Detail Study of Traditional Drugs of India

CHAPTER 35

35.1. INTRODUCTION

A large number of natural plant species, specifically those used extensively in various Indian traditional herbal drugs, have been, and are still being investigated for ascertaining their specific inherent vital pharmacological and microbiological activities.

In the recent past, stretched over to almost two decades the spectacular thrust generated enough interest, inquisitiveness, and incredible latest scientific approach to search for new drugs of tremendous potential value and worth in comparison to the modern allopathic system of medicine.

Based upon the high quality, proper standardization procedures, ultramodern packaging concepts and ideas, exhaustively informative drug-usage literatures, and above all the broad-spectrum methodical promotions both in India and abroad, the Indian traditional herbal drugs have undoubtedly made their presence felt amongst the valued consumers. An overwhelmingly plausible and sound confidence amongst the consumers to make use of such available drugs as: OTC products, prescribed medications, long-term usage in chronic ailments, have really turned them into a widely accepted alternative saga of safer and effective medications not only in India but also across the entire globe.

The importance of 'medicinal plants' right from the very dawn of civilization up to the last couple of decades have witnessed a tremendous cumulative, informative, and educative volume of researches carried out in the ever-expanding field of pharmaceutically significant naturally occurring plant products. Interestingly, the better understanding of the plants as a whole vis-à-vis their important chemical constituents have undoubtedly broadened and strengthened one's acceptability and overall confidence in their usages amongst the consumers. Hence, the prevailing biodynamism of the 'active principles' strategically located in the plant kingdom would certainly provide the mankind with an eternal storehouse of clinically beneficial herbal drugs.

Indian plant drug caught the attention of west since the beginning of colonial days. Garcia da Orta, the personal physician of the then Portuguese governor in India was the first to publish his treatise on Indian drugs in 1563. During the period of 1678–1703, Henrich Van Reed, the Dutch governor of Cochin, published his work in twelve volumes on the medicinal plants of Kerala. In the later period, most of the systematic work on Indian medicinal plants has been published by Indian authors such as Nadkarni (1908), Kirtikar and Basu (1918), Chopra (1956), Aiyer and Kolammal (1960–66), Moose (1976–79), and Nambiar (1986). The aspects of cultivation and utilization of medicinal and aromatic plants were edited in details by Atal and Kapoor (1982) and as we see in recent days Handa (1998) published *Indian Herbal Pharmacopoeia* with an emphasis on the standardization and quality control of traditional drugs of India.

Some of the commonly used traditional drugs have been discussed in this chapter.

ADUSA

Synonym

Vasaka.

Regional Names

Sansk: atarusa, Vasaka; Guj: aduso, ardusi; Hindi: adusa, arusa; Kan: atarusha, adsole, adasale; Mar: adulsa.

Biological Source

Vasaka consists of the fresh or dried leaves of *Adhatoda vasica* Nees.

Family

Acanthaceae.

Habitat

The plant is distributed all over the plains of India and in the lower Himalayan ranges, ascending to a height of 1,500 m.

Macroscopy

Leaves are entire when fresh and crumpled or broken when dried. Shape is lanceolate-ovate lanceolate, crenate to entire margin, acuminate apex, base tapering; petiole 2-to 8-cm long. The leaves are 10-to 30-cm long and 3- to 10-cm broad, pinnate venation, glabrous or slightly pubescent green when fresh, on drying the colour changes from brown to grey. Odour is characteristic and bitter in taste.

Fig. 35.1 *Adhatoda vasica*

Microscopy

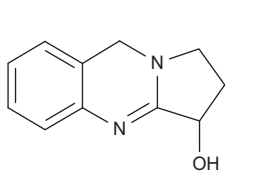
Leaf shows dorsiventral structure with two layers of palisade cells below upper epidermis, epidermal cells sinuous walls with anomocylic stomata on both surfaces; one to three, rarely upto five-celled uniseriate covering trichomes few, and glandular trichomes with unicellular stalk and four-celled head are seen; acicular and prismatic forms of calcium oxalate crystals are also present in mesophyll.

Standards

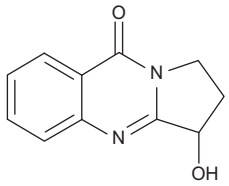
Foreign matter	Not more than 2%
Total ash	Not more than 21%
Acid-insoluble ash	Not more than 1%
Alcohol-soluble extractive	Not less than 3%
Water-soluble extractive	Not less than 22%

Chemical Constituents

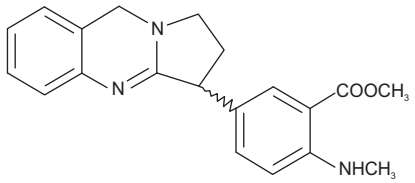
Vasaka contains several alkaloids but the major ones include pyrroloquinazoline alkaloids vasicine about 1.3% accompanied by vasicinol, vasicinone and adhatonine. Aliphatic hydroketones such as 37-hydroxy hexateracont-1-en-5-one and 37-hydroxy hentetracontan 19-one have also been reported from vasaka.



Vasicine



Vasicinone



Adhatonine

Uses

The leaf extract has been used for treatment of bronchitis and asthma for many centuries. It relieves cough and breathlessness. It is also prescribed commonly in ayurveda for bleeding due to idiopathic thrombocytopenic purpura, local bleeding due to peptic ulcer, piles, menorrhagia etc. Large doses of fresh juice of leaves have been used in tuberculosis. Its local use gives relief in pyorrhoea and in bleeding gums.

Marketed Formulations

It is one of the ingredients of the preparations known as Vasavaleha (Dabur), Kasamrit Herbal (Baidyanath) and Vasaka capsule (Himalaya Drug Company).

AMLA

Synonyms

Indian gooseberry, Emblic myrobalan.

Regional Names

Sansk: amalaka, dhatriphala; Guj: ambala, amala; Hindi: amla; Kan: nellikayi; Mar: anvala, avalkathi.

Biological Source

Amla consists of the fresh or dried fruit of *Emblica officinalis* Gaertn. (syn. *Phyllanthus emblica* Linn).

Family

Euphorbiaceae.

Habitat

A deciduous tree, small to medium in size, the average height being 5.5 metres, commonly found in India, Sri Lanka, China, and Malaya ascending to 1,500 m on the hills.

Macroscopy

Fruits, fleshy, almost depressed to globose. 1.5- to 2.5-cm in diameter. It is distinctly marked in six lobes. The fruit is green when tender but the colour changes to light yellow or brick red on maturity. Taste is sour and astringent initially and sweet afterwards.

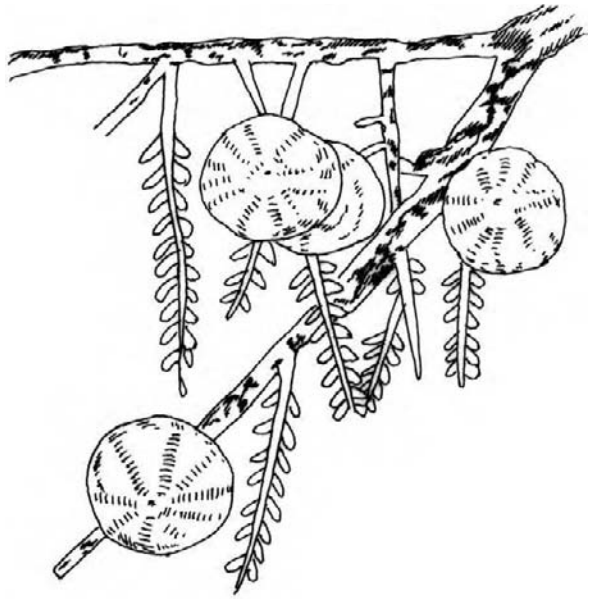


Fig. 35.2 *Emblica officinalis*

Microscopy

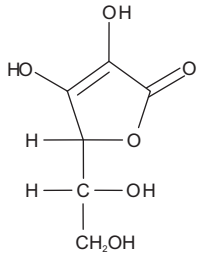
Fruit shows an epicarp consisting of epidermis with a thick cuticle and two to four layers of hypodermis; the cells in hypodermis is tangentially elongated, thick-walled, smaller in dimension than epidermal cells; mesocarp consists of thin-walled isodiametric parenchymatous cells; several collateral fibrovascular bundles scattered throughout mesocarp; xylem composed of tracheal elements, fibre tracheids and xylem fibres; tracheal elements, show reticulate, scalariform, and spiral thickenings; mesocarp also contains large aggregates of numerous irregular silica crystals.

Standards

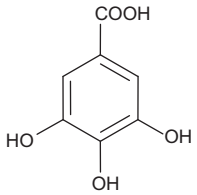
Foreign matter	Not more than 3%
Total ash	Not more than 7%
Acid-insoluble ash	Not more than 2%
Alcohol-soluble extractive	Not less than 40%
Water-soluble extractive	Not less than 50%

Chemical Constituents

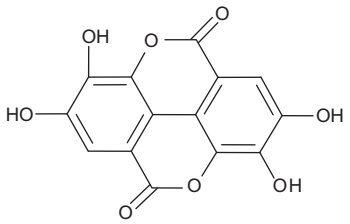
It is highly nutritious and is an important dietary source of Vitamin C, minerals, and amino acids. The edible fruit tissue contains protein concentration 3-fold and ascorbic acid concentration 160-fold compared to that of the apple. The fruit also contains considerably higher concentration of most minerals and amino acids than apples. The pulpy portion of fruit, dried and freed from the nuts contains: gallic acid 1.32%, tannin, sugar 36.10%; gum 13.75%; albumin 13.08%; crude cellulose 17.08%; mineral matter 4.12%, and moisture 3.83%. Tannins are the mixture of gallic acid, ellagic acid, and phyllembin. The alkaloidal constituents such as phyllantidine and phyllantine have also been reported in the fruits. An immature fruit contains indolacetic acid and four other auxins: a1, a3, a4 and a5, and two growth inhibitors R_1 and R_2.



Vitamin C



Gallic acid



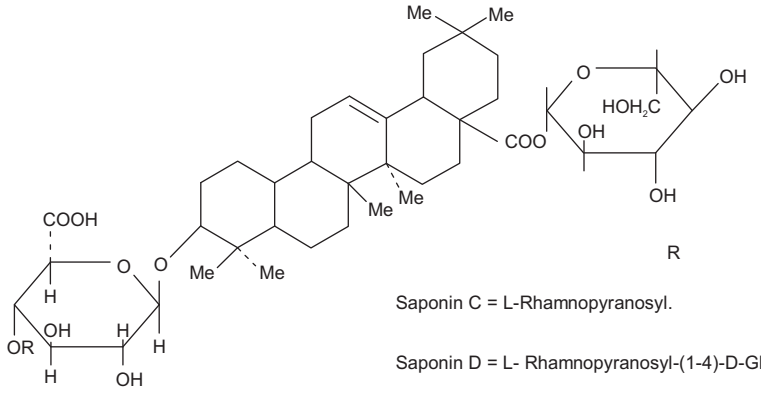
Ellagic acid

Uses

The fruits are diuretic, acrid, cooling, refrigerant, and laxative. Dried fruit is useful in haemorrhage, diarrhoea, diabetes, and dysentery. They are useful in the disorders associated with the digestive system and are also prescribed in the treatment of jaundice and coughs. It has antioxidant, antibacterial, antifungal, and antiviral activities. Amla is one of the three ingredients of the famous ayurvedic preparation, triphala, which is given to treat chronic dysentery, bilousness, and other disorders, and also it is an ingredient in Chyavanprash.

Marketed Formulations

It is one of the ingredients of the preparations known as Jeewani malt (Chirayu Pharma), Triphala churna (Zandu) and Chyavanprash (Dabur).



Structure formula of Saponin C and D

oleanolic acid as an aglycone. It also shows the presence of an insect moulting hormone Ecdysterone, long-chain alcohols such as 17-penetatriacontanol, 27-cyclohexyIheptacosan-7-ol, long-chain ketones and a water-soluble base betaine. Two new saponins C and D have been isolated from the fruits.

Uses

A. aspera is much valued in the indigenous medicine. It is reported to be an astringent and diuretic. A decoction of the plant is useful in pneumonia and renal dropsy, while the juice is useful in opthalmia and dysentery. The leaves are used to cure gonorrhoea, whereas the flowers are used in the treatment of menorrhagia. The roots are astringent and their paste is applied to clear opacity of cornea. It is also reported to be useful in cancer. The plant shows significant abortifacient activity in mice and rabbit. The plant also shows hypoglycaemic activity in the normal and diabetic rabbits.

Marketed Formulations

It is one of the ingredients of the preparation known as Cystone tablet (Himalaya Drug Company).

ARJUNA

Synonym

Arjuna Myrobalan.

Regional Names

Sansk: kakubha, svetavaha; Guj: arjuna, sajada; Hindi: arjuna; Kan: matti, neermatti, mathichakke; Mar: adurta, sadada.

Biological Source

It is the dried bark of *Terminalia arjuna* W. and A.

Family

Combretaceae.

Habitat

This herb has been known from as early as the Vedic period. It is grown in flowerpots in most Hindu homes. Its leaves are used in the worship of gods and goddesses and partaken as prasad. It is native to India. It reached Western Europe only in the 16th century. It is widely grown throughout the world.

Macroscopy

Bark is available in pieces, flat, curved, recurved, channelled to half quilled 0.2- to 1.5-cm thick, 10 cm in length, and upto 7 cm in width; inner surface fibrous and pinkish, short fracture; taste is bitter and astringent.

Fig. 35.4 *Terminalia arjuna*

Microscopy

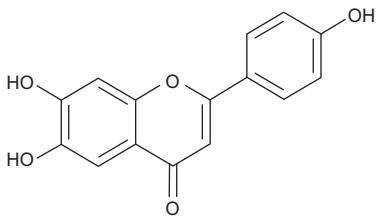
Outer cork consists of 9–10 layers of tangentially elongated cells; cork cambium and secondary cortex are not distinct. Medullary rays are seen traversing almost upto outer bark secondary phloem occupies a wide zone, consisting of sieve tubes, companion cells, phloem parenchyma and phloem fibres; phloem fibres are distributed in rows and present in groups of 2–10; rosette type of calcium oxalate crystals and starch grains are also present.

Standards

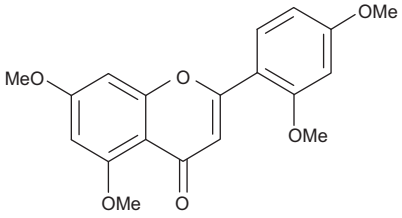
Foreign matter	Not more than 2%
Total ash	Not more than 25%
Acid-insoluble ash	Not more than 1%
Alcohol-soluble extractive	Not less than 20%
Water-soluble extractive	Not less than 20%

Chemical Constituents

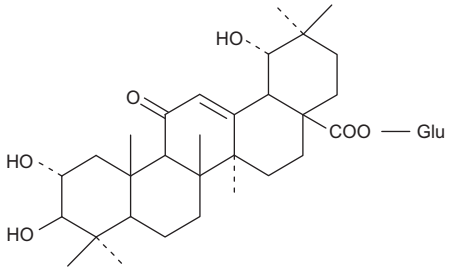
The dry bark from the stem contains about 20 to 24% of tannin, whereas that of the bark obtained from the lower branches is upto 15 to 18%. The tannins present in arjuna bark are of mixed type consisting of both hydrolysable and condensed tannins. The tannins are reported to be present are (+) catechol, (+) gallocatechol, epicatechol, epigallocatechol, and ellgic acid. The flavonoids such as arjunolone, arjunone, and baicalein have been reported from the stem bark. The triterpenoid compounds arjunetin, arjungenin, arjunglucoside I and II, and terminoic acid have also been reported from the bark. The root contains number of triterpenoids such as arjunoside I and II, terminic acid, oleanolic acid, arjunic acid, arjunolic acid, etc. The fruits also contain 7 to 20% of tannins. A pentacyclic triterpenic glycoside arjunoglucoside III has been reported from the fruits along with hentriacontane, myristyl oleate and arachidic stearate.



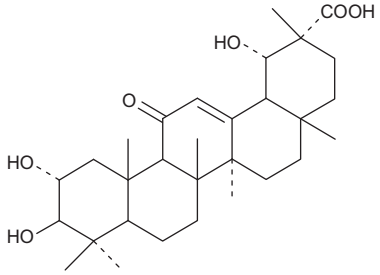
Arjunolone



Arjunone



Arjuglucoside III



Terminoic acid

Uses

Arjuna bark is used as a diuretic and astringent. The diuretic properties can be attributed to the triterpenoids present in fruits. It causes decrease in blood pressure and heart rate. It is used in the treatment of various heart diseases in indigenous systems of medicines. The bark was extensively used in the past by the local tanneries for tanning animal hides. It yields a very firm leather of a colour which is similar babool tanned leather.

Marketed Formulations

It is one of the ingredients of the preparations known as Abana, Geriforte, Liv 52, Mentat (Himalaya Drug Company); Arjun Ghrita, Arjun Churna (Baidyanath Company); and Madhudoshantak (Jamuna Pharma).

ASHOKA

Synonym

Ashok.

Regional Names

Hindi and Bengali: asok; Mar: ashoka.

Biological Source

The drug consists of the dried bark of *Saraca indica* auct. non Linn., syn. *S. asoca* (roxb). De Wilde.

Family

Leguminoseae.

Habitat

Ashoka tree is evergreen tree, grown all over India, in Burma and Ceylon. In India, it is cultivated in states like Madhya Pradesh, Rajasthan, Punjab, Haryana, Uttar Pradesh, Tamil Nadu, Kerala, Karnataka, Maharashtra, and A.P.

Macroscopy

S. indica is a small evergreen tree of 6 to 9 m height distributed throughout India upto an altitude of 750 m in the central and the eastern Himalayas and the Khasi, Garo, and Lusai hills. It is found wild along streams or in the shade of evergreen forests. The bark of the plant is bark brown to grey or almost black with warty surfaces. Leaves are paripinnate, oblong-lanceolate, and rigidly subcoriaceous. Flowers are orange to orange-yellow eventually turning vermillion in dense axillary corymbs. Fruits consist of the flat leathery pods with four to eight ellipsoid-oblong seeds.

Fig. 35.5 *Saraca indica*

Microscopy

The outer most layers consist of few layers of phellem and phelloderm. Phelloderm contains stone cells in large numbers in the form of distinct rings and also large strands. The transverse section also reveals the presence of phloem fibres in small groups, crystal fibres, and funnel-shaped, uniseriate medullary rays in the inner bark. Starch is also present to small extent.

Standards

Foreign matter	Not more than 2%
Total ash	Not more than 11%
Acid-insoluble ash	Not more than 1%
Alcohol (90%)-soluble extractive	Not less than 15%
Water-soluble extractive	Not less than 11%

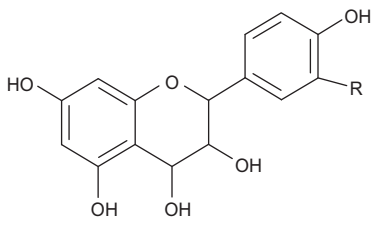
Chemical Constituents

Ashoka stem bark contains about 6% of tannins and anthocyanin derivatives which includes leucopelargonidin-3-O-β-D-glucoside. leucopelargonidin and leucoanidin. It also contains waxy substance constituted of long-chain alkanes, esters, alcohols, and n-octacosanol. The steroidal components present in the bark includes 24-methylcholest-5-en-3-β-ol, (ZZE)-24-ethylcholesta-5,22-dien-3-β-ol, 24-ethylcholest-5-en-3-β-ol and β-sitosterol.

The root bark contains (-) epicatechin, procyandin B_2 and 11'-deoxyprocyanidin B. The pods consists of (+) catechol, (-) epicatechol, and leucocyanidin. The flowers are reported to have various anthocyanin pigments, kaempterol, quercetin and its glycoside, gallic acid, and β-sitosterol.

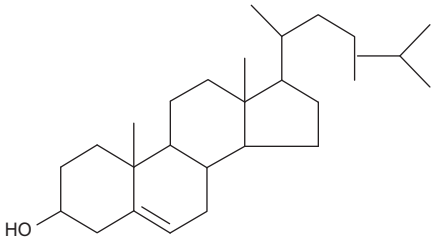
Uses

Ashoka bark is reported to stimulate the uterus making the contractions more frequent and prolonged without producing tonic contractions as in case of ergot alkaloids. The phenolic glycoside is reported to be responsible for the specific oxytocic activity in vitro and in vivo on uterus and isolated myometrial strips and fallopian tube. The bark is reported to have a stimulating effect on the endometrium and ovarian tissue and is used in the treatment of menorrhagia due to uterine fibroids. It is also used in leucorrhoea and in internal bleeding, naemorrhoids, and haemorrhagic dysentery. Alcoholic extract of the bark shows significant



Leucocyanidin R = OH

Leucopelargonidin R = H



24-methylcholest-5-en-3β-ol

antimicrobial activity against a wide range of bacteria and aqueous extract has been found to enhance the life span of mice infected with ehrlich ascites carcinoma.

Marketed Formulations

It is one of the ingredients of the preparations known as Pmensa (Lupin Herbal Lab.), Femiplex (Charak Pharma), and Ashokarishta (Baidyanath Company).

BAHERA

Synonym

Belleric Myrobalan.

Regional Names

Sansk: aksa, aksaka; Guj: bahedan; Hindi: bahera; Kan: tare kai, shanti kayi; Mar: baheda.

Biological Source

Bahera is the dried ripe fruits of *Terminalia belerica* Roxb.

Family

Combretaceae.

Habitat

It is a large deciduous tree found through out India, Burma, and Sri Lanka, common in plains and forests of about 1000 m. Except in dry and arid regions.

Macroscopy

Globular 1.3- to 2.5-cm in diameter, ovoid, suddenly narrowing into a short stalk. Outer surface is velvet in nature, irregularly wrinkled containing five longitudinal ridges. The upper end is depressed and a prominent, sound scar of pedicel is present at one end of the fruit. It is very hard and when broken surface will be yellow in colour. It is devoid of odour and taste is astringent.

Microscopy

T.S. shows an outer epicarp consisting of a layer of epidermis, most of the epidermal cells elongate to form hair-like protuberance with swollen base; next to epidermis it contains a zone of parenchymatous cells, slightly tangentially elongated and irregularly arranged. Stone cells of varying shape and size are present in between these parenchymatous cells. Mesocarp traversed in various directions by numerous vascular bundles collateral, endarch; simple starch grains and rosettes of calcium oxalate crystals are present in parenchymatous cells.

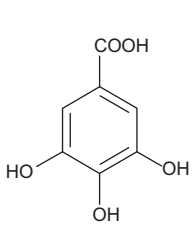
Fig. 35.6 Fruit and flowering branch of *Terminalia belerica*

Standards

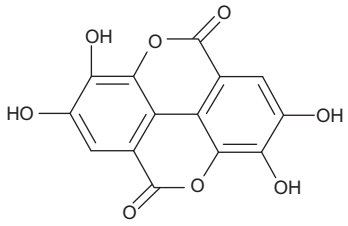
Foreign matter	Not more than 2%
Total ash	Not more than 7%
Acid-insoluble ash	Not more than 1%
Alcohol-soluble extractive	Not less than 8%
Water-soluble extractive	Not less than 35%

Chemical Constituents

Bahera contains tannins (20–25%) like gallic acid, ellagic acid, ethyl gallate, galloyl glucose, and chebulagic acid. Minor contents phyllemblin, β-sitosterol, mannitol, glucose, fructose, rhamnose. The fixed oil in the fruit contains the esters of palmitic, stearic, oleic, and linoleic acids. A new cardiac glucoside bellericanin has also been reported from the fruits.



Gallic acid



Ellagic acid

Uses

The fruit has bitter, astringent, tonic, laxative, demulcent, mild diuretic, hypolipidemic, hepatoprotective, antipyretic activities, and is also used in piles and dropsy. It is a constituent of Triphala and is prescribed in disease of liver and gastrointestinal tracts.

Marketed Formulations

It is one of the ingredients of the preparation known as Sage Triphala syrup (Sage Herbals).

BHILAMA

Synonyms

Marking nut tree, oriental cashew.

Biological Source

It is the tree of *Semecarpus anacardium* Linn. f.

Family

Anacardiaceae.

Habitat

It is a moderate-sized deciduous tree, 12–15 m high, found in the outer Himalayas from Sutlej to Sikkim, Assam, and in hotter parts of India.

Macroscopy

The bark is dark brown, rough, leaves large, simple, obovate-oblong; flowers small, greenish-yellow, in terminal panicles, drupes ovoid, smooth, shining, black when ripe. The pericarp is abundant in a black, oily, bitter and highly vesicant juice used for marking linen, in varnish, paints, and plastics. The juice, known in the trade as Bhilwan shell liquid, is a rich source of phenols. It is obtained from the nuts by extraction with petroleum ether or other solvent, by hot expression in a hydraulic press, or by roasting in a specially designed retort, or by subjecting the nuts to superheated steam at 180–230° in a close retort with an inlet for steam and an outlet for the expelled liquid.

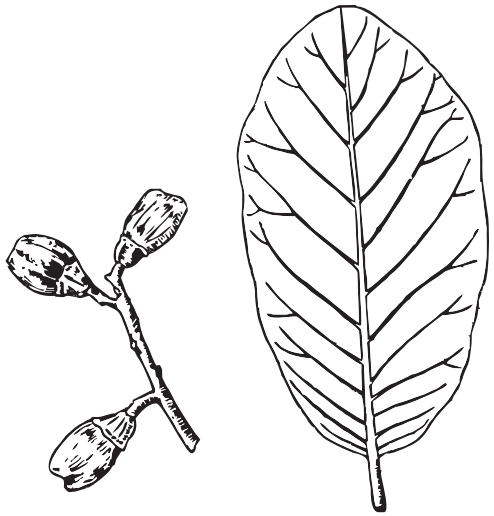
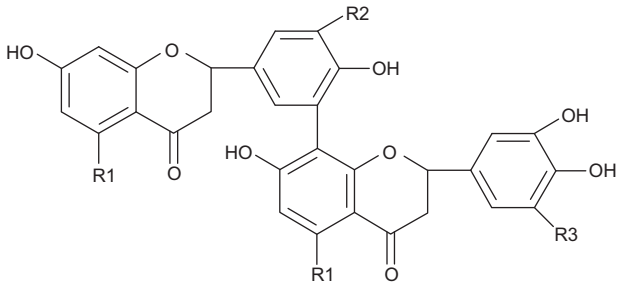


Fig. 35.7 *Semecarpus anacardium*

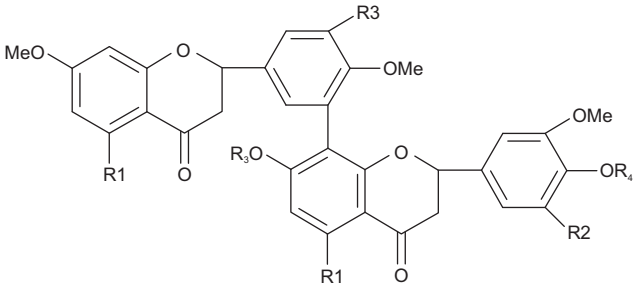
Chemical Constituents

The juice is a dark brown oily liquid or a semisolid depending on the method of extraction. The major constituent is bhilawanol, (46%). It is an O-dihydroxy compound with a catechol nucleus and an unsaturated C_{15}-side chain. It is a mixture of *cis*- and *trans*- isomers of urushenol [3-(pentadecenyl-8')-catechol]. A small quantity of a monohydroxy phenol, semicarpol, is also present. The dark tarry residue left after distillation contains high boiling phenols and hydrocarbons. Thermal degradation of the shell liquid at 400° gives catechol and a mixture of phenols and hydrocarbons.

The fruits contain nicotinic acid, riboflavin, thiamine, and essential amino acids. The nuts yield anacardic acid, aromatic amines, bhilawanol, 1-pentadeca-7,10-dienyl-2,3-dihydroxy benzene, biflavanoids A, B, and C, (3',8-binaringenin and 3',8- biliquiritigenin), tetrahydrobustaflavone, tetrahydroamentoflavone, and nallaflavone. The nutshell contains galluflavanone and jeediflavanone. The seed oil is composed of glycerides of linoleic, myristic, oleic, palmitic, and stearic acids. Anacarduflavanone is present in nutshells. Amentoflavone is present in the leaves. The plant also contains biflavanones A_1 and A_2.



Galluflavanone	R1 = H, R2, R3 = OH
Jeediflavanone	R1 = OH, R2,R3 = H
Semecarpuflavanone	R1,R2 = H, R3 = OH



Nallaflavanone	R1 = OH, R2 = OMe, R3 = Me, R4 = H
Semecarpetin	R1, R2, R3 = H, R4 = Me

Uses

The tree is a host plant of the lac insect. The bark is astringent. The tree exudes a gum or gum-resin, which is used

in leprous affections and nervous debility, also in scrofulous and venereal affections. The fruits are used in asthma, ascites, epilepsy, neuralgia, tumours, warts, psoriasis, and rheumatism; as abortifacient, anthelmintic, and vermifuge. A decoction of the fruits mixed with milk and butter fat is useful in asthma, gout, hemiplegia, neuritis, piles, rheumatism, and syphilitic complaints. The kernel is anthelmintic, cardiotonic, carminative, and digestive. The seed oil is used externally in gout, leprosy, and leucoderma. The root cooked in sour rice water causes sterility in women when eaten. The juice of the pericarp and tree trunk is a powerful counter-irritant and vesicant. It causes painful blisters. The juice is used for tattooing and for chobing elephant feet. The pericarp juice has antibacterial properties.

Marketed Formulations

It is one of the ingredients of the preparations known as Prasarini Tail, Patrangasava, and Sanjivani vati (Dabur).

BRAHMI

Synonyms

Indian Pennywort, Mangosteen.

Regional Names

Sanskrit: manduki, darduracchada; Gujarati: khodabrahmi, khadbhrammi; Hindi: brahma manduki, brahmi; Kan: ondelaga, brahmi soppu; Mar: karivana.

Biological Source

Brahmi is the fresh or dried herb of *Centella asiatica* (L.) (syn. *Hydrocotyl asiatica* Linn.)

Family

Umbelliferae

Habitat

The plant is found in swampy areas of India, commonly found as a weed in crop fields and other waste places throughout India up to an altitude of 600 m and also in Pakistan, Sri Lanka, and Madagascar.

Macroscopy

It is a slender, herbaceous creeper. Stems are long, prostate, filiform, often reddish, and with long internodes, rooting at nodes. Leaves are long-petioled, 1.3 to 6.3 cm in diameter, several from rootstock and 1 to 3 cm from each node of stem. They are orbicular, reniform, rather broader than long, glabrous on both sides and with numerous slender nerves from a deeply cordate base. Fruit 8 mm long, ovoid, hard with a thick pericarp.

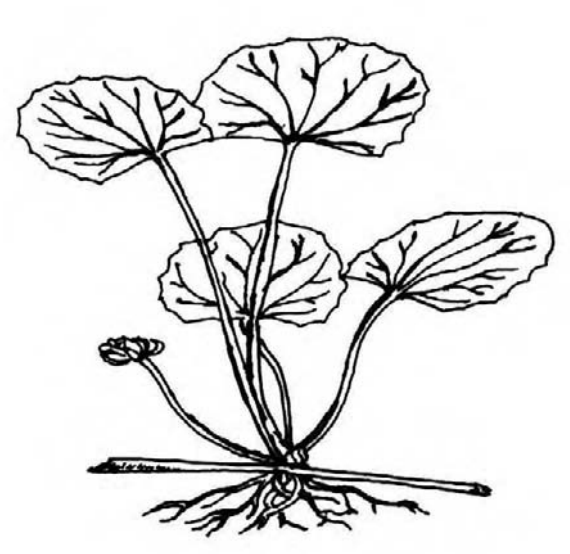


Fig. 35.8 *Centella asiatica*

Microscopy

Root

Outer cork consisting of three- to five-layered, exfoliated rectangular cells, followed by cortex region consisting three or four layers of parenchyma cells containing oval to round, simple, starch grains, and microsphenoidal crystals of calcium oxalate; secondary cortex composed of thin-walled, oval to polygonal parenchymatous cells. Secretory cells are also present.

Stem

Single-layered epidermis composed of round to cubical cells covered by striated cuticle. Two or three layers of collenchymatous cells are found below the epidermis, collenchymatous cells are followed by six to eight layers of thin-walled, isodiametric, parenchymatous cells with intercellular space present; vascular bundles collateral, open, arranged in a ring, capped, by patches of sclerenchyma and traversed by wide medullary rays. Resin ducts are also present in parenchymatous cells of cortex; pith consists of isodiametric parenchyma cells with intercellular spaces.

Leaf

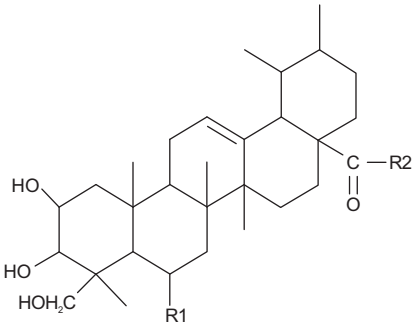
Single-layered epidermis covered by a thick cuticle, two- or three-layered collenchyma in the midrib region on both surfaces, central zone occupied by vascular bundles, mesophyll consists of two or three layer of palisade cells, five to seven layers of loosely arranged, more or less isodiametric spongy parenchyma cells. Rosette type crystals of calcium oxalate and anisocytic stomata are also present. Few anomocytic stomata are also seen.

Standards

Foreign matter	Not more than 2%
Total ash	Not more than 17%
Acid-insoluble ash	Not more than 5%
Alcohol-soluble extractive	Not less than 9%
Water-soluble extractive	Not less than 20%

Chemical Constituents

The drug contains triterpenoid saponin glycosides, indocentelloside, brahmoside, brahminoside, asiaticosides, thankuniside, and isothankuniside. The corresponding trirerpene acids obtained on hydrolysis of the glycosides are indocentoic, brahmic, asiatic, thankunic, and isothankunic acids. These acids, except the last two, are also present in free form in the plant from isobrahmic and betulic acids. The presence of mesoinositol, a new oligosaccharide, centellose, kaempferol, quercetin, and stigmasterol, have also been reported.



	R1	R2
Asiatic acid	-H	-OH
Madecassic acid	-OH	-OH
Asiaticoside	-H	-O-glu-glu-rha
Madecassoside	-OH	-O-glu-glu-rha

Uses

The plant is used as tonic, in diseases of skin, nerves, blood, and also to improve memory. It also strengthens our immune system. Asiaticosides stimulate the reticuloendothelial system where new blood cells are formed and old ones destroyed, fatty materials are stored, iron is metabolized, and immune responses and inflammation occur or begin. The primary mode of action of centella appears to be on the various phases of connective tissue development, which are part of the healing process. Centella also increases keratinization, the process of building more skin in areas of infection such as sores and ulcers. Asiaticosides also stimulate the synthesis of lipids and proteins necessary for healthy skin. Finally centella strengthens veins by repairing the connective tissues surrounding veins and decreasing capillary fragility.

Marketed Formulations

It is one of the ingredients of the preparations known as Iqmen (Lupin Herbal Lab.) and Abana, Geriforte, Menosan, Mentat (Himalaya Drug Company).

CASSIA TORA

Synonyms

Chakunda, Panevar, Wild Senna, Foetid Senna.

Biological Source

It consists of the leaves and seeds of *Cassia tora* Linn.; syn. *C. obtusifolia* L.

Family

Caesalpiniaceae.

Habitat

It is distributed throughout the tropical parts of India as a weed up to an altitude of 1,550 m in the Himalayas.

Macroscopy

A foetid, annual herb or undershrub; up to 1–2 m in height, leaves peripinnate; leaflets three pairs, membranous, ovate-oblong, with glands in the last two pairs; flowers small, yellow, in pairs, on short axillary peduncles; pods stout, slender, sub-4-angled; seeds green, many, flat.

Fig. 35.9 *Cassia tora*

Chemical Constituents

The seeds contain fatty acids, physcion, rubrofusarin, its 6β-gentiobioside, aloe-emodin, chrysophanol,

norrubrofusarin, 8-hydroxy-3-methyl anthraquinone-lβ-gentiobioside, emodin, rhein, β-sitosterol, amino acids, chrysophanic acid, its 9-anthrone, obtusin, aurantio-obtusin, toralactone, torachrysone, questin, glucose, galactose, xylose, raffinose, castasterone, typhasterol, teasterone, 28-nor-castasterone, monopalmitin, monoolein, etc.

The protein bound amino acids are lysine, histidine, theonine, phenylalanine, valine, methionine, tryptophan, leucine, isoleucine, serine, glycine, tyrosine, aspartic acid, alanine, and proline.

Uses

The leaves possess anthelmintic and purgative properties. They are externally used for ringworm and other skin diseases. The pounded leaves are applied to cuts and wounds. A leaf-paste with egg albumin is applied as a plaster for fractured bones. A paste made of equal parts of the leaves and seeds are given in jaundice. A leaf extract showed anti-fungal activity against *Curvularia verruculosa* and *Microsporon nanum.* The seeds are official in Japanese Pharmacopoeia. They are used as a stomachic and tonic. A paste of the seeds with lime juice is used for ringworm and other skin diseases. The seeds are used in eye diseases, liver complaints, and earache. A decoction of the seeds is taken as a blood purifier and for the inflammation of the skin.

Marketed Formulations

It is one of the ingredients of the preparation known as Mahamarichadi Tail (Dabur).

CHIRATA

Synonyms

Indian Gentian, Indian Balmony, Chirayta, *Ophelia chirata, Swertia chirayita.*

Biological Source

Chirata consists of the entire herb of *Swertia chirata* Buch-Ham. It contains not less than 1.3% bitter constituent.

Family

Gentianaceae.

Habitat

India, Nepal, and Bhutan.

Macroscopy

It is an annual, about 3 feet high; branching stem, Upper part of the stem is yellow to brown, thinner, and 2 mm broad. The lower part is purplish or brown to dark brown; 6-mm broad cylindrical and exfoliated at some places showing dull wood. Leaves are smooth entire, opposite, very acute, lanceolate dark brown upto 8-cm long, 1.5- to 2-cm broad. Flowers numerous; peduncles yellow; one-celled capsule. Rhizome is angular to 5-cm long, pale yellow to brown in colour and covered with dense scale leaves. Root is primary, 5- to 10-cm long, light brown, oblique somewhat twisted, tapering, longitudinally wrinkled and with transverse ridges. Drug has no odour but taste is very bitter.

Fig. 35.10 *Swertia chirata*

Microscopy

Root

The microscopy presents 2–4 layers of cork; cortex region consists of 4–12 layers of thick-walled, parenchymataous cells with sinuous walls; secondary phloem composed of thin-walled sieve tubes, companion cells, and phloem parenchyma; secondary xylem composed of lignified and thick-walled vessels, parenchyma, tracheids, and xylem fibres; minute acicular crystals present in abundance in secondary cortex and phloem region; resin are also present as dark brown mass in secondary cortex cells.

Leaf

Single-layered epidermis covered with a thick, striated cuticle, and anisocytic stomata; single-layered palisade tissue below the upper epidermis, four to seven layers of loosely arranged spongy parenchyma cells in messophyll, mucilage, and minute acicular crystal are present in mesophyll cells; parenchyma cells contain oil droplets also.

Stem

Single-layered epidermis, externally covered with a thick striated cuticle present in young stem, in older epidermis

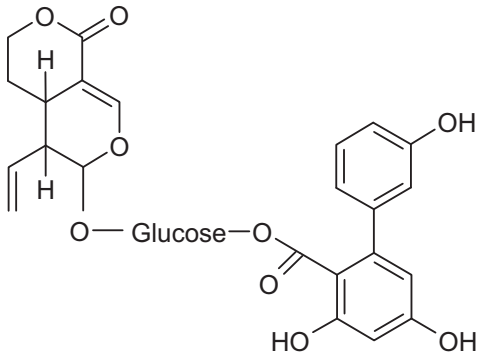
remains intact but cells flattened and tangentially elongated; endodermis distinct, showing anticlinal or periclinal walls, followed by single-layered pericycle consisting of thin-walled cells; cambium, between external phloem and xylem composed of a thin strip of tangentially elongated cells, internal phloem, similar in structure as that of external phloem excepting that sieve tube strand is more widely separated; xylem is continuous and composed mostly of tracheids, a few xylem vessels present; vessels and fibre tracheids have mostly simple and bordered pits and fibres with simple pits on the walls; medullary rays are absent; pith is present in the central part consisting of rounded and isodiametric cells with prominent intercellular spaces; acicular crystals, oil droplets, and brown pigments are also present.

Standards

Foreign matter	Not more than 2%
Total ash	Not more than 8%
Acid-insoluble ash	Not more than 2%
Alcohol-soluble extractive	Not less than 13%
Water-soluble extractive	Not less than 11%

Chemical Constituents

Chirata contains chiritin, gentiopicrin, and amarogentin. Amarogentin is phenol carboxylic acid ester of sweroside a substance related to gentiopicrin. Ophelic acid a noncrystalline bitter substance is present. It also contains gentianine and gentiocrucine.



Amarogentin

Uses

It is an important ingredient in the well-known ayurvedic preparations Mahasudarshan churna and Sudarshan churna used successfully in chronic fever. The whole plant is an extremely bitter tonic digestive herb that lowers fevers and is stimulant. The herb has a beneficial effect on the liver, promoting the flow of bile. It also cures constipation and is useful for treating dyspepsia.

Marketed Formulations

It is one of the ingredients of the preparations known as Diabecon (Himalaya Drug Company), Mehmudgar bati (Baidyanath), Sabaigo (Aimil Company), J.P. Liver syrup (Jaumana Pharma), Fever end syrup (Chirayu), Sage Chirata (Sage Herbals), and Safi (Hamdard Laboratories).

CHITRAK

Synonym

White Lead wort.

Regional Names

Sansk: agni, vahni, hutasa, dahana, hutribhuk, sikhi; Guj: chitrakmula; Hindi: chira, chitrak; Kan: chitramula, vahni, bilichitramoola; Mar: chitraka.

Biological Source

Chitraka consists of dried mature root of *Plumbago zeylanica* Linn.

Family

Plumbaginaceae

Habitat

This herb is found throughout India. It grows wild as a garden plant in all part of India and Ceylon.

Macroscopy

Roots are above 30 cm in diameter, reddish to deep brown in colour, scars of rootlets are present; It has disagreeable odour and acrid in taste.

Fig. 35.11 *Plumbago zeylanica*

Microscopy

Outer cork consists of five to seven rows of cubical to rectangular dark brown cells; cortex consists of two to three rows of thin-walled rectangular. The parenchymatous cells below the cortex region contain starch grains. Phloem fibres are in groups lignified with pointed ends and narrow lumen. Straight medullary rays one to six seriate. Stone cells are absent.

Standards

Foreign matter	Not more than 3%
Total ash	Not more than 3%
Acid-insoluble ash	Not more than 1%
Alcohol-soluble extractive	Not less than 12%
Water-soluble extractive	Not less than 1.2%

Chemical Constituents

Plumbagin.

Uses

Root increases the digestive power and promotes appetite. It is hypoglycaemic, hypolipidaemic, CNS stimulant, and also used in dyspepsia, piles, anasarca, diarrhea, skin diseases, etc.

Marketed Formulations

It is one of the ingredients of the preparations known as J.P. Liver syrup (Jaumana Pharma), Piles care and Mansulate (Chitrayu Company), and Chitrakadi bati Avaleha (Baidyanath).

LODH

Biological Source

It consists of the stem bark of *Symplocos racemosa* Roxb.

Family

Symplocaceae.

Macroscopy

It is an evergreen tree or shrub, 6- to 9-m height, abundant in the plains, and lower hills throughout northern and eastern India, in Himalayas up to 1,400 m, and southwards up to ChotaNagpur. The leaves are dark green above, orbicular, oblong. The flowers are white or yellow, aromatic. The fruits are drupes, purple-black, subcylindrical, smooth; seeds 1–3.

Fig. 35.12 *Symplocos racemosa*

Chemical Constituents

The bark contains oxalic acid, 3-monoglucoside of 7-O-methyl leucopelargonidin, pelargonidin-3-O-glucoside, betulinic, acetyloleanolic, oleanolic, and ellagic acids; flavan glycoside symposide; β-sitosterol, 28-hydroxy-20α-urs-12,18(19)-dien-3β-yl-acetate, 3-oxo-20α-urs-12,18(19)-dien-28-oic, 24-hydroxyolean-12-en-3-one and butelin.

Uses

A yellow dye is extracted from the leaves and bark. Mainly the bark is used as a mordant with other drugs. For dyeing silk yellow, it is used combination with turmeric and *Plecospermum spinosum*. It is one of the ingredients of *abir*, a red powder used during the festival of Holi.

Marketed Formulations

It is one of the ingredients of the preparations known as Evecare, Styplon (Himalaya Drug Company).

GOKHRU

Synonym

Caltrops fruit.

Regional Names

Sansk: goksuraka, trikanta, svadamstra; Guj: bethagokharu, nazagokharu, mithagokhru; Hindi: gokhru; Kan: sannaneggilu, neggilmullu; Mar: sarate, gokharu.

Biological Source

In ayurveda two types of gokhru are used. The smaller or chhota gokhru is the dried ripe seeds of *Tribulus terrestris* Linn.

Family

Zygophyllaceae.

Habitat

The plant is an annual, prostrate herb growing throughout India upto 3,500 m in Kashmir.

Macroscopy

The fruits are yellowish in colour, globose, 1.2 cm in diameter containing five woody, densely hairy, spiny cocci. Large pointed spines are present in each coccus. Two smaller and shorter spines are directed downwards. Several seeds are present in each coccus.

Fig. 35.13 *Tribulus terrestris*

Microscopy

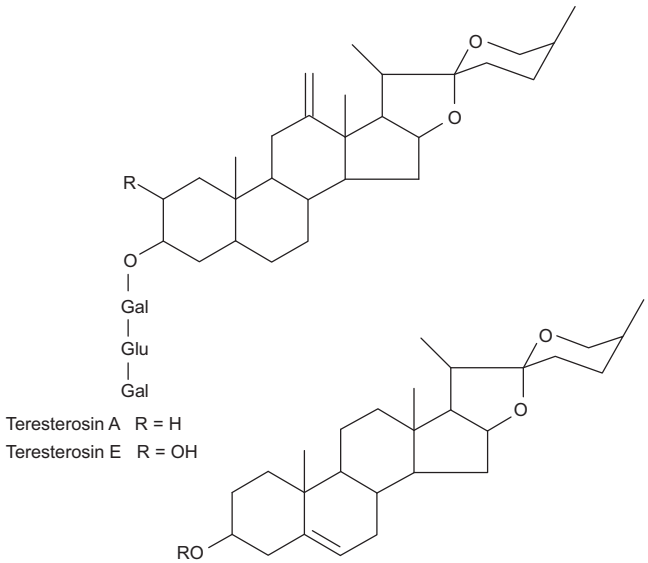
Fruit section shows small rectangular epidermal cells of each coccus. Unicellular trichomes are found on the surface; 6–10 layers of large parenchymatous cells forms mesocarp, next to mesocarp 3–4 compact layers of small cells are present which contains rosette of calcium oxalate crystals.

Standards

Foreign matter	Not more than 2%
Total ash	Not more than 15%
Acid-insoluble ash	Not more than 2%
Alcohol-soluble extractive	Not less than 6%
Water-soluble extractive	Not less than 10%

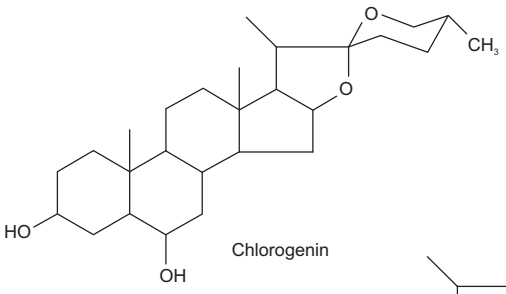
Chemical Constituents

The dried fruits of *T. terstris* consist of steroidal saponins as the major constituents. It includes terestrosins A, B, C, D, and E; desgalactotigonin, F-gitonin, desglucolanatigonin, and gitonin. The hydrolysed extract consists of sapogenins such as diosgenin, chlorogenin, hecogenin, and neotigogenin. Certain other steroidal such as terestroside F, tribulosin, trillin, gracillin, dioscin have also been isolated from the aerial parts of the herb. The flavonoid derivatives reported from the fruits includes tribuloside and number of other glycosides of quercetin, kaempferol, and isorhamnetin. It also consists of common phytosterols, such as, β-sitosterol, stigmasterol, and cinnamic amide derivative, terestiamide.

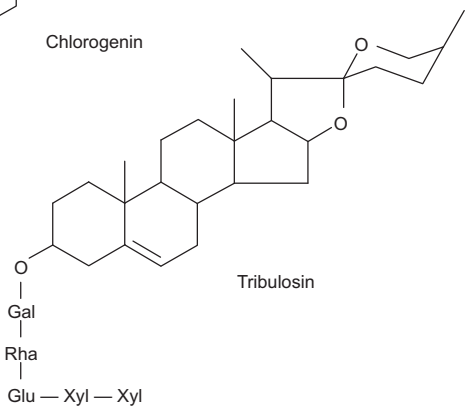


Teresterosin A R = H
Teresterosin E R = OH

Trillin R = Glu
Gracillin R = Glu-Glu-Rha



Chlorogenin



Tribulosin

Uses

The fruit has cooling, anti-inflammatory, anti-arthritic, diuretic, tonic, aphrodisiac properties. It is used in building immune system, in painful micturition, calculus affections, and impotency. It improves and prolongs the duration of erection and also exerts a stimulating effect on reproductary organs.

Marketed Formulations

It is one of the ingredients of the preparations known as Bonnisan, Confido, Himplasia, Renalka (Himalaya Drug Company), Dhatupoushtik churna (Baidyanath), Semento (Aimil), and Body plus capsule (Jay Pranav Ayurvedic Pharmaceuticals).

GUDUCHI

Synonym

Heartleaved Moonseed.

Regional Names

Sansk: anirtavallf, amrta, madlitiparni, guducika, criinnodbhavd; Guj: galac, garo; Hindi: giloe, gurcha; Kan: amrutaballi.

Biological Source

It consists of dried, matured pieces of stem of *Tinospora cordifolia* (Willd.) Miers.

Family

Menispermaceae

Habitat

This herb is a perennial climber found in the Himalayas and in many parts of the South India and Sri Lanka.

Macroscopy

Stem rather succulent with long filiform flesh aerial roots from the branches. It occurs in pieces of varying thickness in market ranging from 0.6 to 5 cm in diameter; young stems are green in colour with smooth surfaces and older ones are light brown in colour, circular lenticels are present on the surface, and is bitter in taste.

Microscopy

The outer cork is differentiated in to two layers, outer layer consists of thick-walled brownish and compressed cells,

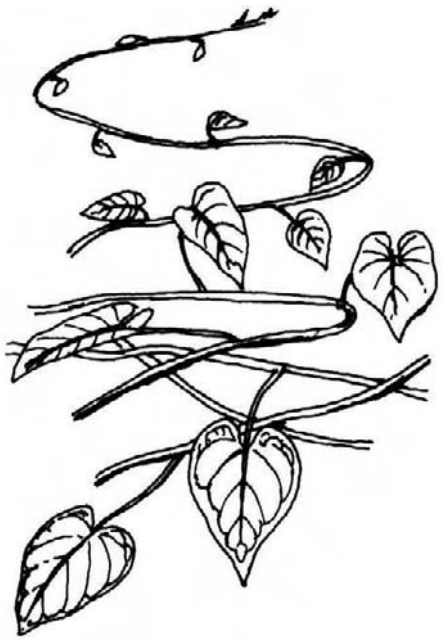


Fig. 35.14 *Tinospora cordifolia*

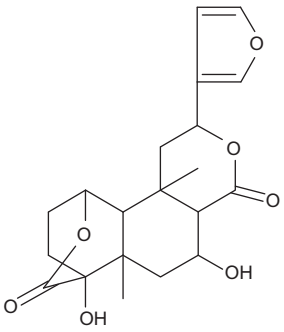
inner layer by thin-walled colourless, tangentially arranged three to four rows of cells; cortex consists of five or more rows of cells, and groups of sclereids are also found in cortex. Cortex cells are filled with plenty of starch grains, simple ovoid, or irregularly ovoid-elllptical, several secretory cells; pericyclic fibres are lignified with wide lumen and pointed ends, associated with a large number of crystal fibres containing a single prism in each chamber; vascular bundles with 15–20 or more cells wide medullary rays are in middle; cambium composed of one to two layers of tangentially elongated cells; central pith composed of large, thin-walled cells mostly containing starch grains.

Standards

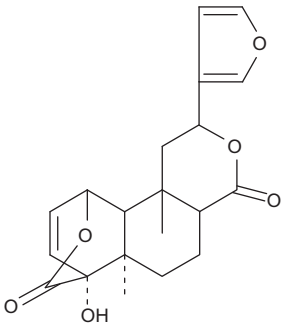
Foreign, matter	Not more than 2%
Total ash	Not more than 16%
Acid-insoluble ash	Not more than 3%
Alcohol-soluble extractive	Not less than 3%
Water-soluble extractive	Not less than 11%

Chemical Constituents

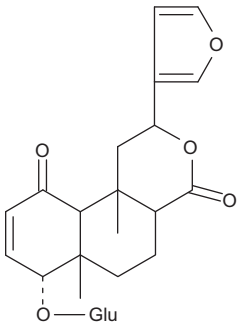
It contains clerodane furanoditerpenes like, columbin, tinosporaside, a lignan, 3,4-bis-(-4-hydroxy-3-methoxy benzyl) tetrahydrofuran and alkaloids like, jactrorhizine, palmatine, berberine, tembeterine. The drug also contains a sesquiterpene glucoside, tinocordifolisoide; phenylpropene disaccharides like, cordifolioside A and B; others include choline, tinosporic acid, tinosporal, tinosporone.



Tinosporoside



Columbin



Tinosporaside

Uses

The drug is used as rejuvinator, hypoglycaemic, immunomodulatory, astringent, antipyretic, blood purifier, antineoplastic, cardiotonic, and antiasthmatic. It is also used in general debility, pyrexia, skin diseases, gout, and rheumatic arthritis.

Marketed Formulations

It is one of the ingredients of the preparations known as Guduchi tablet, Abana, Bonnisan, and Rumalaya (Himalaya Drug Company).

GUGGAL

Synonyms

Gumgugul, Salai-gogil.

Regional Names

Sans: purd, kaugika, palahkas; Guj: gugal, gugar; Hindi: gugal, guggui; kan: kanthagana, guggala; Mar: guggul, mahishaksh.

Biological Source

Guggal is a gumresin obtained by incision of the bark of *Commiphora mukul* (H. and S.) Engl.

Family

Burseraceae.

Habitat

The mukul myrrh (*Commiphora mukul*) tree is a small, thorny plant distributed throughout India.

Collection

Guggal tree is a small thorny tree, 4 to 6 feet tall, branches slightly ascending. It is sometimes planted in hedges. The tree remains without any foliage for most of the year. It has ash-coloured bark, and comes off in rough flakes, exposing the innerbark, which also peels off. The tree exudes a yellowish resin called gum guggul or guggulu that has a balsamic odour. Each plant yields about 1 kg of the product, which is collected in cold season.

Macroscopy

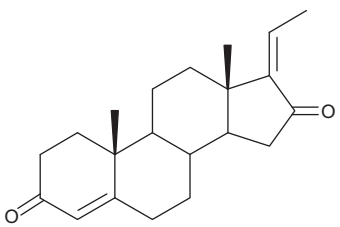
Guggal occurs as viscid, brown tears; or in fragment pieces, mixed with stem, piece of bark; golden yellow to brown in colour. With water it forms a milk emulsion. It has a balsamic odour and taste is bitter, aromatic.

Standards

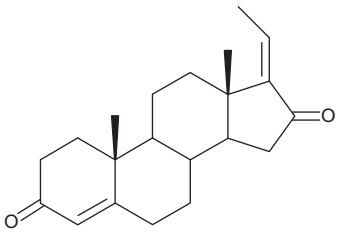
Foreign matter	Not more than 4%
Total ash	Not more then 5%
Acid-insoluble ash	Not more than 1%
Alcohol-soluble extractive	Not less than 27%
Water-soluble extractive	Not less than 53%

Chemical Constituents

Guggal contains gum (32%), essential oil (1.45%), sterols (guggulsterols I to VI, β-sitosterol, cholesterol, Z- and E-guggulsterone), sugars (sucrose, fructose), amino acids, α-camphorene, cembrene, allylcembrol, flavonoids (quercetin and its glycosides), ellagic acid, myricyl alcohol, aliphatic tetrols, etc.



Z-guggulsterone



E-guggulsterone

Uses

Guggal significantly lowers serum triglycerides and cholesterol as well as LDL and VLDL cholesterols (the bad choles-

terols). At the same time, it raises levels of HDL cholesterol (the good cholesterol), inhibits platelet aggregation, and may increase thermogenesis through stimulation of the thyroid, potentially resulting in weight loss. Also gum is astringent, aritirheumatic, antiseptic, expectorant, aphrodisiac, demulcent, and emmenagogue. The resin is used in the form of a lotion for indolent ulcers and as a gargle in teeth disorders, tonsillitis, pharyngitis, and ulcerated throat.

Marketed Formulations

It is one of the ingredients of the preparations known as Arogyavardhini Gutika (Dabur) and Abana, Diabecon, Diakof (Himalaya Drug Company).

KALEJIRE

Synonyms

Small Fennel, Nigella Seed, Black Cumin, Fitch (Biblical), Love in the Mist, Fitches.

Regional Names

Sansk: sthfilajiraka, upakufici, susavi; Guj: kalonji jeeru; Hindi: kalounji, kalaunii, mangaraila; Kan: karijirige; Mar: kalaunji Jire, kalejire.

Biological Source

It consists of seeds of *Nigella sativa* Linn.

Family

Ranunculaceae.

Habitat

Nigella sativa is an annual flowering plant, native to south-west Asia, Africa, and India.

Macroscopy

Seeds are flattened, oblong, angular, funnel shaped, size 0.2 cm. long and 0.1 cm wide, black in colour, slight aromatic odour and bitter in taste.

Microscopy

T.S. of seed shows single layer of thick-walled epidermis covered by cuticle containing reddish-brown content. Epidermis is followed by two to four layers of tangentially elongated, parenchymatous cells. Under this parenchyma cells few layer of cells with reddish brown pigments are seen; endosperm is composed of thick-walled, rectangular to polygonal cells, with oil globules; embryo is embedded in endosperm.

Fig. 35.15 *Nigella sativa*

Standards

Foreign matter	Not more than 2%
Total ash	Not more than 6%
Acid-insoluble ash	Not more than 0.2%
Alcohol-soluble extractive	Not less than 20%
Water-soluble extractive	Not less than 15%

Chemical Constituents

The seeds contain numerous esters of structurally unusual unsaturated fatty acids with terpene alcohols; furthermore, traces of alkaloids are found which belong to two different types: isochinoline alkaloids are represented by nigellimin and nigellimin-N-oxide, and pyrazol alkaloids include nigellidin and nigellicin. The essential oil contains thymoquinone (50%) besides p-cymene (40%), α-pinene (up to 15%), dithymoquinone, and thymohydroquinone. Other terpene derivatives are found only in trace amounts: Carvacrol, carvone, limonene, 4-terpineol, and citronellol. The drug also contains resin, saponin, and tannin.

Uses

It is mainly used in upper respiratory conditions, allergies, coughs, colds, bronchitis, fevers, flu, asthma, and emphysema. It also possesses anti-inflammatory, antihypertensive, anti-diarrhoeal, and hypolipedemic activities.

Marketed Formulations

It is one of the ingredients of the preparations known as Antidandruff shampoo (Himalaya Drug Company) and Kankayan Gutika (Dabur).

KANTAKARI

Synonyms

Kateli, Yellow-berried nightshade.

Biological Source

It consists of the whole plant of *Solanum surattense* Burm. f. (syn. *S. xanthocarpum* Schrad and Wendl.).

Family

Solanaceae.

Habitat

It is very spiny diffuse herb, up to 1.2-m high, found all over India. The leaves are ovate or elliptic, flowers blue, and berries globose, glabrous green.

Chemical Constituents

The berries contain caffeic, chlorogenic, isochlorogenic, and neochlorogenic acids; esculin, esculetin, cycloartanol, cycloartenol, cholesterol, diosgenin, campesterol, cholesterol derivatives, solasodine, solarnargine, β-solamargine, solasonine, solasurine, β-sitosterol and stigmasteryl glucoside. The fruit oil is composed of glycerides of arachidic, linoleic, oleic, palmitic and stearic acids, and solanocarpine. The flowers yield diosgenin, apigenin ,and quercetin glycoside.

Uses

The root is reputed as anti-asthmatic, antiemetic, diuretic, and expectorant, used to prepare an Ayurvedic medicine, *Dasamula.* It is given in asthma, cough, and pain in the chest. A decoction of the root in combination with *Tinospora cordifolia* is useful in cough and fever. The leaves are anodyne. Leaf juice is given with black pepper in rheumatism. The stem, flowers, and fruits are bitter and carminative; useful in burning sensation of the feet accompanied by vesicular watery eruptions. The leaves are applied to relieve pain and leaf juice with black peppers is given in rheumatism. The juice of berries is used in sore throat. The seeds are given as an expectorant in asthma and cough and to relieve toothache. A powder of the berries is mixed with honey and given to children in cough. The plant has alternative, antiasthmatic, aperient, diuretic, digestive, and febrifuge properties and is used to cure bronchitis, cough, constipation, and dropsy. The plant is a part of an ayurvedic formulation *Arkadhi*, which is prescribed in bronchitis, dengue fever, and chest affections. A decoction of the plant is used in gonorrhoea and to promote conception.

Marketed Formulations

It is one of the ingredients of the preparations known as Diakof, Koflet, Chyawanprash (Himalaya Drug Company) and Khadiradi Gutika (Dabur).

LAHSUN

Synonyms

Garlic.

Regional Names

Sansk: rasona, yavanesta; Guj: lasan, lassun; Hindi: lahasun; Kan: balluci; Mar: lasun.

Biological Source

It consists of bulb of *Allium sativum* Linn.

Family

Liliaceae.

Habitat

Europe, Central Asia, United States, and India.

Macroscopy

It is a small plant. The leaves are green, slender, flat, and elongated. The stem is smooth and solid. The bulbs are composed of several bulbils (cloves), enclosed in white skin of the parent bulb. The inflorescence is an umbel initially enclosed in a spathe. Drug occurs either as entire bulb or isolated cloves; bulb is subglobular, 4–6 cm in diameter and consists of 8–20 cloves. The bulb is surrounded by 3–5 whitish papery membranous scales, cloves are irregular, ovoid, tapering at upper end with dorsal convex surface, 2- to 3-cm long, 0.5- to 0.8-cm wide, each cloves surrounded by two very thin papery whitish and brittle scales. Odour is characteristic and aromatic. Aromatic and pungent in taste.

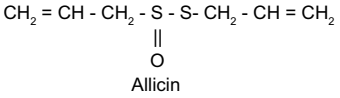
Standards

Foreign matter	Not more than 2%
Total ash	Not more than 4%
Acid-insoluble ash	Not more than 1%
Alcohol-soluble extractive	Not less than 2.5%
Loss on drying	Not less than 60%

Chemical Constituents

The chief active constituent of garlic is volatile oil containing allyl disulphide, alliin, allicin, allyl propyl disulphide, and diallyl disulphide. The drug also contains thio-glycoside,

amino acids, fatty acids, flavonols, vitamins, trace elements, carbohydrates, proteins, mucilage, albumin, etc.



Allicin

Uses

The bulb is used as anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, cholagogue, diaphoretic, diuretic, expectorant, febrifuge, stimulant, stomachic, tonic, and vasodilator. Garlic is also useful for colon cancer, coughs, flatulence, disorders of the nervous system, agues, dropsical affections, pulmonary phthisis, whooping cough, gangrene of the lung, and dilated bronchi, etc.

Marketed Formulations

It is one of the ingredients of the preparations known as Lasuna tablet (Himalaya Drug Company) and Lashunadi bati (Baidyanath).

MALKANGNI

Synonyms

Black-Oil tree, Intellect tree, Climbing-staff plant.

Regional Names

Sans: jyotishmati, kanguni, sphutabandhani, svarnalota; Guj: malkangana, velo; Hin: malkakni, malkamni, malkangni; Mar: kangani, malkangoni.

Biological Source

It consists of seeds and leaves of plant *Celastrus paniculatus* Wild.

Family

Celastraceae.

Habitat

Celastrus paniculata belonging to the genus of woody, climbing shrubs is distributed almost all over the India.

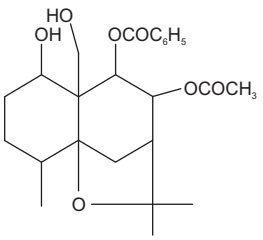
Macroscopy

Leaves simple, alternate, very variable, elliptic, ovate, broadly obovate, glabrous, sometimes pubescent beneath along the venation, up to 6 × 11 cm; base, cuneate, obtuse or rounded, apex acute, acuminate, or obtuse; panicles large, terminal, pubescent; male flowers minute, pale green; calyx lobes suborbicular, toothed; Petals oblong or obovate-oblong, entire; Disk copular; Female flowers having sepals, petals and disk similar to those of male flowers; Capsule subglobose, bright yellow, trivalved, three to six seeded; Seeds ellipsoid, yellowish brown, enclosed in a red fleshy aril. The seeds are bitter in nature.

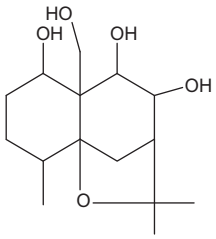
Fig. 35.16 *Celastrus paniculatus*

Chemical Constituents

C. paniculatus seeds contain a number of sesquiterpene polysters namely malkangunins I to VIII and sesquiterpene alkaloids such as celapanine, celapagine, and celapanigine. It also contains about 42–45% of fixed oil. The major fatty acids presents are palmitic, oleic, linoleic, and linolenic. The oil also contain α, α'-dipalmitoylglycerol the unsaponifiable matter (6%) contains phytosterol and celastrol.



Malkangunin



Malkanguninol

Uses

Celastrus panicluata is used in treating mental depression. It is used as an aphrodisiac, as a powerful brain tonic to stimulate intellect, as a stimulant, to increase cognitive recognition (helps with dreams), sharpen memory. It also showed tranquillizing effect. Leaves are emmenagogue.

In folk medicine the seeds are boiled and taken for purification of body and mind through the cleansing of blood. The seeds constitute the drug; they are slightly bitter and hence used almost always with a natural sweetener like Liqourice root (which enhances its effects) or Stevia leaves.

Marketed Formulations

It is one of the ingredients of the preparations known as Iqmen (Lupin Herbal Lab.), Abana, Geriforte, Himcolin, Mentat (Himalaya Drug Company), J.P. Massaj oil, J.P. Painkill oil (Jamuna Pharma), and Syrup Learnol Plus (Dalmia Industries).

METHI

Synonyms

Fenugreek, Greek hay.

Regional Names

Sansk: methini; Guj: methi; Hindi: methi; Kan: menthe, mente.

Biological Source

It consists of dried seeds of *Trigonella foenum-graecum* Linn.

Family

Fabaceae.

Habitat

It is 30- to 60-cm tall; annual herb; grown in India, Europe, Africa, and United States.

Macroscopy

Seeds are oblong or rhomboidalin shape, 0.2- to 0.5-cm long, 0.15- to 0.35-cm broad, dull yellow in colour, surface smooth, very hard; it has a pleasant odour and bitter in taste.

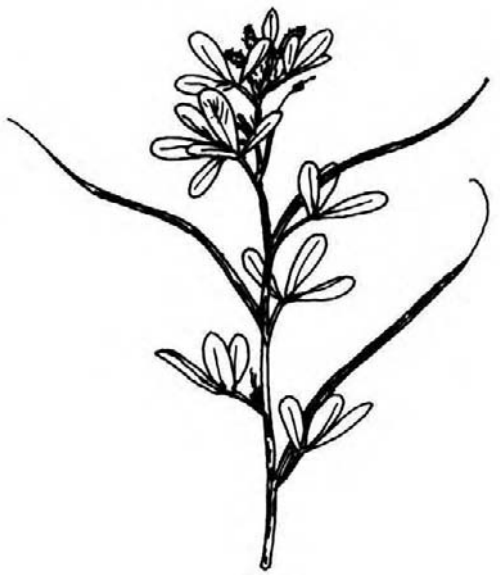


Fig. 35.17 *Trigonella foenum-graecum*

Microscopy

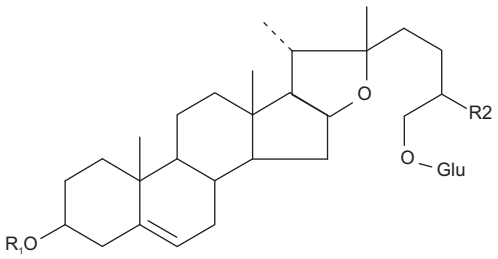
Epidermis covered with thick cuticle followed by four to five layers of tangentially elongated, thin-walled, parenchymatous cells; endosperm consists of a layer of thick-walled cells containing aleurone grains, cotyledons consists of three to four layers of palisade cells varying in size with long axis containing aleurone grains and oil globules. The cells in endosperm contain mucilage.

Standards

Foreign matter	Not more than 2%
Total ash	Not more than 4%
Acid-insoluble ash	Not more than 0.5%
Alcohol-soluble extractive	Not less than 5%

Chemical Constituents

Fenugreek seed contains steroidal saponins as their main chemical constituents. These saponins includes Trigofoenoside A, B, C, D, E, F, and G. The other saponins includes trigonelloside C, yamogenin tetroside B and C, tenugrin B, trigogenin, neotigogenin, yemogenin, diosgenin, and gitogenin. The seeds contains glycosides of diosgenin, that is, graecunins A, B, C, H, I, J, K, L, M, and N. The seed also consists of number of flavonoid compounds such as quercetin, luteolin, vitexin, isovitexin, saponaretin, homoerietin, vicenin-1, and vicenin-2. Fenugreek seed is a rich source of 4-hydroxyisoleucine. Coumarin derivatives, such as trigocoumarin, trigoforin, 4-methyl-7-acetoxycoumarin, and p-coumaric acid, have also been reported from seeds.



	R_1	R_2
Trigofoenoside A	Glu - Rha	$-CH_3$
Trigofoenoside B	Glu - Rha	α-Me
Trigofoenoside C	Glu - Rha - Rha	β-Me
Trigofoenoside D	Glu - Rha - Glu	$-CH_3$
Trigofoenoside E	Glu - Rha - Xyl	$-CH_3$
Trigofoenoside F	Glu - Glu - Rha	CH_3
Trigofoenoside G	Glu - Glu - Rha - Xyl	$-CH_3$

Uses

The seed and leaves are anticholesterolemic, anti-inflammatory, antitumor, carminative, demulcent, emollient,

expectorant, febrifuge, galactogogue, hypoglycaemic, laxative, parasiticide, restorative, and uterine tonic. The seed yields strong mucilage useful in the treatment of inflammation and ulcers of the stomach and intestines. Trigonelline, an alkaloid has shown potential for use in cancer therapy. The seed contains the saponin diosgenin, an important substance in the synthesis of oral contraceptives and sex hormones.

Marketed Formulations

It is one of the ingredients of the preparations known as Dabur Vatika Antidandruff Shampoo (Dabur) and Ayurslim, Geriforte, Immunol (Himalaya Drug Company).

PALAS

Synonyms

Dhak, Bastard teak, Bengal kino tree, Flame of the forest.

Biological Source

It is the whole plant of *Butea monosperma* (Lam.) Tomb; syn. *B. frondosa* Koenig ex Roxb.

Family

Papilionaceae.

Habitat

It is commonly found throughout India, except in the arid regions; in Burma, outer Himalayas up to 1,008 m and Sri Lanka.

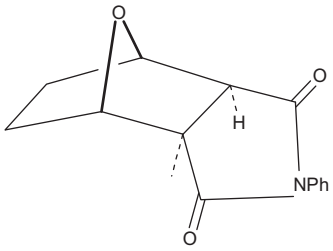
Macroscopy

The plant is a deciduous tree with crooked trunk, up to 15 m in height; bark bluish grey or light brown; branches irregular; leaves long-petioled, three-foliolate, leaflets coriaceous, obovate, from a cuneate base, glabrescent above, densely finely silky below; flower buds dark brown, flowers bright orange-red, sometimes yellow, in 15 cm long racemes on bare branches; pods pendulous, silky tomentose, containing one seed at the apex, reticulately veined; seeds flat, reniform.

Chemical Constituents

Butea gum contains leucocyanidin, its tetramer, procyanidin, gallic acid, riboflavin, and thiamine. The flowers contain flavonoid glycosides, butin, butein, butrin, isobutrin, palasitrin, coreopsin, isocoreopsin (butin-7-glucoside), isomonospermoside, sulfurein, palasitrin, chalcone, aurones; β-sitosterol, 4-carbomethoxy-3,6-dioxo-5-hydro-1,2,4-triazine, fructose, and amino acids. The aqueous extract of the flowers contains mainly chalcone and isobutrin. The unsaponifiable matter consists mainly of myricyl alcohol and β-sitosterol. The fatty acids isolated from the wax are palmitic, stearic, arachidic, behenic, lignoceric, and cerotic acids. Palasimide is present in pods.

Fig. 35.18 *Butea monosperma*



Palasimide

Uses

The hot alcoholic extract of the seeds showed significant anti-implantation and anti-ovulatory activity in rats and rabbits, respectively. The alcoholic extract of the seeds inhibits the growth of *Escherichia coli* and *Micrococcus pyogenes* var. *aureus*. A crude, saline extract (0.9%) of the seeds agglutinates the erythrocytes in experimental animals. The glycosides palasitrin and butrin reduced the number of implants in the mated rats. The seed oil showed a marked and prolonged fall in the blood pressure in animals. The seeds given orally are effective in roundworm and threadworm infections but ineffective in case of tapeworm. The side effects observed as nausea, vomiting, dizziness, general weakness, and in pain in the abdomen. The extracts of the seeds and seed coat administered daily from day one postcoitum for 10 days prevented pregnancy in female rats. The fruits possess anthelmintic property. They are used

in abdominal problems, eye diseases, inflammation, piles, skin diseases, tumours, and urinary discharges. The ether, alcoholic, and aqueous extracts of flowers showed anti-estrogenic activity in mice. A fraction containing sodium salt of phenolic constituents, isolated from the bark, is a potent anti-asthmatic agent. They are active against the fungus *Helminthosporium sativum.* An alcoholic solution of the petals showed anti-estrogenic activity in mice. A decoction of the flowers is given in diarrhoea and to puerperal women. The aqueous extract of the flowers shows significant anti-implantation activity in rats. Flower extract exhibited anti-hepatotoxic activity.

Marketed Formulations

It is one of the ingredients of the preparations known as Lukol (Himalaya Drug Company) and J.P. Nikhar oil (Jamuna Pharma).

PUNARNAVA

Synonym

Hog Weed.

Regional Names

Sansk: punarnava, gophaghni, gothaghni; Guj: dholisaturdi, motosatodo; Hindi: punarnava; Kan: sanadika, kommeberu, komma; Mar: ghetuli, vasuchimuli, satodirnula, punarnava, khaparkhuti.

Biological Source

Punarnava consists of fresh as well as dried whole plant of *Boerhaavia diffusa* Linn.

Family

Nyctaginaceae.

Habitat

The plant is a weed found throughout India and Sri Lanka during rainy season.

Macroscopy

Stem is greenish purple in colour, slender, stiff, cylindrical, swollen at nodes, minutely pubscent or nearly glabrous. Roots are long, cylindrical, 0.2–1.5 cm in diameter; Yellowish brown to brown in colour, longitudinal striations and root scars on surface; short fracture, odourless and bitter in taste. Leaves are opposite, larger ones 2.5- to 3.5-cm long and smaller ones are 1.2-to 1.8-cm long, ovate-oblong, apex rounded, or slightly pointed, base subcordate, glabrous on upper, entire margin. Flowers are very small and white or pink in colour. Two chief varieties are described based on the flower colour, one with white flowers is 'Sweta Punarnava' while the other with red flowers is referred to as 'Rakta Punarnava'. Fruits are 6-mm long, rounded with one seed.

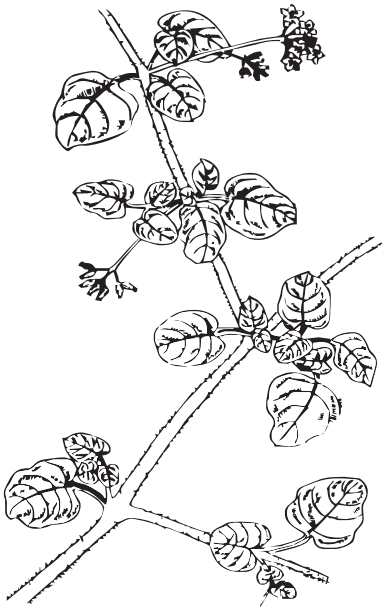


Fig. 35.19 *Boerhaavia diffusa*

Microscopy

Stem

T.S shows epidermal layer containing multicellular uniseriate glandular trichomes consisting of 9–12 cells, cortex consists of 1–2 layers of parenchyma; endodermis indistinct; 1–2 layered pericycle, isolated fibres; small vascular bundles joined together in a ring and many big vascular bundles scattered in the ground tissue, cambium is also present.

Roots

Cork is composed of thin-walled elongated cells with brown walls in the outer few layers. Cork cambium consists of 1–2 layers of thin-walled cells. Cortex is composed of 5–12 layers of thin-walled polygonal cells; central regions of root are occupied by primary vascular bundles; moreover, numerous raphides of calcium oxalate crystals are also present. Simple starch grains and fibres are abundant in cortex region.

Leaves

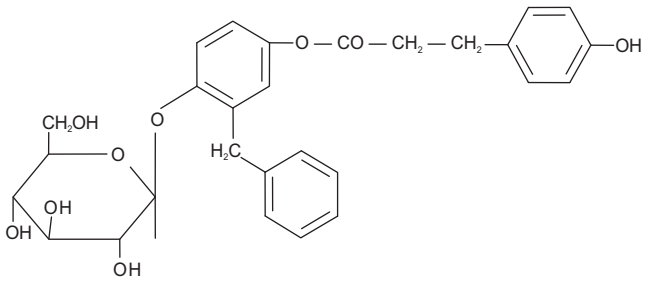
Epidermis contains anomocytic stomata on both sides and glandular trichomes three- to four-celled, single layer of palisade parenchyma; loosely arranged spongy parenchyma two to four layers; cluster type of calcium oxalate crystals and orange red resinous matter are present in mesophyll.

Standards

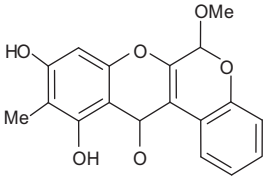
Foreign matter	Not more than 2%
Total ash	Not more than 15%
Acid-insoluble ash	Not more than 6%
Alcohol-soluble extractive	Not less than 1%
Water-soluble extractive	Not less than 4%

Chemical Constituents

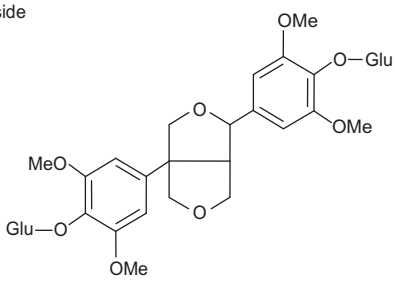
Punarnava contains a phenolic glycoside punarnavoside upto 0.03–0.05%. It also shows the presence of rotenoids, such as, boeravinones A, B, C, D, and E. Lignan derivatives such as liridodendrin and syringaresinol mono-β-D-glucosides have been reported. The root contains a purine nucleoside-hypoxanthine-9-arabinofuranoside and boeravine, ursolic acid, and β-sitosterol. The root also contains an insect moulding hormone, β-ecdysone.



Punarnavoside



Boeravinone A



Liridodendrin

Uses

Punarnava possess potent antifibrinolytic, anti-inflammatory, and diuretic properties. Punarnavoside has been found to be responsible for antifibrinolytic activity. Punarnava is a very useful drug for the treatment of inflammatory renal diseases and nephritic syndrome. It is also recommended for the treatment of IUD menorrhagia. Plant extract also shows hepatoprotective activity and is effective in cases of oedema and ascites resulting from early cirrhosis of liver and chronic peritonitis. Liridodendrin and hypoxanthine-9-arabinofuranoside exhibits, antihypertensive activity, the former being a Ca^{2+} channel antagonist. Root extract on oral administration was found to stop intrauterine contraceptive device-induced bleeding in experimental animals. The whole herb in the form of juice is given internally as a blood purifier. It is eaten as a vegetable in curries and soups.

Marketed Formulations

It is one of the ingredients of the preparations known as Deepact (Lupin Herbal Lab.), Abana, Immunol, Diabecon (Himalaya Drug Company), Punarnawadi, Guggulin, Punarnavarista (Baidyanath), Sobigol (Aimil), and Painkill oil, J.P. Liver syrup (Jamuna Pharma).

RASANA

Biological Source

It consists of the whole plant of *Pluchea lanceolata* (DC) Clarke.

Family

Asteraceae.

Habitat

It is found in the saline or sandy soil of Punjab, Rajasthan and Gangetic plain, and in Delhi as a weed.

Macroscopy

It is an erect undershrub, 30-to 60-cm tall; stem and branches terete, gray-pubescent. Leaves sessile, coriaceous, oblanceolate, obtuse, narrowed at the base, entire. Flower heads in compound corymbs, white, yellow lilac, or purple.

Fig. 35.20 *Pluchea lanceolata*

Chemical Constituents

The leaves of *P. lanceolata* contain quercetin, moretenol, its acetate, neolupenol, isorhamnetin, and quercitrin. The flowers yield pluchine, sorghumol acetate, moretenol, its acetate, stigmasterol, neolupenol, cycloart-23-en-3β,25-diol, β-sitosterol-D-glucoside, nonacosane, heptacosane, hentriacontane, and octacosane.

Uses

The herb possesses analgesic, antipyretic, laxative, and nervine tonic properties. A decoction of the plant is used in bronchitis and inflammation. In Tibet, the drug is used to treat asthma, cough, hiccough, poisoning, and diseases caused by *vayu*. The leaves are substituted for senna leaves.

Marketed Formulations

It is one of the ingredients of the preparations known as Ashwagandharishta, Rheumatil tablet (Dabur).

SHATAVARI

Synonym

Asparagus.

Regional Names

Sansk: narayani, vari, abhiru, atirasa; Guj: satavari; Hindi: satavar, satamul; Kan: ashadi poeru, halavu bau, narayani, makkala; Mar: shatavari.

Biological Source

The drug is derived from dried tuberous roots of *Asparagus racemosus* Willd.

Family

Liliaceae.

Habitat

The plant is a climber growing to 1–2 m in length found all over India.

Macroscopy

The leaves are like pine-needles, small, and uniform. The inflorescence has tiny white flowers, in small spikes. The roots are finger-like and clustered. The roots are cylindrical, fleshy raberous, straight or slightly curved, tapering towards the base and swollen in the middle; white to colour, 5–15 cm in length, and 1- to 2-cm diameter, irregular fracture, longitudinal furrows and minute transverse wrinkles on upper surface, and is bitter in taste.

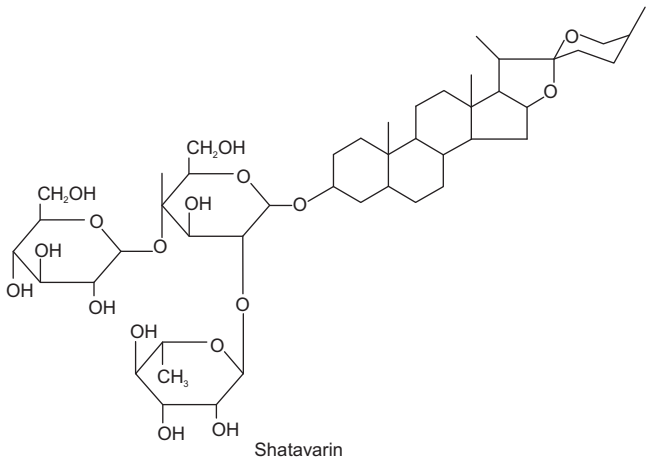
Fig. 35.21 *Asparagus racemosus*

Standards

Foreign matter	Not more than 1%
Total ash	Not more than 5%
Acid-insoluble ash	Not more than 5%
Alcohol-soluble extractive	Not less than 10%
Water-soluble extractive	Not less than 45%

Chemical Constituents

The active constituents are steroidal saponins, such as, Shatavarin I-IV (0.1—0.2%). The aglycone unit is sarsapogenin. In shatavarin I three glucose and one rhamnose molecules are attached whereas shatavarin IV possesses two glucose and one rhamnose molecules. The other compounds isolated from *A. racemosus* are β-sitosterol, stigmasterol, their glycosides, sarsasepogenin, spirostanolic acid, furostanolic saponins, 4,6-dihydroxy-2-O-(2'-hydroxy-isobutyl) benzaldehyde, undecanyl cetanoate and polycyclic alkaloid asparagamine A.



Shatavarin

Uses

The root is alterative, antispasmodic, aphrodisiac, demulcent, diuretic, galactogogue, and refrigerant. It is taken internally in the treatment of infertility, loss of libido, threatened miscarriage, menopausal problems, hyperacidity, stomach ulcers, and bronchial infections. Externally it is used to treat stiffness in the joints. The root is used fresh in the treatment of dysentery.

Marketed Formulations

It is one of the ingredients of the preparations known as K.G. Tone (Aimil), Menosan, Diabecon, Galactin, Abana (Himalaya Drug Company), Dhatuposhtik churna, Rhuma oil, Brahmi Rasayan, Mahanarayan tel (Baidyanath), J.P. Massaj oil, Pain-kill oil (Jamuna Pharma), Memoplus, Jeevani malt (Chirayu), and Satavari kalp and Satavarex granules (Zandu).

SHANKHPUSHPI

Synonym

Sankhapushpi.

Regional Names

Sansk: sankhapushpi; Guj: shankhavali; Hindi: sankhapushpl; Kan: bilikantlsoppu, shankhapushpl; Mar: shankhavela, sanklmhull, sankhapuspi.

Biological Source

Shankhpushpi consists of the whole aerial parts of *Convolvulus pluricaulis* Choisy.

Family

Convolvulaceae.

Habitat

The plant grows wildly in plains of India.

Macroscopy

Root

1- to 5-cm long, 0.1-to 0.4-cm thick, yellowish-brown to light brown in colour.

Stem

Slender, light green, cylindrical in shape, about 0.1 cm or less in thickness with clear hair nodes and internodes.

Leaf

Shortly petiolate, linear-lanceolate, acute apex, hairy on both surfaces; 0.5- to 2-cm long and 0.1-to 0.5-cm broad, light green in colour.

Flowers

White or pinkish in colour.

Fruit

Oblong globose with caraceous, pale brown pericarp.

Seed

Brown in colour, minutely puberulous.

Fig. 35.22 *Convolvulus pluricaulis*

Microscopy

Root

Outer cork composed of 10–15 layers of tangentially elongated thick-walled cells, cortex composed of 6–10 layers of oval to elongated, elliptical, parenchymatous cells. Yellowish-brown tanniniferous, secretory cells are present in cortex region; phloem is composed of sieve elements, phloem parenchyma, and phloem rays; xylem consisting of usual elements; medullary rays are 1–3 cells wide and multicellular in length; starch grains are also present.

Stem

Single-layered epidermis, covered with thick cuticle and contains unicellular hairs. Cortex is divided in two zones, two to three upper collenchymatous and one to two lower parenchymatous layers; pericycle present in the form of single strand of fibres in endodermis; phloem mostly composed, of sieve element and parenchyma; xylem consists of vessels fibres and parenchyma; medullary rays and tacheids are not distinct and in centre slightly lignified pith is seen.

Leaf

Single-layered epidermis is covered with thick cuticle, unicellular covering trichomes. Epidermis followed by

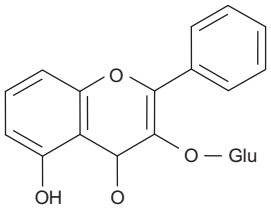
two to three layers of chlorenchymatous cells; two layered palisade cells below epidermis in mesophyll region, spongy parenchyma four to five layered, vascular bundles bicollateral composed of usual elements of phloem and xylem, rest of tissue between chlorenchyma and vascular bundles composed of four to five layers of parenchymatous cells.

Standards

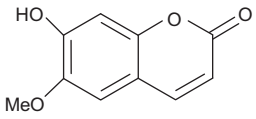
Foreign matter	Not more than 2%
Total ash	Not more than 17%
Acid-insoluble ash	Not more than 8%
Alcohol-soluble extractive	Not less than 6%
Water-soluble extractive	Not less than 10%

Chemical Constituents

The chief constituent of the drug is an alkaloid known as shankhpushpine. The drug also contains flavonoids and coumarin derivatives. Flavonoids include kaempferol, kaempferol-3-glucosides. 6-Methoxy-7-hydroxy coumarin has been reported from the plant. Various long-chain fatty alcohols such as *n*-hexacosanol, *n*-octacosanol, *n*-triacontanol, and dotriacontanol are also present. It also contains 3,4-dihydroxycinnamic acid, β-, and ε-sitosterols and sugars like glucose, rhamnose, and sucrose.



Kaempferol-3-O-glucoside



6-Methoxy-7-hydroxycoumarin

Uses

The drug is used as a brain tonic, anti hypertensive, and as tranquillizer. The plant is used as a vegetable in northern India. The fresh juice is used as a nervine tonic in case of epilepsy, insanity, and nervous debility. It has been reported to improve memory. The possible potentiation of cognitive process by *C. pluricaulis* is reported to be due to the increased supply of proteins to hippocampus, thus enhancing the learning process. It also reduces spontaneous motor activity and reduces fighting response.

The aerial parts of *Canscora decussata* family Gentianaceae is used as a substitute for shunkhpushpi in Karnataka and Konkan region in India. It consists of xanthone derivatives, triterpenoids, and bitter substances. *Chitoria ternate* family Papilionaceae is a plant with blue colours which is used in Kerala as shunkhpushpi.

Marketed Formulations

It is one of the ingredients of the preparations known as Mentat, Anxocare (Himalaya Drug Company), Shankhapushpi syrup (Baidyanath), and Shankhpushpi churna (Shantikunj Pharmacy).

TULSI

Synonyms

Holi Basil, Sacred basil.

Regional Names

Sans: surasa, suresam sahumaniari, bhutaghni; Guj: tulsi, tulsi; Hindi: tulasi; Kan: tulasi, sritulasi; Mar: tulasi.

Biological Source

It consists of the dried leaves of *Ocimum sanctum* Linn.

Family

Labiatae.

Habitat

This herb has been known from as early as the Vedic period. The plant is cultivated throughout India especially in Hindu houses and temples for worship of gods and goddesses. It has widely grown throughout the world.

Fig. 35.23 *Ocimum sanctum*

Macroscopy

Tulsi is an annual herb, grows 30-to 75-cm height. The stems are branched, generally purplish in colour, and covered with soft hairs. Leaves are oblong, obtuse or acute,

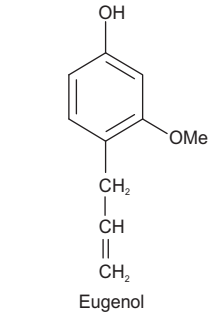
margin entire or serrate, 2-to 5-cm long, 1.5-to 14-cm wide, petiole slender 1.3-to 2.5-cm long, pubescent on both sides. Seeds sub globose, brown or red in colour with mucilaginous outer covering slightly notched at the tip and broadly rounded at the base; odourless; taste, slightly pungent and mucilaginous.

Standards

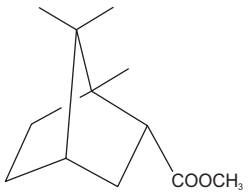
Foreign matter	Not more than 2%
Total ash	Not more than 8%
Acid-insoluble ash	Not more than 2%
Alcohol-soluble extractive	Not less than 4%

Chemical Constituents

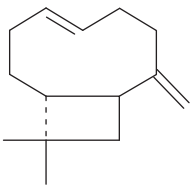
Leaves contain volatile oil 0.4–0.8% containing chiefly eugenol 21% and β-caryophyllene 37% (eugenol content reaches maximum in spring and minimum in autumn) sesquiterpenes and monoterpenes like, bornyl acetate, β-elemene, methyleugenol, neral, β-pinene, camphene, α-pinene, etc. It also contains ursolic acid, campesterol, cholesterol, stigmasterol, β-sitosterol, and methyl esters of common fatty acids.

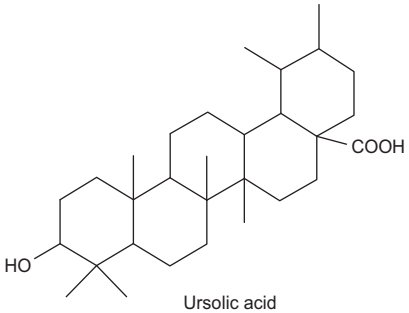


Eugenol



Bornyl acetate


Caryophylline



Ursolic acid

Uses

The leaves are used as aromatic, carminative, stimulant, and flavouring agent. Leaves have hypoglycaemic, immunomodulatory, antistress, analgesic, antipyretic, anti-inflammatory, antiulcerogenic, antihypertensive, CNS depressant, radioprotective, antitumor, antibacterial, expectorant, diaphoretic, antiperiodic, anticatarrhal, antiseptic, and spasmolytic properties and are used in bronchitis, cold, cough, fever, and in gastric disorders. Seeds are demulcent and used in genitourinary disorders. It is also used in scorpion sting and snakebite.

Marketed Formulations

It is one of the ingredients of the preparations known as Respinova (Lupin Herbal Lab.), Abana, Diabecon, Diakof, Koflet, Tulsi Pure Herb (Himalaya Drug Company), Amylcure (Aimil), Nomarks cream (Nyle Herbals), Sualin (Hamdard) and Kofol syrup (Charak Pharma).

TYLOPHORA

Synonyms

Anantmul, *Tylophora asthmatica* W. and A.

Biological Source

The drug consists of dried leaves and roots of *Tylophora indica* Burm f.

Family

Asclepiadaceae.

Habitat

Tylophora is a perennial climbing plant native to the plains, forests, and hills of southern and eastern India.

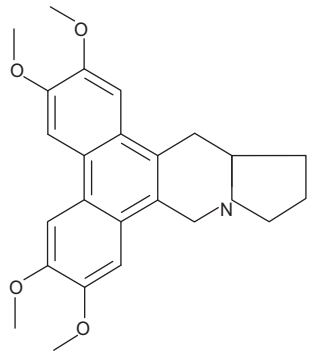
Macroscopy

Leaves, ovate, or ellipticoblong shape, acute or acuminate apex, cordate base, 5-to 10-cm long, 2.5-to 5.3-cm wide, glabrous, pubescent beneath. The whole part of the plant is pale yellow-brown in colour and devoid of odour but has a sweetish and subsequent acrid taste.

Fig. 35.24 *Tylophora indica*

Chemical Constituents

The active constituents are phenanthroindolizidine alkaloids like tylophorine, tylophorinine, tylophorinidine, and septicine. The plant also contains a phytosterol (cetyl alcohol, wax, resin, pigments, tannin, glucose, calcium salts, potassium chloride, α-amyrin, and flavonoids like quercetin, kaempferol, and tyloindane.



Tylophorine

Uses

The dried leaves are used in the treatment of bronchial asthma, bronchitis, rheumatism, and dermatitis. It is also used as emetic, diaphoretic, anti-inflammatory, antibacterial, and expectorant. The roots have stimulant, emetic, cathartic, expectorant, stomachic, antidysentery, antidiarrhoeal, and diaphoretic properties.

Marketed Formulations

It is one of the ingredients of the preparation known as Geriforte Aqua (Himalaya Drug Company).

VIDANG

Synonym

False black pepper.

Regional Names

Sansk: jantughna, krmighna, vella, krmihara; Guj: vavding, vavading, vayavadang; Hindi: vayavidanga, bhabhiranga; Kan: vayuvidanga, vayuvilanga; Mar. vavading, vavding.

Biological Source

Vidang consists of dried ripe fruits of *Embelia ribes* Burm.

Family

Myrisinaceae.

Habitat

These climbing herbs are found in India, Central and lower Himalayas, Sri Lanka, Burma, South China, and Singapore.

Macroscopy

Fruits are globular to subglobular, brownish black, 24 mm in diameter, style at apex, often short, thin pedicel, and persistent calyx with usually three or five sepals present; pericarp brittle enclosing a single seed covered by a thin membrane; seed, reddish in colour and covered with yellowish spots, aromatic odour, astringent in taste.

Fig. 35.25 *Embelia ribes*

Microscopy

Fruit T.S. shows epicarp consisting of single row of tabular cells of epidermis with wrinkled cuticle; mesocarp consists of a number of layers of reddish brown-coloured cells and numerous fibre vascular bundles. Mesocarp and endodermis composed of stone cells; endodermis consisting of single-layered, thick-walled large, palisade like stone cells; seed coat is composed of two- to three-layered reddish brown-coloured cells; the cells in endosperm are irregular in shape and thick walled, containing fixed oil and proteinous masses; mesocarp contains few prismatic crystals of calcium oxalate and a small embryo is seen.

Standards

Foreign matter	Not more than 2%
Total ash	Not more than 6%
Acid-insoluble ash	Not more than 1.5%
Alcohol-soluble extractive	Not less than 10%
Water-soluble extractive	Not less than 9%