head, it reduced fever.³ (Also quoted in the API.)

AYURVEDIC SYNONYMS

Uttamkanyaka, Daṇḍotpalā.

Different compounds of Sahadevi and Sahadevā are found in Bhāvaprakāsha.³

HABITAT

Throughout India ascending to an altitude of 1800 m.

One of the most common Indian weeds.

REGIONAL LANGUAGE NAMES

Eng: Purple Fleabane, Fleabane;
Assam: Sahdevi;
Beng: Kuksim;
Guj: Sadoree, Sadodee;
Hindi: Sahadei;

CONSTITUENTS

Saponins, Sapogenins, Flavonoids.

The whole plant from South India contains luteolin and its 7-O-glucoside, 7-O-glucuronide, and diosnetin.

The roots yielded the triterpenes, alpha- and beta-amyrins and their acetates, in addition to stigmasterol, sitosterol, campesterol, and alpha-spinosterol.^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Jwara, Visamajwara, Sidhma, Visphota, Bhūtabādhā, Grahābādhā, Sphoṭaka, Pradara, Slipada.

Used for fever, intermittent fever, pityriasis versicolor, pustular eruption, ghost syndrome, planetary evil influence syndrome, boils, leucorrhea, and other vaginal discharges and filariasis (therapeutic uses not based on classical references).

An infusion of the plant, in combination with quinine, is used against malarial fevers; the decoction is diaphoretic. The juice of the plant is given to children with urine incontinence.

Fresh juice of the leaves is given in amebiasis.

A poultice of the leaves is used against humid

herpes, eczema, ringworm and for the extraction of guinea worm.
The root is used for diarrhea, stomachache and as an anthelmintic.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Ālamottādi Kashāya (Not in AFI, Sahasrayoga text, CCRAS), contains a paste of Vata (Banyan) tender leaf-buds, Bhadramula (*Cyperus rotundus* rhizome) and Uttam-kanyā roots.

To be taken with milk in the morning for chronic fever.

Chandrakalā Rasa (Yogarātnākara, sixteenth century), a mercury-based multi-mineral drug,

was processed in the juice of Sahadevi and seven other plants.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 ml (Swarasa). 5–10 g. (Powder for external use only.)

The chloroform extract of stem bark and leaves induced diuresis, but the methanolic extract exhibited anti-diuresis property.

Both polar and non-polar fractions of the plant extract showed analgesic, anti-pyretic and anti-inflammatory effects; the polar extract was found to have anti-diarrheal activity.

Anti-bacterial and anti-larval activities against *Filarial vector* have been reported.²⁴²

Vetiveria zizanioides (Linn.) Nash

Uśirā

BOTANICAL SOURCE(S)

Vetiveria zizanioides (Linn.) Nash
(Fam. Poaceae)

Fresh root is used as a substitute of Rakta-chandana (*Pterocarpus santalinus* Linn. f.).^{3,4}

PHARMACOPOEIAL AYURVEDIC DRUG

Uśirā (Root).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Vīrana, Ādhaya, Sevyā.

Vīraṇa mūlaka.⁴

Abhaya.^{4,30}

Amrṇāla.³⁰

Lāmājaka, Nalada.³

Bahumūlaka, Indragupta,
Sugandhimūla, Jaṭāmedā.²⁷
Nalada.²⁸

HABITAT

A densely tufted grass, found throughout the plains and lower hills of India, especially on the

banks of rivers and rich marshy soil, ascending to an altitude of 1,200 m.

Found wild in Haryana, Uttar Pradesh, Rajasthan, Gujarat, Bihar, Odisha, Assam, Madhya Pradesh, and throughout South India.

Systematically cultivated in certain places in Kerala, Tamil Nadu, Karnataka, and Andhra Pradesh.

REGIONAL LANGUAGE NAMES

Eng: Cuscut grass,

Assam: Usir, Virina;

Beng: Venarramula, Khaskhas;

Guj: Sugandhi valo, Valo;

Hindi: Khasa, Gandar, Bena, Khas;

Kan: Mudivala, Baladaberu, Lamanch, Bala daberu;

Mal: Ramaceam, Vetiver, Lamajja, Ramacham;

Mar: Bala, Vala;

Ori: Ushira, Benachera;

Punj: Panni, Khas;

Tam: Vetiver, Vilamichaver;

Tel: Vetivelu, Vettiveru;

Urdu: Khas.

CONSTITUENTS

Essential oil.

The Vetiver roots from Banthra (near Lucknow, Uttar Pradesh) gave 0.28% essential oil on a dry weight basis. The oil contains sesquiterpene and sesquiterpene derivatives, mainly gamma-cadinene, clovene, alpha-amorphene, aromadendrene, junipene, beta-himachalene, franscene, beta-bisabolene, *cis*-caryophyllene, khusimol, epiglobulol, spathulenol, khusinol, khusinone, khusimone, and khusinol acetate. The oil also contains engenol, wo-eugenol, and khusinol.²⁴³

(The obtained oil was similar to Bharatpur oil, which fetches higher prices on the market.)²⁴³

THERAPEUTIC AND OTHER ATTRIBUTES

Jwara, Trṣṇā, Mūtrakṛcchra, Vraṇa.

Used for fever, morbid thirst, dysuria, and ulcers (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta (1000 BC) used powdered leaves or their infusions in prescriptions for senility, debility, bilious fever, chronic skin diseases, skin eruptions, piles, hemoptysis, toxicosis, and suppurated conditions.^{27,28}

The oil (at 200 ppm) showed anti-fungal activity against *Aspergillus niger* (77%), *A. flavus* (70%), *Fusarium oxysporum* (83%), and *Penicillium*

sp. (82%), as well as significant anti-bacterial activity against *Staphylococcus aureus* and moderate activity against *S. pyogenes*, *E. coli*, and *Corynebacterium ovis*.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Ushirāsava (Bhaishajya Ratnāvali, seventeenth century), contains Ushirā roots with 20 herbs, all in equal proportion.

Used as a hemostatic and restorative tonic in bleeding disorders.

Yogarāja Guggulu (Bhaishajya Ratnāvali) contains purified Guggulu with 27 supporting herbs, including Ushira. Used for rheumatic and inflammatory disorders.

Shadānga Kvātha Churna (Ashtāngahridaya, seventh century) contains the Ushirā plant with five supporting herbs. Commonly used for fever associated with thirst.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form for infusion.

The major component (15%) of the oil, khusimol, has been found to inhibit the binding of vasopressin to rat liver V_{1a} receptors.^{2(a)}

Vigna trilobata (L.) Verdc.

Mudgaparni

BOTANICAL SOURCE(S)

Vigna trilobata (L.) Verdc.

Syn. *Phaseolus trilobatus* (L.) Schreb.
(Fam. Fabaceae)

In Kerala, *Centrosema pubescens* and *Vigna* sp. *V. pilosa*, *V. angularis*, *V. umbellata*, *V. vexillata*, and *V. adenantha* are used as the source of Mudgaparni.⁵ In Tamil Nadu, *Vigna trilobata* is used.⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Mudgaparni (Whole plant).

API, Part I, Vol. IV.

Mudgaparni and Māshaparni are often used together as both belong to the *Jivaniya* (life-promoting) group of Charaka (1000 BC). *Ashta varga* (the “Eight Tonic Herbs”) of classical Ayurveda also belongs to *jivaniya* group.

AYURVEDIC SYNONYMS

Suryaparni, Saha.

Kshudra sahā.^{4,30}

Sahā, Shūrpa-parni.³⁰

Mārjara gandhikā.⁴

HABITAT

Found wild, but also cultivated throughout India as a forage corp.

Centrosema pubescens is grown in the heavy rainfall tracts of Madhya Pradesh, Kerala, Karnataka, Andhra Pradesh, and Tamil Nadu.

REGIONAL LANGUAGE NAMES

Beng: Muganee;

Guj: Janglee maga;

Hindi: Janglee Mung;

Kan: Abaregid;

Mal: Kattuppayaru;

Mar: Ranmug;

Punj: Mugvan;

Tam: Kattuppayaru, Panippayaru;

Tel: Pilla pesara.

CONSTITUENTS

Sterols.

The plant contain friedelin, epifriedelin, stigmasterol, and tannins.³²

The plant is actually a green fodder that is nutritious and keeps cattle healthy. Contains (on a dry basis) protein 11.4%, fat 1.3%, N-free extract 41.4%, fiber 22.1%, ash 13.4%, calcium (as CaO) 2.69% and phosphorus (as P₂O₅) 0.40%. In China, the root is reported to be a source of a kind of arrowroot.^{2(a)}

Centrosema pubescens Benth., used in Kerala, is also a green fodder. It contains methionine

0.439%, cystine 0.055% and tryptophan 0.065% amino acids.^{20(c)} Crude protein 15.50% (dry basis).^{2(a)} Rich in canavanine. Calcium 1.61% and phosphorus 0.47%.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Dāha, Jwara, Vātarakta, Pitta dāha, Kāśa, Musika viṣa, Kṣaya, Kṛmi, Ksat śoṭha, Kuṣṭha, Pradara, Madya trṣṇā

Used for burning syndrome, fever, gout, heart-burn, cough, rat bite poison, phthisis, worm infestations, inflamed wounds, obstinate skin diseases, leucorrhea, and other vaginal discharges and excessive urge for alcohol (therapeutic uses based on texts from 1000 BC to sixteenth century).

It is difficult to validate the biological activities of classical Mudgaparni, as a number of *Vigna* sp. are used as its source.

IMPORTANT FORMULATION/ APPLICATIONS

In all the quoted compounds, except in Ratnagiri Rasa, Mudgaparni and Mashaparni have been used as supporting drugs.

Neither Mudgaparni nor Māshaparni are used during the processing of the multi-mineral drug, Ratnagiri Rasa, according to the AFI text.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–5 g.

Both Mashaparni and Mudgaparni belong to the most important *Jivaniya* group of classical Ayurveda. However, genuine material is scarce.

***Vigna unguiculata* (Linn.) Walp.**
(wrong botanical name)
syn. *Dolichos biflorus* Linn.
(correct botanical name)

Kulattha

BOTANICAL SOURCE(S)

Vigna unguiculata (Linn.) Walp.
syn. *Dolichos biflorus* Linn.
(Fam. Leguminosae)

Vigna unguiculata (L.) Walp. and *Dolichos biflorus* Linn. are not synonyms.
Vigna unguiculata syn. *V. sinensis* (Linn.) Savi ex. Hassk. is equated with Cowpea (*Lobia*).^{2(a,d)}
Dolichos biflorus Linn. is equated with Horsegram (Kulattha).^{2(a)} The CCRAS also equated *Dolichos biflorus* Linn. with Kulattha.²⁵

PHARMACOPOEIAL AYURVEDIC DRUG

Kulattha (Seed).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Khalva, Vardhipatraka.

Kulittha, Kulatthikā.²⁷

HABITAT

Cultivated all over India.

Dolichos biflorus: an important pulse crop in Tamil Nadu, Karnataka, Andhra Pradesh and Maharashtra. Cultivation in upper India is confined to Himachal Pradesh, hilly regions of Uttar Pradesh, Chota Nagpur, Bengal, and parts of Assam.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Horsegram;
Beng: Kulattha, Kalaya;
Guj: Kalathi, Kulathi;
Hindi: Kulathi, Kurathi;

Kan: Huruli, Hurali;
Mal: Mudiraa;
Mar: Kulitha;
Tam: Kollu, Kaanam;
Tel: Ulavalu;
Urdu: Kulthi.

CONSTITUENTS

An enzyme (urease) and oil.

Dolichos biflorus: seeds contain crude protein 22.0%, fat 0.5%, mineral matter 3.1%, fiber 5.3%, carbohydrates 57.3%, calcium 0.28%, and phosphorus 0.39%; iron 7.6 mg, nicotinic acid 1.5 mg, carotene 119 international vitamin A units per 100 g. Globulins account for nearly 80% of the total nitrogen and contain arginine 6.0%–7.1%, tyrosine 6.68%, and lysine 7.64%. Urea is formed along with asparagine and glutamine during seed germination and seedling growth. Horsegram is a rich source of ureas.^{2(a)} The ethanolic extract of the seeds gave a isoflavone diglycoside, 5-hydroxy-7, 3, 4-trimethoxy-8-methyl-isoflavone-5-neohesperidoside.^{2(d),25}

THERAPEUTIC AND OTHER ATTRIBUTES

Aśmari, Naṣtārtava.

Used for calculus and amenorrhea (therapeutic uses based on texts from 1000 BC to sixteenth century).
The use of the seeds as a diuretic and anti-lithiatric has been clinically established.^{2(c)}
The diuretic activity of a dipeptide, pyroglutamyl-glutamine, isolated from the seeds, has been found to be two to three times that of acetazolamide in albino rats.
The seeds are a rich source of the enzyme urase.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Saptasāra Kvātha Churna (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains 7 plant drugs including Khalva (Kulattha), all in equal proportion. For digestive impairment constipation, splenomegaly, colics and spasms, prostatic hypertrophy.

Dhanvantara Tailam (Vaidyayoga Ratnāvali, 1953) contains Bala (*Sida cordifolia*) root as the main plant drug, Kulatthe seeds and classical Dashamūla (now almost extinct) as supporting herbs and 31 as supplementary herbs. Used for paralysis, neuritis, and neurasthenia.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

12 g of the drug in powder form for decoction.

Vigna unguiculata is reported as a source of angiotensin-I converting enzyme-inhibitory and antioxidant peptides. (Maira R. Segura-Campoo et al., Chapter 7, *Bioactive Food Peptides in Health and Disease*, book edited by Blanca Hernández-Ledesma, InTech, January 30, 2013.)

Vitex negundo Linn.

Leaf

Nirguṇḍī

BOTANICAL SOURCE(S)

Vitex negundo Linn.
(Fam. Verbenaceae)

Shveta Nirgundi is equated by some authors with *Vitex trifolia* Linn.³

PHARMACOPOEIAL AYURVEDIC DRUG

Nirguṇḍī (Leaf).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Sinduvāra, Samphālīka, Nīla.

Shveta Nirgundi: Sindhuvāra, Sindhukah, Sindhuvārakah.⁵

Nili Nirgundi: Nirgundi, Shephālī, Suvahā.⁵

(Flowers of both species are blue or purple. Shveta Nirgundi: whole plant is covered with dense gray hair, giving a white color for the whole plant. Nili Nirgundi: whole plant looks blackish due to the purplish tomentum on the plant body.)⁵

HABITAT

Found throughout India, ascending to an altitude of 1500 m in the outer Himalayas. Common in

waste places around villages, river banks, moist localities and in deciduous forests.

V. trifolia: found from the foot of the Himalayas southwards throughout the greater part of India and in the Andaman Islands.

REGIONAL LANGUAGE NAMES

Eng: Five-leaved Chaste Tree;
Assam: Aslak;
Beng: Nirgundi, Nishinda;
Guj: Nagod;
Hindi: Nirgundi, Sinduar, Sambhalu;
Kan: Lakkigida, Nekkigida;
Mal: Indranee, Nirgundi;
Mar: Nirgundi;
Punj: Sambhalu, Banna;
Tam: Karunochchi, Nocchi;
Tel: Nallavavilli, Vavilli;
Urdu: Sambhalu, Panjangusht.

CONSTITUENTS

Alkaloids and essential oil.

Leaves yielded an alkaloid nishindine; flavonoids, 5-hydroxy-3,6,7,3',4'-pentameth-oxyflavone and casticin; iridoid glycosides, aucubin, agnucosid and 2-*p*-hydroxy benzoylmussaenosidic acid;³² negundoside, nishindoside; isomeric

flavones, casticin and glucosides, luteolin-7-glucoside and alpha-D-glucoside of a tetra-hydroxy monomethoxy flavone.^{2(c)} The active fraction of leaf extract showed the presence of casticin, isoorientin, chrysophenol D, luteolin, *p*-hydroxybenzoic acid, and D-fructose.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śūla, Śopha, Vātavyādhi, Āmavāta, Kuṣṭha, Kaṇḍu, Kāsa, Pradara, Ādhmāna, Piha (Plihā) roga, Gulma, Aruci, Kṛmi, Vraṇa, Nadi vraṇa, Karṇasula, Sūtikā, Jwara.

Used for colic, edema, diseases of the nervous system, rheumatism, obstinate skin diseases, pruritus, cough, leucorrhea, flatulence, splenic disease, abdominal lumps, tastelessness, worm infestations, ulcers, sinusitis, earache, and puerperal fever (therapeutic uses based on texts from thirteenth to sixteenth centuries). Nirgundi was specific for helminthiasis and Sinduvāra was an antidote to poisons. The leaf juice of Nirgundi and roots and flowers was used in most formularies.³⁰

IMPORTANT FORMULATION/ APPLICATIONS

Nirgundi Taila (Sarvaroga, Chikitsaratnam, not in AFI)⁶ contains juices of 10 plants, including

that of Nirgundi and goat’s urine, all in equal proportion, with 10 supporting herb. Especially used for diseases of the ear, for dressing ulcers; as a massage oil for arthritis, swellings. Vishatinduka Taila (Bhaishajya Ratnāvali, seven-teenth century) contains Nirgundi leaf juice among 10 herbal drugs. Used for rheumatism, gout, and inflammatory disorders. Nirgundi leaf juice is used with other plant juices in the processing of the quoted mineral drugs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 ml. (Swarasa). Modern medicinal work with *Vitex* was taken up just before the 1950s. From 1943 to 1957, approximately 32 clinical trials were conducted on a product (Angolyt, Madaus, Germany) in order to evaluate its effectiveness in treating premenstrual syndrome, mastitis, and menopausal symptoms.⁹ In Europe, *Vitex agnus-castus* is administered in capsules and extract forms standardized to the iridoid content, egnuside.⁹ (*V. negundo* leaf also contains agnuside.)

<i>Vitex negundo</i> Linn.	Root	Nirgundi
BOTANICAL SOURCE(S) <i>Vitex negundo</i> Linn. (Fam. Verbenaceae) Shveta Nirgundi is equated by some authors with <i>Vitex trifolia</i> Linn. ³	AYURVEDIC SYNONYMS (Ayurvedic synonyms not quoted.) Nila Nirgundi. Shveta Nirgundi: Sindhuvāra, Sindhukah, Sindhuvarakah. ⁵ Nili Nirgundi: Nirgundi, Shephalt, Suvaha. ⁵ (Flowers of both species are blue or purple. Shveta Nirgundi: whole plant is covered with dense gray hair, giving a white color for the whole plant. Nili Nirgundi: whole plant looks blackish due to the purplish tomentum on the plant body.) ⁵	
PHARMACOPOEIAL AYURVEDIC DRUG Nirgundi (Root). API, Part I, Vol. IV.		

HABITAT

Throughout India, ascending to an altitude of 1,500 m in the lower Himalayas. Common in waste places around village, river bank, moist localities and deciduous forests.

REGIONAL LANGUAGE NAMES

Eng: Five-leaved Chaste Tree;
Assam: Aslak;
Beng: Nirgundi, Nishinda;
Guj: Nagod;
Hindi: Nirgundi, Sinduar, Sambhalu;
Kan: Lakkigida, Nekkigida;
Mal: Indranee, Nirgundi;
Mar: Nirgundi;
Punj: Sambhalu, Banna;
Tam: Karunochchi, Nocchi;
Tel: Nallavavilli, Vavilli;
Urdu: Sambhalu, Panjangusht.

CONSTITUENTS

Alkaloid (Nishindine).

Dried powder contains hentriacontane, beta-sitosterol, and its acetate and stigmasterol.^{2(c)}

Root yielded a furano eremophilane;^{2(c)} 3-formyl-4,5-dimethyl-8-oxo-5H-6, 7, dihydronaphtho (2,3-b) furan; acetyl oleanic acid.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Sula roga, Kasa, Kustha, Kandu, Pradara, Adhmana, Krmi roga, Slesmaja jvara

Used for diseases causing colic, cough, obstinate skin diseases, pruritus, leucorrhea, flatulence, worm infestations, and catarrhal fever (therapeutic uses based on texts from 1000 BC to sixteenth century).

Oil cooked with the juice of the root and leaves of Nirgundi was prescribed internally as well as externally (as a liniment and nasal drops) for sinusitis, obstinate skin diseases and erysipelas (Charaka Samhitā, 1000 BC; Vrndamadhava, eighth century). In cervical adenitis, the root pounded with water was used as snuff

(Vrndamādhava). *Ghee* cooked with the root, fruit, and leaves was given for consumption (Chakradatā, seventh century).^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Mahāvishagarbha Taila (Bhaishajya Ratnāvali, seventeenth century), contains Nirgundi root among 40 main constituents. For nervine disorders.

Mānasa Mitra Vataka (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Nirgundi root with 62 herbo-mineral constituents and a decoction and juices of nine plants, cow's milk and female breast milk. Used for epilepsy, insanity and mental disorders.

Nirgundi Kalpa (Bhaishajya Ratnāvali; not quoted in the API); powdered root of Sambhālu (650 g), thoroughly mixed with honey (1300 g), sealed in an earthen pot pretreated with *ghee* is kept buried in rice piles or husk piles. The drug is recovered after 1 month and used as an age-sustaining and aphrodisiac tonic.

Root powder of Sambhālu with cow's urine was recommended in Bhaishajya Ratnāvali for obstinate skin diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 ml.

Butanol extract of the root of Nirgundi exhibited anti-inflammatory and analgesic effects.²⁶ The cold aqueous infusion and chloroform extracts of the root markedly inhibited oxytremorine-induced tremors in mice.²⁶ The pet-ether, butanol and chloroform extracts of the root and leaf produced anti-spasmodic effects.²⁶

The 70% ethanolic extract of the root of *V. negundo* in 400 mg/kg p.o. exhibited no anti-spermatogenic, anti-ovulatory, anti-implantation, and abortifacient activities in experimental animals (CCRAS).²⁶ (This indicates that *V. negundi* was not the drug source of Ayurvedic Nirgundi, which was Garbha-pātini, an abortifacient). (See texts quoted in API, Vol. V, page 347.)

Vitex negundo Linn.

Dried fruit

Reṇukā

BOTANICAL SOURCE(S)

Vitex negundo Linn.
(Fam. Verbenaceae)

Hareṇukā and Renuka are equated with *Vitex agnus-castus* Linn., and Nirgundi with *Vitex negundo* Linn. (AFI, Part I, pages 313 and 323).

Vitex agnus-castus is a different plant drug that is used for relieving menstrual disorders due to primary or secondary corpus luteum insufficiency, pre-menstrual syndrome, mastodynia and menopausal complaints. Its extract is luteotropic.^{2(c)}

In Tamil Nadu, *Piper aurantiacum* Wall. ex DC. fruits are used as Hareṇukā.^{6,28}

Piper aurantiacum and *V. negundo* are also different drugs.^{2(a),28}

PHARMACOPOEIAL AYURVEDIC DRUG

Reṇukā (Dried fruits).

API, Part I, Vol. V.

(In practice, fruits of Nirgundi are used as Renuka.)³

AYURVEDIC SYNONYMS

Rājaputrī, Nandinī, Kapilā, Dvijā, Bhasmagandhā, Pāṇḍupatrī, Hareṇukā.

Reṇukā, Kaunti, Pāṇḍu putrī.⁴

Kaunti was used as Bigger cardamom, Bhadrailā, by Vagbhaṭ (Ashtāṅgahridaya, seventh century).^{16(a)}

HABITAT

A small tree with triplicate to pentafoolate leaves and bluish inflorescence, found throughout India.

Piper aurantiacum Wall. ex DC., known as Shambhaluka desi and Renuka in Bengal, is found in Nepal, Lakhimpur, and the Khasi hills in Assam.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Chaste Tree, Hemp Tree;

Beng: Renuka, Kauntē, Renuka beej;

Guj: Harenu, Renuka;

Hindi: Renukaa, Renuka, Sambhaalooka beej;

Kan: Renuka;

Mar: Renuka beej;

Tam: Yettee.

CONSTITUENTS

Seeds contain hydrocarbons such as *n*-tritriacontane, *n*-hentriacontane, *n*-pentatriacontane and nonacosane. Other constituents of the seeds include β-sitosterol, *p*-hydroxybenzoic acid and 5 oxyisophthalic acid. (Source: Reference 32.)

The triterpene vitextriterpene, anti-inflammatory substances including the diterpene 5-beta-hydro-8,11,13-abietatrien-6 alpha-ol; the triterpene, lanostan-8,25-dien-3 beta-ol; the triterpenoids, 3-beta-acetoxyolean-12-en-27-oic acid, 2-alpha-, 3-alpha-dihydroxy oleana-5-, 12-dien-28-oic acid, 2-beta, 3-alpha-diacetoxy oleana-5, 12-dien-28-oic and 2-alpha, 3-beta-diacetoxy-18-hydroxyoleana-5,12-dien-28-oic acid; the flavonoid artemetin and the lignan 6-hydroxy-4-(4-hydroxy-3-methoxyphenyl)-3-hydroxymethyl-7-methoxy-3,4-dihydro-2-naphthaldehyde.^{2(c)} (See References 15, 25, and 32.)

THERAPEUTIC AND OTHER ATTRIBUTES

Tr̥ṣṇā, Kaṇḍu, Dāha, Kāsa, Netraroga, Daurbalya, Dadru, Klaibya, Gulma

Used for morbid thirst, pruritus, burning syndrome, cough, diseases of the eye, emaciation, ringworm, impotency, and abdominal lumps.

While quoting attributes from classical texts, the abortifacient activity of Renuka seeds (prominently mentioned in Kaiyadev Nighantu, Maḍanapāla Nighantu, Bhāvaprakāsha Nighantu and Nighantu Ratnākara; see API, Part I, Vol. V, page 347) have been erased.

Klaibya in Nighantu Ratnākara (1837) should be read with *daurbalya* (emaciation due to spermatorrhea or premature ejaculation, for which Unani physicians were using Sambhālu in prescriptions). In experimental studies, seeds disrupted spermatogenesis.^{2(d)}

During the classical period, Nirgundi, Sindhuvāra or Reṇukā were never used for impotency.^{16(a),27,28} Surprisingly, the *Medhya* (memory- and intellect-promoting) properties mentioned in quoted text have also been ignored.

IMPORTANT FORMULATION/ APPLICATIONS

Chandanādi Taila (Yogarātnākar, sixteenth century), contains Reṇukā among 31 plant drugs, all in equal proportion.

Prameha Mihira Taila (Bhaishajya Ratnāvali, seventeenth century), contains Reṇuka (Reṇukā) seeds among 41 supporting herbs, all in equal proportion.

Balā Ashvagandā Lakshādi Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica), contains Kaunti (Hareṇuka, also Bhadrailā^{16(a)}) with 17 supporting herbs, all in equal proportion.

Dashamulārishta (Ashtāngahridaya, seventh century), Sarasvatārishta (Bhaishajya Ratnāvali) and Mahāyogarāja Guggulu (Shārangadhara Samhitā, thirteenth century) contain Reṇuka seeds among supporting herbs.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–3 g.

The fruits of *Piper aurantiacum* Wall. ex DC. syn. *P. wallichii* Hand.-Mazz. are used in Tamil Nadu as Hareṇukā.⁶ The fruits are reported to be used as a uterine stimulant. The crude alcohol extract of the fruits (from the Jaipur market), when injected into dogs, showed strong stimulation of the uterus and intestines, increasing both tonus and movement.^{2(a)}

Seeds of *Vitex agnus-castus* Linn. are imported from Iran. They are sold as Sambhālu seeds and Reṇukā.⁶³

Vitis vinifera Linn.

Drākṣā

BOTANICAL SOURCE(S)

Vitis vinifera Linn.
(Fam. Vitaceae)

Dehydrated grapes (raisins) are produced mainly from Thompson seedless, Muscat of Alexandria, and Black Corinth types.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Drākṣā (Dried mature (fruit).

API, Part I, Vol. III.

In case Drakṣhā was not available, fruits of Kāshmari (*Gmelina arborea* Linn.) were used (Bhāvaprakāsha, sixteenth century).³ If both were unavailable, the flowers of Madhūka (*Madhuca indica* I.F. Gmel.) were used.⁴

AYURVEDIC SYNONYMS

Mṛdvikā, Gostanī.

Madhuphalā, Svādvī, Hāra hūrā, Phalottamā, Madhuyoni, Rasālā.⁴

HABITAT

Grapes are mostly cultivated in north-western India in Punjab, Himachal Pradesh and Kashmir. However, dried (mature) fruits are mostly imported into India, from the Middle East and Southern European countries.

REGIONAL LANGUAGE NAMES

Eng: Dry grapes, Raisins;
Assam: Dakh, Munaqqa;
Beng: Maneka;
Guj: Drakh, Darakh;
Hindi: Munkka;
Kan: Draksha;
Mal: Munthringya;
Mar: Draksha, Angur;

Ori: Drakya, Gostoni;
 Punj: Munaca;
 Tam: Drakshai, Kottai drakshai;
 Tel: Draksha kottai, Drakshai;
 Urdu: Munaqqa.

CONSTITUENTS

Malic, Tartaric & Oxalic acids, Carbohydrates and Tannins.

Nutritional value of seedless raisins (per 185 g):
 total carbohydrates 131 g, starch 4.5 g, sugars 97.98 g, total fat 0.8 g; vitamin C 3.8 mg, vitamin E 0.2 mg, vitamin K 5.8 µg, thiamin 0.2 mg, niacin 1.3 mg, B6 0.3 mg, foliate 8.3 µg, pantothenic acid 0.2 mg, choline 18.3 mg, betaine 0.5 mg; minerals: calcium 82.5 mg, iron 3.1 mg, magnesium 52.8 mg, phosphorus 167 mg, potassium 1236 mg, sodium 18.2 mg, zinc 0.4 mg, copper 0.5 mg, manganese 0.5 mg, selenium 1.0 µg, fluoride 366 µg.²⁴⁴

THERAPEUTIC AND OTHER ATTRIBUTES

Tṛṣṇā, Jwara, Kāsa, Śwāsa, Dāha, Śoṣa, Kāmalā, Raktapitta, Kṣata kṣina, Vibandha, Arśa, Agnimāndya, Madātyaya, Pāndu, Udāvarta, Aśya Śosa, Vātarakta.

Used for thirst, fever, cough, asthma, burning syndrome, cachexia, jaundice, bleeding disorders, debility due to chest injury, constipation, piles, digestive impairments, alcoholism, anemia, upward movement of gases, consumption and gout (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka and Sushruta (1000 BC) used the fruits alone or in drinks for cough, asthma, consumption, cardiac disorders, hemothermia,

fever, digestive impairments, urinary afflictions, and as a laxative.^{27,28}
 Charaka prescribed the juice of Drakshā and Āmalaka in jaundice and anemia.^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Drākshāsava (Yogarātnākara, sixteenth century); Drākshārishta (Shārangadhara Samhitā, thirteenth century), contain Draksha as the main drug with 14 and 9 supporting herbs, respectively. For digestive and respiratory disorders.

Drākshāvaleha (Ashtāngahridaya, seventh century) contains Drakshā and Pippali (*Piper longum*) as the main plant drugs with four supporting herbs. Used for anemia and jaundice.

Drākshādi Kvātha Churna (Ashtāngahridaya) contains 17 plant drugs, including Drakshā, in equal proportions. Used for fever, alcoholism, vomiting, vertigo and bleeding disorders.

Drākshādi Churna (Vaidya Yoga Ratnāveli, 1953) contains 24 plant drugs, including Drakshā, in equal proportions. Used for phthisis, cough, leucorrhea, and menorrhagia.

Elādi Gutikā (Bhaishajya Ratnāvali, seventeenth century); Drākshā is among the five main plant drugs. Used for cough, asthma, and fever.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

5–10 g of the drug.

At the Indian Agricultural Research Institute, New Delhi, techniques for raisin making have been standardized with the use of a boiling solution of 0.5% caustic soda and sulfur fumes.^{2(c)}

BOTANICAL SOURCE(S)

Wedelia chinensis Merril
Syn. *Wedelia calendulacea* Less.
(Fam. Asteraceae)

White-flowered variety is equated with *Eclipta alba* (L.) Hassk.

PHARMACOPEIAL AYURVEDIC DRUG

Keśarāja (Whole plant).

API, Part I, Vol. VI.

AYURVEDIC SYNONYMS

Pitabhṛṅgarāja, Avanti.

Kesharāgā.³
Mārkava,^{4,30} Bheka rāja, Kesha ranjana, Aṅgārikā,
Bhṛṅgāhva, Suryavallabha.⁴
Avanti could not be traced as a synonym.

HABITAT

In wet places throughout India in plains.

The plant is cultivated in the Chennai
(Tamil Nadu) region.

REGIONAL LANGUAGE NAMES

Ben: Bhrangaraja;
Hindi: Pilaabhangraa;
Kan: Kalsarji, Gargari;
Mal: Mannakkannunni;
Ori: Kesandara;
Tam: Manjalkarilaamkanni, Paatalai
kayyaantakarai;
Tel: Paccha guntagalijeru.;

CONSTITUENTS

Coumestan (mixture of wedelolactone and demethyl wedelolactone); norwedelic acid, norwedelolactone, tri- *o* -methylwedelolactone and β-amyrin.

Coumestan, isolated from the methanol extract, exhibited anti-hepatotoxic activity, and also produced significant stimulatory effects on liver cell regeneration. Wedelolactone has also been found to be a potent and selective 5-lipoxygenase inhibitor. The hepatoprotective activity could be assigned to the presence of glucuronic acid moieties in the bisdesmosdic oleanolic acid saponins isolated from the fresh leaves.^{2(c)}

Norwedelic acid—[5,6-dihydroxy-2
(2',4',6'-trihydroxyphenyl)-benzofuran-3-carboxylic acid].^{2(d)}

THERAPEUTIC AND OTHER ATTRIBUTES

Arśa (piles), Atisāra (diarrhoea), Daurbalya (weakness), Hṛdroga (heart disease), Indralupta (alopecia), Jvara (fever), Kṛmi (helminthiasis), Kāmālā (Jaundice), Kāsa (cough), Pāṇḍu (anaemia), Plihāvṛddhi (splenomegaly), Śiraḥśūla (headache), Ślīpada (Fliariasis), Strīroga (gynaecological disorders), Śūla (pain/colic), Śvāsa (Asthma),
Vṛana (ulcer) (therapeutic uses based on a Sanskrit *śloka* composed by a contemporary scholar).

Leaves are used for dyeing gray hair and for promoting hair growth; also used in cough, cephalalgia and skin diseases, especially alopecia.

A decoction of the herb is used in uterine hemorrhage and menorrhagia.^{2(a)}

The plant is used as a tonic for hepatic and splenic enlargement; the aqueous extract is used for wound healing.^{2(c)}

IMPORTANT FORMULATION/ APPLICATIONS

Ashoka Ghrita (Bhaishajya Ratnāvali, seventeenth century), contains Bhṛṅgaraja plant juice among 7 main plant drugs; and 20 supporting herbs in equal proportion.

Used as a uterine and nervine female tonic, and used for leucorrhea and menorrhagia.

Grahiṇī Mihira Taila (Bhaishajya Ratnāvali) contains 32 plant drugs, including Kesharāja (Bhrṅgrāja), all in equal proportions. Used for diarrhea, dysentery and urinary and vaginal disorders.

DOSAGE/USAGE/CAUTIONS/COMMENTS

Curna (powder): 3 to 6 g.

Compounds from *Wedelia chinensis* synergistically suppress androgen activity and the growth of prostate cancer cells.²⁴⁵

Withania somnifera Dunal.

Aśvagandhā

BOTANICAL SOURCE(S)

Withania somnifera Dunal.
(Fam. Solanaceae)

Physalis somnifera L.¹⁰⁽⁴⁾

Cultivated variety: *Withania ashwagandha* Kaul.⁷

Reported as a third species in India.²⁴⁹

Used as a substitute of Kākoli and Kshirakākoli (of *Ashta varga*).³

PHARMACOPOEIAL AYURVEDIC DRUG

Aśvagandhā (Root).

API, Part I, Vol. I.

Five forms of the plant reported in CCRAS literature:

I: Exclusively cultivated in Madhya Pradesh, source of the roots of commerce.

II: Sandy desert soil of Pilani, Marwar and some parts of Rajasthan.

III: Chandigarh and some other mountainous areas of Punjab and Uttar Pradesh.

IV: Near Delhi.

V: Near Delhi and Ahmedabad, along hedges and shady habitats.

I: Roots slender.

II and III: Roots straight and unbranched. Thick.

IV and V: Branched roots. Woody.

AYURVEDIC SYNONYMS

Hayagandhā, Vājigandhā.

Turangāhvā, Gokaṇṇā, Ashvarohaka,

Varāhakarni, Varadā, Balyā, Vājikarī, Vṛsha.⁴

Ashva kanda, Gandharva gandha, Turaga, Turaga gandhā, Turanga gandha.³

(See Arabian synonyms.)

HABITAT

Cultivated in certain areas of Madhya Pradesh and Rajasthan.

Found in Africa, the Arabian peninsula, West

Asia, the Indian subcontinent, Southeast

Europe, and Southwest Europe.¹⁹

Indigenous to Africa, the Mediterranean region, and India.¹

Believed to be extinct since 1875, but rediscovered in 1988.¹

REGIONAL LANGUAGE NAMES

Assam: Ashvagandha;

Beng: Ashvagandha;

Guj: Asgandha;

Hindi: Asgandh;

Kan: Angarberu, Hiremaddina- gida;

Kash: Asagandh;

Mal: Amukkuram;

Mar: Asagandha, Askagandha;

Ori: Aswagandha;

Punj: Asgandh;

Tam: Amukkaramkizangu;

Tel: Pennerugadda;

Urdu: Asgand.

Arabian peninsula: Babu, Sumal far (Oman); Haml balbul, 'ebab (Oman, Saudi Arabia); Genegeneh (Oman, Dhofari Arabic); 'ubab (Yemen).²⁶⁵

CONSTITUENTS

Alkaloids and withanolides.

Chemotype I (Israel) contains withaferin A as the major constituent; minor constituents are withanolides N and O. Chemotype II (Israel) contains withanolide D as the major constituent; withanolide G, 27-hydroxywithanolide D, 14 alpha-hydroxywithanolide D, and 17 alpha-hydroxy withanolide D are present in trace amounts. Chemotype III (Israel) contains withanolides E–M. F₃ (from crossing I and III) contains withanolides Q and R, as well as withanolides P and S.³²

Indian species possibly belong to chemotype I, containing withanone and withaferin A as major constituent.^{17(4th edn.)} which of the 4 forms of wild variety (reported in CCRAS literature) was used during the classical period, is not known.

THERAPEUTIC AND OTHER ATTRIBUTES

Kṣāya, Daurbalya, Vātaroga, Śoṭha, Klaibya

Used for phthisis, weakness, diseases of the nervous system, inflammation, and impotency (therapeutic uses based on a sixteenth century text). (Some wild variety was used.)

Charaka (1000 BC) included Ashvagandhā in the *vajikarana* (aphrodisiac and sex-stimulant) group. Ashtāngahridaya (seventh century) included it in the age-sustaining group. Shārangadhara Samhitā (thirteenth century)¹⁸ considered Ashvagandha to be spermatogenic and a libido stimulant; it was recommended topically for stimulating the growth of the penis, as well as for restoring the original shape to the relaxed vagina.³⁴

By the sixteenth century, Ashvagandha entered into more than 30 compounds as a nourishing, rejuvenating, restorative and aphrodisiac drug for debility, anxiety neurosis, muscular

atrophy, and nerve dysfunctions. (For detailed analyses, see References 19[a] and 18.)

IMPORTANT FORMULATION/ APPLICATIONS

Ashvagandhārishta (Bhaishajya Ratnāvali, seventeenth century), contains Ashvagandhā root as the main plant drug with 17 supporting and 9 supplementary herbs. Used for epilepsy, insanity, and diseases of the nervous system.

Ashvagandhādi leha (a contemporary confection of Tamil Nadu) contains Ashvagandha, China root, and Indian sarsaparilla in equal proportions. Used for blood impurities, syphilis, and impotency.

Balāshvagandhā lakshādī Taila (Sahasrayoga, a non-Samhitā, Kerala Materia Medica) contains Balā (*Sida cordifolia*) root, Ashvagandhā root and Lac as the main drugs, with 17 supporting herbs. Used as a massage oil for neuritis.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

The cultivated variety, *Withania ashvagandha* Kaul., should be compared with other chemotypes.

(Compounds, especially withanolides, have been described and evaluated with variations dependent upon cultivation and varieties.)^{247,248}

Findings contrary to Ayurvedic attributes should be reviewed:

1. Withaferin A demonstrated immunosuppressive effects in contrast to the immunostimulant activity found in *Withania* extracts.^{23,246}
2. Ashvadandhā was used during classical period for male impotency, while a methanolic extract of the root induced marked penile dysfunction in rats.²²

Woodfordia fruticosa (Linn.) Kurz.

Dhātakī

BOTANICAL SOURCE(S)

Woodfordia fruticosa (Linn.) Kurz.
(Fam. Lythraceae)

Syn. *W. floribunda* Saliab.; *Lythrum fruticosum* L.¹⁵

PHARMACOPEIAL AYURVEDIC DRUG

Dhātakī (Flower).

API, Part I, Vol. I.

If Yashtimadhu (licorice) was not available,
Dhātakī may be used.³

AYURVEDIC SYNONYMS

Bahupūṣpī, Tāmrāpūṣpī, Vahnijvālā.

Kunjari, Sindhu pushpā, Pramodini, Pārvatiyā,
Surākhyā, Madya-vasini.⁴

Dhātripushpikā, Gucchapushpā, Sanghapushpā,
Agnigvālā, Vahnipushpi, Vahnishikhā.⁵

HABITAT

Throughout India, ascending to 1500 m in
Himalayas and also in the Gangetic plains; culti-
vated in gardens.

Rather scarce in South India, but distributed
in Eastern tropical Africa, the West Indian
Ocean, China, the Indian subcontinent, Indo-
China, and Malesia.¹⁹

REGIONAL LANGUAGE NAMES

Eng: Fire flame bush;
Assam: Dhaiphool;
Beng: Dhaiphul;
Guj: Dhavadi, Dhavani;
Hindi: Dhāi, Dhava;
Kan: Dhataki, Tamrapushpi;
Mal: Tattiripuvu, Tatire;
Mar: Dhayati, Dhavati;
Ori: Dhaiphula, Dhatuki;
Punj: Davi, Phul Dhava;
Tam: Kattattipoo, Kattati, Kattathi;
Tel: Aarl Puruvu.

CONSTITUENTS

Tannin and glucoside.

Flowers contain the polyphenol (–)-epigallocatechin gallate and several hydrolysable tannins, including tellimagrandin I, genin D, heterophyllin A, oenothien A and B, woodfordin A–I, and isoschimawalin A.^{2(c)}

(–)-epigallocatechin gallate and oenothien B exhibited anti-HIV activities. Woodfordin C and oenothien B exhibited marked host-mediated anti-tumor activities.^{2(c)}

Flowers also gave chrysophanol-8-O-beta-D-glucopyranoside, cyanidin-3, 5-diglucoside, hecogenin, inositol, kaempferol-3-glucoside, naringenin-7-glucoside, and quercetin-3-rhamnoside.¹⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Atisāra, Trṣṇā, Visarpa, Vṛṇa, Raktapitta

Used for diarrhea, morbid thirst, erysipelas, ulcers, and bleeding disorders (therapeutic uses based on a sixteenth century text).

Flowers are added to all alcoholic polyherbal compounds for fermentation.

Charaka and Sushruta (1000 BC) used a sweetened decoction of the flowers for persistent dysentery, fever, and hemothermia;^{27,28} included Dhātakī among the conception-promoting group of herbs.

Powdered flowers mixed with honey was prescribed for leucorrhea; a paste of flowers with flowers of Nilotpala (blue lotus) and honey was given to women to aid conception (Vṛndamadhava, eighth century; Gadaniagraha, twelfth century).

Flowers were used in prescriptions for diarrhea and dysentery throughout the classical period.^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Bṛhat Gangādhara Churna (Shārangadhara Samhitā, thirteenth century), contains Dhātakī

flowers among 13 plant drugs, all in equal proportion. Used for diarrhea and dysentery.

Gangādhara Churna (not quoted in the API) contains only six plant drugs.

Pushyānuga Churna (Bhaishajya Ratnāvali, seventeenth century; not quoted in the API) contains Dhātaki flowers among 26 plant drugs, all in equal proportions. Used as a uterine tonic for leucorrhea, metrorrhagia, and dysmenorrhea.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g of the drug in powder form.

A skin-lightening cosmetic is prepared using the plant extract and cholesteric liquid crystals. A hair tonic from the plant containing 5- α -reductase has been prepared.^{2(d)}

BOTANICAL SOURCE(S)

Xeromphis spinosa (Thunb.) Keay
Syn. *Randia dumetorum* Lam.
(Fam. Rubiaceae)

Randia spinosa Poir syn. *R. brandisii* Wight & Arn.; *R. tomentosa* Wight & Arn., non-Blume.¹⁵
The fruits of *Gardenia turgida* Roxb. are sold as substitutes. The dried fruits of *Artabotrys odoratissimus* R. Br. are occasionally found as adulterants.³⁶

PHARMACOPOEIAL AYURVEDIC DRUG

Madana (Fruit).

API, Part I, Vol. I.

AYURVEDIC SYNONYMS

Sanskrit synonyms not quoted.

Madanaphala, Pinditaka.³
Chhardana, Pindi, Raṭha, Karahāta, Shalyaka, Vishapushpaka.⁴

HABITAT

Sub-Himalayan tracts extending eastwards in Sikkim up to 1200 m and southwards to Peninsular India.

Found in Assam, Naga and the Khasi hills, Travancore and the Andaman Islands.
Randia: distributed in Asia and Africa.^{2(a)} About 20 species are found in tropical and warm regions of America, such as Florida, and Bolivia.¹ Fourteen species exist in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Emetic nut;
Assam: Maen,
Beng: Mainaphal, Mayanaphal;
Guj: Mindhal, Mindhol, Mindhar;

Hindi: Manphal;
Kan: Mangarikai, Karigidda, Madanaphala
Maggrekai, Kari, Maggare Kayi;
Kash: Madanfāl;
Mal: Malankara, Malamkarakka;
Mar: Gal, Galphala, Giephala, Madanphala;
Ori: Maena, Madana;
Punj: Mindhal, Rara, Manphal;
Tam: Marukkara;
Tel: Mranga kaya, Monga kaya;
Urdu: Mainphal, Jauz-ul-Qai.

CONSTITUENTS

Essential oil, saponin, tannin and resin.

Saponins occur to the extent of 2%–3% in fresh fruits and *about* 10% in the dried whole fruit.^{2(a)}
Fruits contain randinin (a hemolytic triterpenoid saponin); randia acid and neutral saponins yield oleanolic acid as sapogenin; ursosaponin gives ursolic acid and glucose; dumetoronins A–F give oleanolic acid as aglycone and beta-D-galactopyranosyl-(1 → 3)-oleanolic acid (randoside A).¹³
Fruits also contain citric and tartaric acid;¹⁵ acid resin and traces of an essential oil;^{2(a)} tannins 1.6% (outer pulp) and 5% (inner pulp).
Seeds are reported to be free from saponins.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Gulma, Vidradhi, Kuṣṭha, Śleṣmajvara, Pratiśyāya

Used for abdominal lumps, abscesses, obstinate skin diseases including leprosy, fever due to influenza and coryza (therapeutic uses based on texts from 1000 BC to sixteenth century).
Charaka (1000 BC) prescribed Madana with Pippali (*Piper longum*) and Indrayava (*Wrightia tinctoria* seeds) with warm water for emesis during fever.^{16(a)}
The nuts are used in small doses as a single drug for aborting accumulated phlegm, bile, and toxic substances.

The bark of the nut is applied externally in rheumatism and to disperse abscesses. The pulp of the fruit, dried and powdered, is used in small doses as a substitute for ipecacuanha. The pulp is emetic, anti-dysenteric, anthelmintic, and abortifacient. The fruit and pulp are toxic in large doses.

**IMPORTANT FORMULATION/
APPLICATIONS**

Pippalyādi Taila (Bhaishajya Ratnāvali, seventeenth century), contains 12 plant drugs including Madana, all in equal proportion.

Used for dysentery, dysuria, and digestive impairments; used as an enema in rectal prolapse, inflammation, and piles. Madanādi Lepa (Bhaishajya Ratnāvali) contains Madanphala as a single drug, processed in beeswax and butter with a high fat content.

DOSAGE/USAGE/CAUTIONS/COMMENTS

0.5–1.0 g of the drug in powder form for decoction.
3–6 g of the drug for induction of vomiting.

In experimental animals, crude saponin produced salivation, irritated the mucus membrane and produced sneezing, vomiting, and bleeding from the urinary tract.^{2(a)}

BOTANICAL SOURCE(S)

Zanthoxylum armatum DC.

Syn. *Z. alatum* Roxb.

(Fam. Rutaceae)

Fruits of *Z. rhetsa* (Roxb.) DC. and *Z.*

acanthopodium DC. are used as substitutes.³⁶

Z. rhetsa,³⁶ syn. *Z. limonella* (Dennst.) Alston;

Z. budrunga Wall. ex DC. is found in Kerala,

Karnataka and Bangladesh. Used mostly in

South India. Known as Atitejani and Su-tejasi,

while *Z. armatum* is Tejovati of Ayurvedic

medicine.^{2(a)}

PHARMACOPOEIAL AYURVEDIC DRUG

Tumburu (Fruit).

API, Part I, Vol. IV.

Z. rhetsa is known in the trade as Triphala

(Triphal). Not to be confused with *triphala* (the

“Three Myrobalans”).³⁶

AYURVEDIC SYNONYMS

Tejovati, Tejovali, Tejohva.

HABITAT

Hot valleys of the Himalayas from Jammu to Khasia hills at 600-1800 m and eastern ghats in Orissa and Andhra Pradesh at 1200 m, also planted in Assam.

REGIONAL LANGUAGE NAMES

Beng: Tejovati;

Guj: Tejabala, Tejbal;

Hindi: Tejbal;

Kan: Tejapatri, Jimmi, Tumbura, Tumburudra,

Tejovanti;

Mal: Thumboonal, Thumbooni, Valiyavaluzhavam;

Mar: Tejabal;

Ori: Tejabala;

Punj: Tejovati, Tejabal;

Tam: Thejyovathi;

Tel: Tejovathi;

Urdu: Kabab-e- Khandan (Miswak).

Eng: Toothache tree.

Urdu: Faghir, Kabab-e-Khandan.⁷

CONSTITUENTS

Essential oil.

The fruits contain 3.5% oil, the rare monoterpene triol, 3, 7-dimethyl-1-octene-3, 6, 7-triol; lin-alool 58.30%, limonene 24.46%, methyl cinnamate 8.92%, myrcene 3.55% and alpha-thujene 1.65%; also contain 1, 8-cineole, *p*-cymene, *cis*-ocimene, gamma-terpene, camphor, alpha-fenchol, carvone, tagetonol and allo-aromadendrene, in addition to alpha-terpeniol and beta-caryophyllene.

Seeds contain acids including *cis*-9-hexadecenoic, eicosenoic, and palmitic acids.^{2(c)} Tambuletin has been determined as an 8-glucoside of gossypetin-7, 4'-dimethyl ether.²⁵

THERAPEUTIC AND OTHER ATTRIBUTES

Swasa, Kasa, Ardita, Kaphaja roga, Hrdroga, Kantha roga, Arsa, Hikka, Agnimandya, Asya roga, Daiita roga.

Used for asthma, cough, facial palsy, diseases of the mucus membrane, cardiac diseases, pharyngitis, piles, hiccup, digestive impairments, diseases of the buccal cavity and dental diseases (therapeutic uses based on texts from 1000 BC to sixteenth century).

Charaka (1000 BC) used Tumburu in prescriptions as an errhine for congestion in the head, hemicrania, chronic coryza, and loss of consciousness.

Sushruta (1000 BC) used Tumburu for congestion in the chest and cardiac region,^{16(a)} and as an ingredient of a potion for hysterical convulsions.²⁸

Charaka and Sushruta used a paste of Tumburu topically for muscular atrophy, piles, tumors, and skin diseases.^{16(a)}

**IMPORTANT FORMULATION/
APPLICATIONS**

Sapta Vimshataka Guggulu (Bhaishajya Ratnāvali, seventeenth century), Guggulu is the main drug. Tumburu fruit is among 27 supporting herbs.
Dadhikā Ghrita (Ashtāngahridaya, seventh century); the Tumburu fruit is included among 45 supporting constituents.
Mahavishagarbha Taila (Bhaishajya Ratnāvali) contains Tumbini fruit (*Lagenaria siceraria*, AFI, page 327), not Tumburu fruit; among the

46 plant drugs in a compound of 72 herbo-mineral constituents.
Hingvādi Taila (Chakradata, eleventh century) contains Tumburu fruit as a main plant drug with asafoetida and dried ginger in the oil base. Used as an eardrop for earache.

**DOSAGE/USAGE/CAUTIONS/
COMMENTS**

2–4 g.
A lotion of fruits is used for scabies.^{2(a)}
The essential oil of the fruit exhibited strong antibacterial activity against *E. coli*, *Vibrio cholerae*, *Micrococcus pyogenes* var. *aureus*, *Shigella dysenteriae*, and *Salmonella typhi*.^{2(a)}
Essential oil of leaves: anti-fungal.^{2(a)}

<i>Zanthoxylum armatum</i> DC.			Stem bark	Tejovati
BOTANICAL SOURCE(S)		REGIONAL LANGUAGE NAMES		
<i>Zanthoxylum armatum</i> DC. Syn. <i>Z. alatum</i> Roxb. (Fam. Rutaceae) Syn. <i>Z. planispinum</i> Sieb. & Zucc. ¹⁵		Beng: Tejovati; Guj: Tejabala, Tejbal; Hindi: Tejbal; Kan: Tejapatri, Jimmi, Tumbura, Tumburudra, Tejovanti; Mai: Thumboonal, Thumbooni, Valiyavaluzhavam; Mar: Tejabal; Ori: Tejabala; Punj: Tejovati, Tejabal; Tam: Thejyovathi; Tel: Tejovathi; Urdu: Kabab-e- Khandan (Miswak).		
PHARMACOPOEIAL AYURVEDIC DRUG		Eng: Toothache tree. Urdu: Faghir, Kabāb-e-Khāndān. ⁷		
Tejovati (Stem bark). API, Part I, Vol. II.		CONSTITUENTS		
AYURVEDIC SYNONYMS		A bitter crystalline principle identical with Berberine, a Volatile oil and Resin.		
Tejohvā. Tejasvani, Tejavati, Tajani, Tejini (API, quoted text).		Bark yielded (–)-berberine; stem bark yielded (–)-dictamnine. ^{2(a)} Dried bark and branches contain four lignans, sesamin, fargesin, eudesmin and epieudesmin; three furoquinoline		
HABITAT				
Hot valleys of the Himalayas from lammu to Khasia hills at 600-1800 m and eastern ghats in Orissa and Andhra Pradesh at 1200 m, also planted in Assam.				

alkaloids, dictamnine, 8-hydroxy dictamnine, gamma-fagarine, and a neutral lactone, pluviatide.^{25,32}

Wood and bark yield magnofluorine and xanthoplanine³² 0.02% and 0.01% as pictrate, respectively.^{2(a)}

THERAPEUTIC AND OTHER ATTRIBUTES

Śvāsa, Kāsa, Mukharoga, Āmavāta, Aruci, Hikkā

Used for asthma, cough, orolingual diseases, diseases of the nervous system, tastelessness, and hiccup (therapeutic uses based on texts from the twelfth to sixteenth centuries).

Tejovati (bark) was used as a toothpowder during the period of Bhavaprakasha (sixteenth century).³

In ethnomedicine, the bark is used for treating diarrhea and cholera.^{2(c),32}

IMPORTANT FORMULATION/ APPLICATIONS

Kālaka Churna Lepa (Ashtāngahridaya, seventh century), contains 12 plant parts, including Tejohva (Tejovati) stem bark, all in equal proportion. The paste is used as a gargle and mouthwash for odontic and orolingual diseases.

Panch-tikta-guggulu Ghrita (Ashtāngahridaya) contains 25 supporting herbs, including Tejovati fruit (not stem bark), all as supporting herbs in equal proportions. Used for diseases of the nervous system.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

10–20 g of the drug for decoction.

Zingiber officinale Rosc.

Fresh rhizome

Ārdraka

BOTANICAL SOURCE(S)

Zingiber officinale Rosc.
(Fam. Zingiberaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Ārdraka (Fresh rhizome).

API, Part I, Vol. II.

Indian ginger is considered to be only second to Jamaican ginger in quality. Cochin ginger is light brown to yellowish-gray. Calicut ginger from Malabar is orange or reddish-brown, resembling African ginger. It is inferior to Cochin ginger in quality. Kolkata ginger is grayish-brown to grayish-blue externally. Indian ginger is more starchy than Jamaican ginger.

Chinese ginger is white and free from fiber.

Japanese ginger is obtained from *Z. mioga* Rosc.^{2(a)}

AYURVEDIC SYNONYMS

Kaṭubhadra, Sṛṇigavera.

Shringavera, Ārdrikā.³

HABITAT

Widely cultivated in India.

The plant does not occur in a truly wild state and rarely flowers, though the cultivated plants on the West coast of India are said to bear flowers quite frequently in October.

It is much cultivated in Jamaica.¹ Also found in Bangladesh, Taiwan, Nigeria, and Sierra Leone.^{2(a)}

Zingiber: more than 100 species are found in the Indo-Malesian region, from East Asia to tropical Australia.¹ Fourteen species exist in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Ginger;
 Beng: Ada;
 Guj: Adu;
 Hindi: Adarakha;
 Kan: Alia, Hasishunti;
 Mal: Inchi;
 Mar: Ardrak, Ale;
 Punj: Adi, Adrak;
 Tam: Inji, Injee, Allam, Lakottai;
 Tel: Allamu, Allam;
 Urdu: Adrak.

CONSTITUENTS

Volatile oil containing cineole zingiberol, and sesquiterpene like zingiberene, bisobolene and sesquiphellandrene, gingerosol in the oleo- resin.

Extraction (with acetone) of pungent gingerol compounds from green (4–5 months) and dry (8–9 months) ginger samples from Taiwan gave: 6-gingerol 5.62% and 1.12%; 8-gingerol 0.05% and 0.12%; 10-gingerol 0.04% and 0.14%; and total gingerol 0.78% and 1.38% w/w, respectively.^{2(d)}

6-gingerol reduces nausea and vomiting.¹³

The main components of fresh ginger oil are zingiberene and beta-sesquiphellandrene. Ginger oil induced the detoxifying enzyme system, glutathione S-transferase, which is active against chemical carcinogens, in the small intestine mucosa and liver of female A/J mice. The active principles [6]-shogaol (at 2.5 mg/kg) and [6]-, [8]-, and [10]-gingerol (at 5 mg/kg) have been found to enhance gastro-intestinal motility in mice.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vibandha, Anāha, Śūla, Śopha, Kaṇṭharoga

Used for constipation, distention of the abdomen, colic, edema, and diseases of the throat (therapeutic uses based on texts from 1000 BC to sixteenth century).

Classical prescriptions: Ārdraka with an equal quantity of jaggery for edema; with Kulattha (*Dolichos biflorus*) for piles; milk processed with Ārdraka for diseases of the abdomen.^{16(a)}

Charaka (1000 BC) prescribed Ārdraka with an equal quantity of jaggery (20 g), increasing by 20 g per day up to 200 g, for edema, abdominal diseases, jaundice, internal congestions, cough, bronchitis, consumption and polyuria.^{16(a)}

(Ginger juice, given in increasing doses, was not found to be effective in dropsy and chronic heart diseases.)

IMPORTANT FORMULATION/ APPLICATIONS

Ārdraka Khanda Avaleha (Bhārata Bhaishajya Ratnākara, twentieth century), contains Ārdraka as the main plant drug, with 12 supporting herbs, in equal proportion. Used for constipation, cough, asthma, bleeding disorders, edema, and worm infestations.

Sāraswatārishta (Bhaishajya Ratnāvali, seventeenth century) contains Brahmi as the main plant drug; Ārdraka (= Shunthi, AFI) is among six supporting herbs. Also contains 12 supplementary herbs. Used for epilepsy and mental disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

2–3 ml. of the drug in juice form with honey.

In Shārangadhara Samhitā (thirteenth century), Shunthi was incorporated in 68 prescriptions, and Ardraka only in 13; in Bhavaprakasha (sixteenth century), Shunthi features in 95 prescriptions, while Ārdraka only in 35.^{3,134}

Oral administration of fresh ginger or its extracts is prescribed for treating various types of gastric ulcers.^{2(c)} Higher doses can cause significant exfoliation of gastric epithelial cells in humans.^{2(c)}

Zingiber officinale Rosc. Dried rhizome Śunṭhī

BOTANICAL SOURCE(S)

Zingiber officinale Rosc.
(Fam. Zingiberaceae)

PHARMACOPOEIAL AYURVEDIC DRUG

Śunṭhī (Dried rhizome).

API, Part I, Vol. I.

Indian ginger is considered only to be second to

Jamaican ginger in quality. Cochin ginger is light brown to yellowish-gray. Calicut ginger from Malabar is orange or reddish-brown, resembling African ginger. It is inferior to Cochin ginger in quality. Kolkata ginger is grayish-brown to grayish-blue externally. Indian ginger is more starchy than Jamaican ginger.

Chinese ginger is white and free from fiber.

Japanese ginger is obtained from *Z. mioga* Rosc.^{2(a)}

International Pharmacopoeial name: Zingiberis rhizome.⁸

AYURVEDIC SYNONYMS

Auṣadha, Mahauṣadha, Nāgara, Viśva, Viśvabheṣaja, Śṅgavera, Viśvā, Viśvauṣadha.

Katubhadra, Kaṭutkaṭa.⁴

Nāgara, Nāgarā, Nagaraka (AFI).

HABITAT

Widely cultivated in India.

The plant does not occur in a truly wild state and rarely flowers, though the cultivated plants on the West coast of India are said to bear flowers quite frequently in October.

Much cultivated in Jamaica.¹ Also found in Bangladesh, Taiwan, Nigeria, and Sierra Leone.^{2(a)}

Zingiber: more than 100 species are from the Indo-Malesian region, from East Asia to tropical Australia.¹ Fourteen species exist in India.^{2(a)}

REGIONAL LANGUAGE NAMES

Eng: Ginger root, Ginger;

Assam: Adasuth, Aadar shuth;

Beng: Suntha, Sunthi;

Guj: Sunth, Sundh, Suntha;

Hindi: Sonth;

Kan: Shunthi;

Kash: Shonth;

Mal: Chukku;

Mar: Sunth;

Ori: Sunthi;

Punj: Sund;

Tarn: Sukku, Chukku,

Tel: Sonthi, Sunti;

Urdu: Sonth, Zanjabeel.

CONSTITUENTS

Essential oil, pungent constituents (gingerol and shagaol), resinous matter and starch.

Oils derived from ginger from Jamaica, Nigeria,

Sierra Leone, China, India and Australia:

zingiberene 20%–30%; beta-bisabolene

5%–12%; ar-curcumene 6%–19%; and beta-

sesquiphellandrene 7%–12%. Australian oils

are rich in citral (averaging 19.8%), whereas oils from other areas contain much less (0.5%–4.0%, averaging 1.8%); Cochin ginger contains more citral than Jamaican or African ginger.^{2(a)}

Dried rhizomes contain the anti-ulcer compounds

beta-sesquiphellandrene, beta-bisabolene, ar-curcumene, and shagol.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Agnimāndya, Ādhmāna, Pāṇḍu, Śvāsa, Udararoga, Āmavāta

Used for impaired digestion, flatulence, anemia, asthma, diseases of the abdomen, and diseases of the nervous system/rheumatism (therapeutic uses based on texts from the thirteenth to sixteenth centuries).

Classical prescriptions: Shunthi processed with milk for coryza and bronchial asthma; with Pippali (*Piper longum*) or Drakshā (*Vitis vinifera*) mixed with jaggery for cough; mixed with jaggery for jaundice; processed with Mushta (*Cyperus rotundus*) and Ativishā (*Aconitum heterophyllum*) for diarrhea; with Chitraka (*Plumbago zeylanica*) mixed with vinegar for piles.

Shunthi was an ingredient of an anti-narcotic drink of Charaka for alcoholism.^{16(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Saubhagya Shunthi (Bhaishajya Ratnāvali, seventeenth century). A herbomineral drug, contains Shunthi as the main plant drug with 22 supporting herbs and 2 minerals. A uterine tonic after delivery, as a digestive, carminative, astringent, and lactagogue.

Trikatu Churna (Bhaishajya Ratnāvali) contains dried ginger rhizomes, black pepper, and long pepper in equal proportions. Used as a composite drug in Ayurvedic compounds for cough, bronchitis, and anorexia.

Saubhāgya Vati (Bhaishajya Ratnāvali) was a herbo-mineral compound for asthma, cough, and intermittent fever.

Vaishvānara Churna (Chakradata, eleventh century) contains Haritaki as the main plant drug, with Nāgara and three other digestive, and carminative ingredients. Used for flatulence, colic, and other digestive disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

1–2 g of the drug in powder form.

For motion sickness: 0.5–2 g of powdered drug in a single dose.^{11(b)}

6-shogaol and galanolactone seem to act on serotonin receptors.¹³

Dried ginger is described in pharmacopoeias and in traditional systems of medicines as an anti-inflammatory agent in the treatment of migraine, headache²⁵⁰ and rheumatic²⁵¹ and muscular disorders.¹⁰⁽¹⁾

Standardization basis marker compound of Shunthi: total gingerols-NLT 0.8% w/w (IP).

United States Pharmacopoeia: not less than 0.8% gingerols and gingerdiones and not more than 0.18% of shagols.^{11(b)}

Ziziphus xylopyrus Willd.

Ghoṇṭā

BOTANICAL SOURCE(S)

Ziziphus xylopyrus Willd.
(Fam. Rhamnaceae)

Z. xylopra Willd. including *Z. glaberrima* Santapau.^{2(c)}

PHARMACOPOEIAL AYURVEDIC DRUG

Ghoṇṭā (Fruit).

API, Part I, Vol. V.

Ghoṇṭā is also a synonym of the Areca nut.^{7,30}

AYURVEDIC SYNONYMS

Ghoṭī, Goṭikā.

Gopa ghoṇṭā.³⁰
Ghotikā.

HABITAT

Distributed in North-West India, U.P., Bihar, and South India in moist deciduous forests.

Ragīni lac is recovered from the tree. Lac is hosted in Madhya Pradesh, Uttar Pradesh, and Punjab.⁷

REGIONAL LANGUAGE NAMES

Eng: Jujab;
Beng: Kulphal;
Guj: Gatbadar, Gatabordi;
Hindi: Ghunta, Kakora, Kaathabera;
Kan: Yeranu;

Mar: Ghoti, Bhorghoti;
 Tam: Kottai, Mulkottai;
 Tel: Gotti, Got, Gotiki.

CONSTITUENTS

The pulp of the fruit contains reducing sugars, sucrose, citric acid, carotene, vitamin C and tannins.

Fruits contain the catechol type of tannins (8%–12%); also contain oleanolic acid, *l*-epicatechin and *Z*-leucocyanidin and 3, 3', 4-tri-*O*-methyl-ellagic acid. Seeds from Katyani (Maharashtra) gave 10% of a fatty oil with oleic 47.3%, linoleic 24.6% and saturated acids (mainly myristic acid) 28.1%.^{2(a)} The plant contains amphibine H and nummularine K. Amphibine H showed significant anti-microbial activity against the Gram-negative bacteria *Klebsiella pneumoniae* and *E. coli*. Nummularine K showed activity against both Gram-negative and Gram-positive bacteria.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Vraṇa, Kaṇḍu, Kuṣṭha, Raktavikāra, Svayathu, Prameha, Nādivraṇa, Duṣṭavraṇa, Vamana, Jvara

Used for ulcers, pruritus, obstinate skin diseases, blood impurities, edema, urinary disorders/

polyuria, sinusitis, non-healing ulcers, vomiting, and fever (therapeutic uses based on texts from 1000 BC to sixteenth century).

Gopa Ghontā belonged to the *Ārgvadhādi gana* (group), which was specific for alleviating poisoning, obstinate urinary diseases including diabetes, obstinate skin diseases including leprosy, fever, vomiting, and itching. The group also helped in the cleansing of ulcers.⁴

IMPORTANT FORMULATION/ APPLICATIONS

Ārgavadhādi Kvātha Churna (Ashtāngahridaya, seventh century), Ghontā seed is among 20 plant drugs, all in equal proportion.

Used for toxemia, vomiting, skin diseases, non-healing ulcers, and urinary disorders.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g.

While quoting classical texts, in API, Vol. V, page 305, the properties of Gundra (*Typha australis* Schum. and Thonn.) have been quoted for Ghontā. This should be ignored.

Zizyphus mauritiana Lam.

Kola

BOTANICAL SOURCE(S)

Zizyphus mauritiana Lam.
 Syn. *Z. jujuba* Lam.
 (Fam. Rhamnaceae)

Badar and Kola is equated with *Z. mauritiana* and Karkandhu with *Z. nummularia*.^{16(b)}
Z. jujuba Lam. non-Mill. (Chinese Tsao, Unnab of Unani medicine is equated with *Z. jujuba* Mill. syn. *Z. sativa* Gaertn., *Z. vulgaris* Lam.).

PHARMACOPOEIAL AYURVEDIC DRUG

Kola (Fruit pulp).
 Kola (Stem bark).

API, Part I, Vol. III.

AYURVEDIC SYNONYMS

Kolī, Badarī, Badara, Karkandhu.

Badarāmla, Phenila.³

Three varieties of jujuba have been mentioned by Charaka (1000 BC)—Badara, Kola (Kuala) and Karkandhu (bearing big, medium and small fruits). Karkandhu was known as Shragāla-badari. Sinchitkā-phala was another variety. Sushruta (1000 BC) mentioned five varieties—Badara, Kola, Karkandhu, Sauvira and Sinchitkā-phala. Later on, during the sixteenth century, only three varieties (Badara, Kola and Karkandhu) were used.^{16(b)}

HABITAT

Wild and also extensively cultivated throughout India, also found in Himalayan region.

REGIONAL LANGUAGE NAMES

Eng: Jujube;
Assam: Vagari;
Beng: Kul vadar, Vadar, Vadai, Narkolikul;
Guj: Bor;
Hindi: Desi ber;
Kan: Borehannu;
Mal: Lanta, Lantakkura;
Mar: Bor;
Ori: Borakoli;
Punj: Desi ber;
Tam: Ilandai;
Tel: Regi;
Urdu: Ber.

Eng: Indian jujube, Common jujube.^{2(a)}

CONSTITUENTS

Fruit pulp: Vitamin C, Sugars and Minerals.

Stem bark: tannins and alkaloids.

Fruit pulp contains carbohydrates 17.0%; and minerals 0.3%; calcium 4.0 mg/100 g; phosphorus 9.0 mg/100 g; iron 1.8 mg/100 g; vitamin C 76 mg/100 g; highest content of sugars 10.5%, and ascorbic acid 205 mg/100 g.^{2(a)}

Fruits gave cyclic AMP and cyclic GMP; zizyphus saponins I, II, and III and jujuboside B and j-coumaroylates of aliphatic acid.³²

Citric acid is the major acid in the fruits.^{2(a)}

Bark contains 4%–9% tannins;^{2(a)} leucocyanidin and cyclopeptide alkaloids—mauritines A–F, amphibines A–F and franguloline;³² the triterpenoid zizyberanolic acid, along with lupeol, betulinic acid, and ceanothic acid.^{2(c)}

THERAPEUTIC AND OTHER ATTRIBUTES

Fruit pulp: Dāha, Raktavikāra, Trṣṇā, Aruci
Burning syndrome, blood disorders, morbid thirst, tastelessness.

Stem bark: Tvaka, Raktātisāra, Vṛṇa.

Skin diseases, diarrhea with blood and ulcers
(therapeutic uses based on texts from the sixteenth century).

Sushruta (1000 BC) prescribed the fruits of Badara in hemoptysis, menstrual and other vaginal disorders, for bilious and rheumatic afflictions; ripe fruits were used as a demulcent and purgative; oil of seeds was used for anuria, and green fruits as a diuretic, stomachic and laxative. A fine powder of Karkandhu mixed with butter and jaggery was prescribed for leucorrhea (Rājamārṇanda, eleventh century; Gadanigraha, twelfth century).¹⁸

A decoction of the bark is used for diarrhea and dysentery, and also as an astringent in gingivitis.^{2(a)}

IMPORTANT FORMULATION/ APPLICATIONS

Dhanvantara Taila (Vaidya Yoga Ratnāvali, 1953), contains Balā (*Sida cordifolia*) root as the main plant drug. Kola fruit is among 13 supporting herbs. The compound also contains 21 supplementary herbs. Used as a massage oil for diseases of the nervous system.

Yavāni Shāḍhava (Ashtāngahridaya, seventh century); Kola fruit pulp is among the six main plant drugs. To be sucked for tastelessness, malabsorption syndrome, and constipation.

Nyagrodhādi Kvātha Churna (Ashtāngahridaya); Koli (Kola) stem bark is among the 21 plant drugs, all in equal proportions. Used for jaundice, fever, vomiting, tastelessness, and skin diseases.

DOSAGE/USAGE/CAUTIONS/ COMMENTS

3–6 g. (Dried pulp).

Fruit kernels are reported to have sedative effects and are recommended as a sporic. They are given as an antidote to aconite poisoning and are prescribed to stop nausea and vomiting and for the relief of abdominal pain in pregnancy.^{2(a)}

In Chinese medicine, the seeds of *Zizyphus jujuba* Mill. var. *spinosa* Bunge are used for neurasthenia, insomnia, absent-mindedness, palpitations, and night sweats.²⁵²

APPENDIX I

ABBREVIATIONS

API:	The Ayurvedic Pharmacopoeia of India, Part I, Vol. I (1989), II (1993), III (2001), IV (2004), V (2006), VI (2008); Government of India, Ministry of Health & Family Welfare, New Delhi.	CSIR:	Council of Scientific & Industrial Research, New Delhi.
AFI:	The Ayurvedic Formulary of India, Part I, Second Revised English Edn., 2003; Part II, First English Edn., 2000, AYUSH, Government of India, Ministry of Health & Family Welfare, New Delhi.	ICMR:	Indian Council of Medical Research, Medicinal Plants Unit, New Delhi.
CCRAS:	Central Council for Research in Ayurveda and Siddha, New Delhi (until 2012). Central Council for Research in Ayurvedic Sciences, AYUSH, Government of India, Ministry of Health & Family Welfare, New Delhi (after 2012).	IP:	Indian Pharmacopoeia, Government of India, Sixth Edition, 2010, Addendum 2012.
		NISCAIR:	National Institute of Science Communication and Information Resources (CSIR), New Delhi.
		RAV:	Rashtriya Ayurveda Vidyapeeth (National Academy of Ayurveda) (an autonomous organization under Ministry of Health & Family Welfare, Govt. of India).

APPENDIX II

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APPENDIX III

ABBREVIATIONS OF TECHNICAL TERMS

α	alpha	IU	International Unit
β	beta	ID ₅₀	Median inhibitory dose
γ	gamma	Kcal/kg	Kilocalorie per kilogram
ABTS	2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonicacid)	LC ₅₀	Median lethal concentration
ACE	Angiotensin converting enzyme	LD ₅₀	Median lethal dose
BHA	Butylated hydroxyanisole	LDL	Low density lipoproteins
BHT	Butylated hydroxytoluene	LH	Luteinizing hormone
bw	Body weight	m	Meter
cm	Centimeter	MIC	Minimum inhibitory concentration
CCl ₄	Carbon tetrachloride	MTD	Maximum tolerated dose
COX	Cyclooxygenase	μ g	Microgram
CNS	Central nervous system	mg	Milligram(s)
CTC	Common toxicity criteria	mg/kg	Milligram per kilogram
CVS	Cardiovascular system	ml/mL	Milliliter
d	day(s)	NLT	Not Less Than
DNA	Deoxyribonucleic acid	NMT	Not More Than
L-Dopa	Levodopa	p.o.	Per oral
<i>E. coli</i>	<i>Escherichia coli</i>	PMID	PubMed identifier unique number
ED ₅₀	Median effective dose	ppm	Parts per million
EDTA	Ethylenediaminetetraacetic acid	RBC	Red blood corpuscles
FSH	Follicle stimulating hormone	s.c.	Subcutaneous
GABA	Gamma-amino butyric acid	SGOT	Serum glutamic oxaloacetic transaminase
g/gm	Gram(s)	SGPT	Serum glutamic pyruvic transaminase
g/kg	Gram per kilogram	<i>Sh.</i>	<i>Shigella</i>
h	Hour	Sp.	Species
Hb	Hemoglobin	Spp.	Multiple species
HDL	High density lipoproteins	Subsp.	Subspecies
HIV	Human immunodeficiency virus	<i>Staph.</i>	<i>Staphylococcus</i>
HPLC	High pressure liquid chromatography	Syn.	Synonym
HPTLC	High performance thin layer chromatography	TLC	Thin layer chromatography
HSV-1,-2	Herpes simplex virus 1 and 2	UV	Ultraviolet
5-HT	5-Hydroxytryptamine	Var.	Variety
i.m.	Intramuscular	<i>Vib.</i>	<i>Vibrio</i>
i.p.	Intraperitoneal	VLDL	Very low density lipoproteins
i.v.	Intravenous	v/v	Volume per volume
IC ₅₀	Median inhibitory concentration	v/w	Volume per weight
		WBC	White blood corpuscles
		Wk	Week(s)
		w/w	weight per weight

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is the first review of all the therapeutic sections of 456 plant drugs in the first six volumes of the *Ayurvedic Pharmacopoeia of India*. It covers pharmacognosy of classical Ayurvedic herbs, their chemical constituents, therapeutic uses, and doses on the basis of contemporary scientific literature.

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