THE AYURVEDIC PHARMACOPOEIA OF INDIA

PART- I

VOLUME – IV

GOVERNMENT OF INDIA

MINISTRY OF HEALTH AND FAMILY WELFARE

DEPARTMENT OF AYUSH

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CONTENTS

Appendix-1

1.1 Apparatus for Tests and Assays

1.1.1-Nessler Cylinder.
1.1.2-Sieves
1.1.3-Thermometers
1.1.4-Volumetric Glassware
1.1.5- Weights and Balances

Appendix-2

2.1 Testing Drugs

2.1.1- Systematic Study of Crude Drugs
2.1.2- Microscopic methods of Examining Crude Vegetable Drugs
2.1.3- Types of Stomata
2.1.4-Determination of Stomatal Index
2.1.5-Determination of Palisade Ratio
2.1.6-Determination of Vein –Islet Number
2.1.7-Determination of Stomatal Number

2.2 Determination of Quantitative Data of Vegetable Drugs

2.2.1 - Sampling of drugs
2.2.2 - Foreign Matter and Determination of Foreign matter
2.2.3 - Determination of Total Ash
2.2.4 - Determination of Acid Insoluble Ash
2.2.5 - Determination of Water Soluble Ash
2.2.6 - Determination of Alcohol soluble Extractive
2.2.7 - Determination of Water Soluble Extractive
2.2.8 - Determination o of Ether Soluble Extractive (Fixed Oil Content)
2.2.9 - Determination of Moisture Content (Loss on Drying)
2.2.10 - Determination of Volatile Oil in Drugs
2.2.11 - Special Processes used in Alkaloidal Assays
2.2.11-a - Continuous Extraction of Drugs
2.2.11-b - Tests for Complete Extraction of Alkaloids
2.2.12 - Thin Layer Chromatography (TLC)

2.3 Limit Tests

2.3.1- Limit Test for Arsenic
2.3.2-Limit Test for Chlorides
2.3.3-Limit Test for Heavy Metals
2.3.4-Limit Test for Iron
2.3.5 - Limit Test for lead
2.3.6-Sulphated Ash
2.3.7-Limit Test for Sulphates

LEGAL NOTICES

In India there are laws dealing with drugs that are the subject of monographs which follow. These monographs should be read subject to the restrictions imposed by these laws wherever they are applicable.

It is expedient that enquiry be made in each case in order to ensure that the provisions of the law are being complied with.

In general, the Drugs & Cosmetics Act, 1940 (subsequently amended in 1964 and 1982), the Dangerous Drugs Act, 1930 and the Poisons Act, 1919 and the rules framed thereunder should be consulted.

Under the Drugs & Cosmetics Act, the Ayurvedic Pharmacopoeia of India (A.P.I.), Part-I, Vol. IV, is the book of standards for single drugs included therein and the standards prescribed in the Ayurvedic Pharmacopoeia of India, Part-I, Vol. IV would be official. If considered necessary these standards can be amended and the Chairman of the Ayurvedic Pharmacopoeia Committee authorised to issue such amendments. Whenever such amendments are issued the Ayurvedic Pharmacopoeia of India, Part-I, Vol. IV, would be deemed to have been amended accordingly.

GENERAL NOTICES

Title - The title of the book is "Ayurvedic Pharmacopoeia of

Name of the Drugs - The name given on the top of each monograph of the drug is in Sanskrit as mentioned in the Ayurvedic classics and/or in the Ayurvedic Formulary of India , Part-I and Part-II will be considered official. These names have been arranged in English alphabetical order. The Latin name (taxonomical nomenclature) of each drug as found in authentic scientific literature has been provided in the monograph in the introductory paragraph. The official name will be the main title of the drug and its scientific name will also be considered as legal name.

Introductory Para - Each monograph begins with an introductory paragraph indicating the part, scientific name of the drug in Latin with short description about its habit, distribution and method of collection, if any.

Synonyms - Synonyms of each drug appearing in each monograph in Sanskrit, English, Hindi, Urdu and other Indian regional languages have been mentioned as found in the classical texts, Ayurvedic Formulary of India, Part-I and Part-II as procured from the experts, scholars of Ayurveda and officials in the field from different states.

Italics - Italic type has been used for scientific name of the drug appearing in the introductory paragraph of each monograph as also for chemicals and reagents, substances or processes described in Appendix.

Odour and Taste - Wherever a specific odour has been found it has been mentioned but the description as 'odourless' or 'no odour' has in many cases been avoided in the description, as large numbers of drugs have got no specific odour. The "odour" is examined by directly smelling 25 g of the powdered drug contained in a package or freshly powdered. If the odour is discernible the sample is rapidly transferred to an open container and re-examined after 15 minutes. If the odour persists to be discernible, it is described as having odour.

The "Taste" of a drug is examined by taking a small quantity of 85 mesh powder by a tip of moist glass rod and applying it on tongue previously rinsed with water. This may not be done in case if poisonous drugs, indicated in monograph.

Mesh Number - Wherever the powdering of the drug has been required the sieve "Mesh Number 85" has been used. This will not apply for drugs containing much oily substance.

Weights and Measures - The metric system of weights and measures is employed. Weights are given in multiples or fractions of a gramme (g) or of a milligram (mg). Fluid measures are given in multiples or fractions of millilitre (ml).

When the term "drop" is used, the measurement is to be made by means of a tube, which delivers in 20 drops 1 gram of distilled water at 15°C.

Metric measures are required by the Pharmacopoeia to be graduated at 20°C and all measurements involved in the analytical operations of the Pharmacopoeia are intended, unless otherwise stated to be made at that temperature.

Identity, Purity and Strength - Under the heading "Identification" tests are provided as an aid to identification and are described in their respective monographs.

The term "Foreign Matter" is used to designate any matter, which does not form part of the drug as defined in the monograph. Vegetable drugs used as such or in formulations, should be duly identified and authenticated and be free from insects, pests, fungi, micro-organisms, pesticides, and other animal matter including animal excreta, be within the permitted and specified limits for lead, arsenic and heavy metals, and show no abnormal odour, colour, sliminess, mould or other evidence of deterioration.

The quantitative tests e.g. total ash, acid-insoluble ash, water-soluble ash, alcohol-soluble extractive, water- soluble extractive, ether-soluble extractive, moisture content, volatile oil content and assays are the methods upon which the standards of Pharmacopoeia depend. The methods for assays are described in their respective monographs and for other quantitative tests, methods are not repeated in the text of monographs but only the corresponding reference of appropriate appendix is given. The analyst is not precluded from employing an alternate method in any instance if he is satisfied that the method, which he uses, will give the same result as the Pharmacopoeial Method. In suitable instances the methods of microanalysis, if of equivalent accuracy, may be substituted for the tests and assays described. However, in the event of doubt or dispute the methods of analysis of the Pharmacopoeia are alone authoritative.

Limits for Heavy Metals – All Ayurvedic Drugs (Single/Compound formulation) must comply with the limits for Heavy Metals prescribed in individual Monograph and wherever limit is not given then they must comply with the limits given in WHO publication "Quality Control Methods for Medicinal Plants and Material".

Standards - For statutory purpose, statements appearing in the API, Part-I, Vol. V, under Description, those of definition of the part and source plants, and Identity, Purity and Strength, shall constitute standards.

Thin Layer Chromatography (T.L.C.) - Under this head, wherever given, the number of spots and Rf values of the spots with their colour have been mentioned as a guide for identification of the drug and not as Pharmacopoeial requirement. However, the analyst may use any other solvent system and detecting reagent in any instance if he is satisfied that the method which he uses, even by applying known reference standards, will give better result to establish the identity of any particular chemical constituent reported to be present in the drug.

Quantities to be weighed for Assays and Tests - In all description quantity of the substance to be taken for testing is indicated. The amount stated is approximate but the quantity actually used must be accurately weighed and must not deviate by more than 10 per cent from the one stated.

Constant Weight - the term "Constant Weight" when it refers to drying or ignition means that two consecutive weighings do not differ by more than 1.0 mg per g of the substance taken for the determination, the second weighing following an additional hour of drying on further ignition.

Constituents - Under this head only the names of important chemical constituents, groups of constituents reported in research publications have been mentioned as a guide and not as pharmacopoeial requirement.

Percentage of Solutions - In defining standards, the expression per cent (%), is used, according to circumstances, with one of the four meanings given below.

Per cent w/w (percentage weight in weight) expresses the number of grammes of active substance, in 100 grammes of product.

Per cent w/v (Percentage weight in volume) expresses the number of grammes of active substance in 100 millilitres of product.

Per cent v/v (percentage volume in volume) expresses the number of millilitres of active substance in 100 millilitres of product.

Per cent v/w (percentage volume in weight) expresses the number of millilitres of active substance in 100 grammes of product.

Percentage of alcohol - All statements of percentage of alcohol (C_2H_5OH) refer to percentage by volume at 15.56 °C.

Temperature - Unless otherwise specified all temperatures refer to centigrade (celsius), thermometric scale.

Solutions - Unless otherwise specified in the individual monograph, all solutions are prepared with purified water.

Reagents and Solutions - The chemicals and reagents required for the test in Pharmacopoeia are described in Appendices.

Solubility - When stating the solubilities of Chemical substances the term "Soluble" is necessarily sometimes used in a general sense irrespective of concomitant chemical changes.

Statements of solubilities, which are expressed as a precise relation of weights of dissolved substance of volume of solvent, at a stated temperature, are intended to apply at that temperature. Statements of approximate solubilities for which no figures are given, are intended to apply at ordinary room temperature.

Pharmacopoeial chemicals when dissolved may show slight physical impurities, such as fragment of filter papers, fibres, and dust particles, unless excluded by definite tests in the individual monographs.

When the expression "parts" is used in defining the solubility of a substance, it is to be understood to mean that 1 gramme of a solid or 1 millilitre of a liquid is soluble in that number of millilitres of the solvent represented by the stated number of parts.

When the exact solubility of pharmacopoeial substance is not known, a descriptive term is used to indicate its solubility.

The following table indicates the meaning of such terms :-

Descriptive terms	Relative quantities of solvent
Very soluble	Less than 1 part
Freely soluble	From 1 to 10 parts
Soluble	From 10 to 30 parts
Sparingly soluble	From 30 to 100 parts
Slightly soluble	From 100 to 1000 parts
Very slightly soluble	From 1000 to 10,000 parts
Practically insoluble	More than 10,000 parts

Therapeutic uses and important formulations –Therapeutic uses and important formulations mentioned in this Pharmacopoeia are, as provided in the recognised Ayurvedic classics and in the Ayurvedic Formulary of India, Part –I and Part-II.

Doses – The doses mentioned in each monograph are in metric system of weights, which are the approximate conversions from classical weights mentioned in Ayurvedic texts. A conversion table is appended giving classical weights of Ayurvedic System of Medicine with their metric equivalents. Doses mentioned in the Ayurvedic Pharmacopoeia of India (A.P.I.) are intended merely for general guidance and represent, unless otherwise stated, the average range of quantities per dose which is generally regarded suitable by clinicians for adults only when administered orally.

It is to be noted that the relation between doses in metric and Ayurvedic systems set forth in the text is of approximate equivalence. These quantities are for convenience of prescriber and sufficiently accurate for pharmaceutical purposes.

The abbreviations commonly employed are as follows:

Abbreviations of technical terms	
m.	Metre
l.	Litre
mm.	Millimetre
cm.	Centimetre
µ.	Micron (0.001 mm)
Kg.	Kilogram
g.	Gramme
mg.	Milligram
ml.	Millilitre
IN.	Normal solution
0.5 N.	Half-normal solution
0.1 N.	Decinormal solution
1M.	Molar solution
Fam.	Family
PS.	Primary Standards
TS.	Transverse Section

Abbreviations used for Languages	
Sansk.	Sanskrit
Assam.	Assamese
Beng.	Bengali
Eng.	English
Guj.	Gujrati
Kan.	Kannada
Kash.	Kashmiri
Mal.	Malayalam
Mar.	Marathi
Ori.	Oriya
Punj.	Punjabi
Tam.	Tamil
Tel.	Telugu

ABBREVIATIONS FOR PARTS OF PLANTS	
Cotyledon	Cotldn.
Flower	Fl.
Fruit	Fr.
Heart Wood	Ht. Wd.
Leaf	Lf.
Pseudo-bulb	Pseudo-bulb
Root Bark	Rt. Bk.
Root	Rt.
Rhizome	Rz.
Seed	Sd.
Stem Bark	St. Bk.
Stem	St.
Tuberous Root	Tub. Rt.
Wood	Wd.
Whole Plant	Wh. Pl.

1. Adhaki (Sd.)

ĀḌHAKĪ (Seed)

Āḍhakī consists of dried seed of *Cajanus cajan* Linn. (Fam. Fabaceae), an erect shrub 1.5 to 3 m high, cultivated nearly throughout the country as a pulse crop.

SYNONYMS

Sanskrit	:	Tuvari
Assamese	:	Ruharmah
Bengali	:	Arhar
English	:	Pigeon Pea
Gujrati	:	Tuver
Hindi	:	Arhar
Kannada	:	Togari
Kashmiri	:	--
Malayalam	:	Thuvara
Marathi	:	Toor
Oriya	:	Harada, Kandulagachha
Punjabi	:	Arhar
Tamil	:	Adagi Tuvari, Thuvarai, Tuvarai
Telugu	:	Kandulu
Urdu	:	Arhar

DESCRIPTION

a) Macroscopic

Seed rounded to oval, 0.4 to 0.7 cm dia., having a white hilum; varying in colour from yellow and red to brown; odour and taste not distinct.

b) Microscopic

Seed coat shows single layered, radially elongated, palisade-like, thin-walled cells, covered externally by striated cuticle and internally supported by a single layered bearer cells, followed by 8 to 10 layers of tangentially elongated, elliptical, thin-walled, parenchymatous cells; cotyledon composed of oval to polygonal, thin-walled, parenchymatous cells most of them containing groups of simple, rounded to oval starch grains, measuring 5 to 36 μ in dia.

Powder- Light brown; seed coat in surface view shows polygonal, thin-walled cells with intercellular spaces; groups of oval to polygonal, parenchymatous cells, and rounded to oval starch grains measuring 5 to 36 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than 2 per cent, Appendix	2.2.2.
Total Ash	Not more than 4 per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than 0.5 per cent, Appendix	2.2.4.
Protein content	Not less than 20 per cent (as determined by following method)	-

Method:

Determination of Total Nitrogen:-

Place an appropriate amount of the substance, accurately weighed, in a 500 ml Kjeldahl's flask of hard glass. The material to be tested, if solid or semi-solid, may be wrapped in a sheet of nitrogen free filter paper for convenience in transferring it into the flask. Add 10 g of powdered potassium sulphate, 0.5 g of powdered copper sulphate and 30 ml of nitrogen free sulphuric acid. Incline the flask at an angle of about 45° and gently heat the mixture, keeping the temperature below the boiling point of the mixture until frothing has ceased. Increase the heat until the acid boils and continue the heating for four hrs until the solution acquires a clear greenish colour. Allow the mixture to cool, add 150 ml of water, thoroughly mix the contents of the flask and cool again. Add cautiously, so as to cause the solution to flow down inside the flask to form a layer under the acid solution, 100 ml of a 30 % w/v solution of sodium hydroxide in water. Add a few pieces of granulated zinc, and connect the flask by means of kjeldahl connecting bulb with a condenser, the delivery tube from which dips beneath the surface of a mixture of 30 ml of 0.5 N HCl or 0.5 N H_2S0_4 and 25 ml of water contained in an Erlenmeyer flask or a wide mouthed bottle of about 500 ml capacity. Mix the contents of the flask by gentle rotation, and distil until about two thirds of the contents of the flask have distilled over. Add about 3 drops of solution of methyl red to the contents of the receiving vessel and determine the excess of acid by titration with 0.5 N sodium hydroxide. Repeat the experiment with the same quantities of reagents and in the same manner, but omitting the substance under test. The difference between the two titrations represent the acid required to neutralize the ammonia. Each ml of 0.5 N hydrochloric acid or 0.5 N Sulphuric acid is equivalent to 0.007004 g of N.

When the nitrogen content of the substance under test is known to be low, 0.5 N hydrochloric or 0.5 N sulphuric acid may be replaced by 0.1N hydrochloric acid or 0.1 N sulphuric acid and 0.1 N sodium hydroxide should then be used in titrating the excess acid. Each ml of 0.1 N hydrochloric acid or 0.1 N sulphuric acid is equivalent to 0.001401 g of N

Total Protein =Total Nitrogen X 6.25.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' using Toluene: Ethyl acetate (90: 10) shows under U.V. (366 nm) four fluorescent zones at Rf. 0.11, 0.23, 0.30 and 0.40 (all blue). On exposure to Iodine vapour three spots appear at Rf. 0.23, 0.30 and 0.96 (all yellow).

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṣāya
Guna	:	Laghu, Rukṣa
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Mēdōhara, Pittakara, Sangrahi, Vātakara, Varṇya, Viṣapaha, Stanyavṛddhi

IMPORTANT FORMULATIONS - Kānkāyana Guṭika

THERAPEUTIC USES - Kāna Atisthaulya, Raktavikāra, Raktapitta, Viśarōga, Sthaulya, Mēḍōrōga, Arśa

DOSE - As directed by the physician

2. Agaru (Ht.Wd.)

AGARU (Heart Wood)

Agaru consists of dried heart wood of *Aquilaria agallocha* Roxb. (Fam. Thymelacaceae), a large evergreen tree, distributed in North East part of the country.

SYNONYMS

Sanskrit	:	Aguru, Lauha, Kṛmija
Assamese	:	Agaru
Bengali	:	Agaru, Agarkashtha, Agar Chandan
English	:	Eagle Wood
Gujrati	:	Agar
Hindi	:	Agar
Kannada	:	Krishna Agaru
Kashmiri	:	--
Malayalam	:	Akil
Marathi	:	Agar
Oriya	:	--
Punjabi	:	Ooda, ooda, pharsi
Tamil	:	Akil kattai
Telugu	:	Agaru
Urdu	:	Ood Hindi, Agar

DESCRIPTION

a) Macroscopic

Drug available in cut pieces, dark brown to nearly black; fracture, hard; no characteristic smell and taste.

b) Microscopic

Shows mostly uniseriate sometimes biseriate xylem rays; vessels isolated having simple pitted thickening and filled with dark brown contents; xylem fibres short having narrow lumen occupying a major portion of wood; xylem parenchyma less in number and simple pitted; included phloem tissues in pockets partially disorganised, leaving large circular or oval holes, containing collapsed and broken tissues.

Powder - Dark brown; shows numerous aseptate fibres, simple pitted vessels with dark brown contents.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	13	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	1	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	2	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' plate using Toluene: Ethylacetate (9:1) shows in visible light two spots at Rf. 0.17 and 0.27 (both light brown). Under U.V. (366 nm) five fluorescent zones appear at Rf. 0.17, 0.27, 0.36, 0.57 and 0.80 (all blue). On exposure to Iodine vapour eight spots appear at Rf. 0.05, 0.11, 0.15, 0.24, 0.33, 0.57, 0.73 and 0.80 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and after heating the plate for ten minutes at 105°C five spots appear at Rf. 0.13, 0.18, 0.25, 0.37 and 0.59 (all violet).

CONSTITUENTS - Essential Oil

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta
Guna	:	Laghu, Snigdha, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Śirovirēcana, Kaphahara, Pittalam, Tvacya, Vātahara

IMPORTANT FORMULATIONS - Madhukasava, Mṛdvīkāsava, Karpuradyarka, Cyavanaprāśa Avalēha, Aṇu Taila, Candanādi Taila, Khadirādi Gutika, Svaśahara Kaśaya Cūrna, Guducyādi Taila

THERAPEUTIC USES - Akṣirōga, Śvāsa, Karṇa Rōga, Kuṣṭha, Viśa

DOSE - 1-3g

3. Aklari (Endm.)

AKLĀRI (Endosperm)

Aklāri consists of dried endosperm of *Lodoicea maldivica* Pers. Syn. *L. seychel larum* Labill. (Fam. Arecaceae), a tall, dioecious palm with straight, smooth, annulated trunk, 18 to 30 m high and 0.3 m dia, growing on all types of soils from the sandy shore to the arid mountain top and also cultivated in India.

SYNONYMS

Sanskrit	:	Samudra Nārikēḷa
Assamese	:	--
Bengali	:	Narikel, Jora Narikel
English	:	Double coconut
Gujrati	:	Dorai Nareal
Hindi	:	Dari yai Nariyal
Kannada	:	Joditengu
Kashmiri	:	--
Malayalam	:	Aklari
Marathi	:	Dariyacha Naral
Oriya	:	Samudra Narikela
Punjabi	:	Dariyai Nariyal
Tamil	:	Thunga, Kadal Thengai
Telugu	:	Samudra Tenkaya Kohari
Urdu	:	Narjeel Daryaee

DESCRIPTION

a) Macroscopic

Drug occurs in varying sizes, about 2.0 cm thick; very hard having much the appearance and texture of vegetable ivory; outer surface moderately rough to smooth, dark brown in colour; inner surface rough, dirty white in colour with number of small tooth-like projections, when soaked in water it softens a little and can be split into thin fibrous bundles; fracture, very hard; odour and taste not characteristic.

b) Microscopic

Testa shows 4 to 6 layers of polygonal, tangentially elongated, lignified, thick-walled cells filled with reddish-brown contents, followed by a wide zone of oval to polygonal, thick-walled cells; endosperm consists of spindle-shaped cells with thick walls having a central lumen with club-shaped canals extending to the cell wall; a few simple starch grains present in endosperm measuring 13 to 18 μ in dia., and small minute aleurone grains; oil globules present throughout the region.

Powder - Dirty brown; shows thick-walled, elongated, spindle-shaped endosperm cells, moderately thick-walled, polygonal, slightly wavy cells of testa in surface view, a few of them containing oil globules and small minute aleurone grains and simple starch grains measuring 13 to 18 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	2	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.4	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	0.3	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	4	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using n-Butanol : Acetic acid: Water (4:1:5) v/v shows under UV (366 nm) one fluorescent zone at Rf. 0.94 (blue). On exposure to Iodine vapour four spots appear at Rf. 0.40, 0.60, 0.77 and 0.94 (all yellow). On spraying with 60% Methanolic-Sulphuric acid reagent and heating the plate at 120°C for ten minutes two spots appear at Rf. 0.31 (brown) and 0.94 (dark brown).

CONSTITUENTS - Sugars and Sterols.

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu
Guna	:	Laghu
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Vātahara, Hṛdya, Viṣaghna, Tṛṣṇanigrahaṇa, Śītapraśamana, Agnidiptikara

IMPORTANT FORMULATIONS - Gōrōcanādi Vaṭi, Mṛtasañjīvani Guṭika, Javahara Mohara

THERAPEUTIC USES - Viṣucika, Hṛdrōga, Śīta Jvara

DOSE - 5-10 gm of the drug in the powder form

4. Aparajita (Lf.)

APARĀJITĀ (Leaf)

Aparājitā consists of dried leaf of *Clitoria ternatea* Linn. (Fam. Fabaceae), a perennial twining climber common all over the tropical parts of country being cultivated and also found wild, growing over hedges and thickets

SYNONYMS

Sanskrit	:	Girikarṇika
Assamese	:	--
Bengali	:	Aparajita
English	:	Winged-leaved clitoria
Gujrati	:	Garnee
Hindi	:	Aparajita, Koyal
Kannada	:	Girikarnike
Kashmiri	:	--
Malayalam	:	Shankhpushpam
Marathi	:	Gokarnee
Oriya	:	Aparajita
Punjabi	:	Aparajita
Tamil	:	Kakkanam
Telugu	:	Dintena, Sankupushpam
Urdu	:	--

DESCRIPTION

a) Macroscopic

Drug generally occurs in the form of leaves and leaflets, rachis broken with or without intact leaflets; leaflet with small petiolule, ovate or elliptic oblong, rarely roundish, obtuse, entire, glabrous or with a few short appressed hairs, subcoriaceous, base obtuse or acute; 2.5 to 5.0 cm long, 1.8 to 3.0 cm wide, yellowish-green; no odour or taste.

b) Microscopic

Rachis- shows single layered epidermis externally covered with thick, smooth cuticle; uni to tricellular, hooked hair with warty cuticle, found on epidermis of either side; vascular bundle crescent shaped consisting of xylem and phloem; pericycle present in the form of broken ring; rest of the tissues between epidermis and pericycle composed of oval to polygonal, thin-walled, 3 to 5 layered, parenchymatous cells.

Leaflet - shows dorsiventral structure; both upper and lower epidermis consists of single layered cells, covered externally with thick cuticle; some epidermal cells of both

surfaces elongate outwards forming uni to tri-cellular warty hairs, basal cells smaller and apical cells longer; palisade single layered; palisade ratio 3 or 4; spongy parenchyma 4 or 5 layered with intercellular spaces and containing a few prismatic crystals of calcium oxalate; stomata paracytic, present on both surfaces; stomatal index 58 to 64 on lower surface, 31 to 42 on upper surface; vein islet number 22 to 24; veinlet terminal number 34 to 37 per sq. mm.

Powder - Yellowish-green; shows groups of spongy parenchyma, palisade cells, fibres, xylem vessels with spiral thickenings, fragments of hairs with or without warty cuticle, wavy thin-walled, epidermal cells with paracytic stomata in surface view.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	15	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	4	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	7	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	15	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel "G" plate using n-Butanol : Acetic Acid: Water (4:1:5) shows under UV (366 nm) three spots at Rf. 0.34 (violet). 0.59 (blue) 0.93 (red). On exposure to Iodine vapour three spots appear at Rf. 0.29. 0.54 and 0.93 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate at 105°C for ten minutes three spots appear at Rf. 0.25 (brown), 0.35 (grey). and 0.59 (yellow).

CONSTITUENTS - Glycosides - Flavonal glycosides and Resin glycosides

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta, Kaṣāya
Guna	:	Laghu
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Mēdhya, Kanthya, Cakṣusya, Pittōpadravanaśini, Tridōṣa Śāmaka, Visapaha, Garahaghni

IMPORTANT FORMULATIONS - Vāta Raktāntaka Rasa

THERAPEUTIC USES - Śūla, Śotha, Ardhavabhedaka, Bhrama, Dāha, Āmadōśa, Graha Bādha, Jvara, Kāsa, Kuṣṭha, Maūtradōṣa, Raktātīsara, Svāśa, Unmāda, Viṣa, Vraṇa, Vamana.

DOSE - Root powder 1-3gSeed powder 1-3 gLeaf powder 2-5 g

5. Atmagupta (Rt.)

ĀTMAGUPTA (Root)

Ātmagupta consists of dried root of *Mucuna prurita* Hook. Syn. *M. pruriens* (L.) DC. (Fam. Fabaceae), a herbaceous twining annual found wild almost all over the country and in Andaman and Nicobar Islands.

SYNONYMS

Sanskrit	:	Kapikacchu, Markai, Kandura, Śūkaśimbi, Kapiprabha
Assamese	:	--
Bengali	:	Aalkushee, Alkusa
English	:	Cowhage, Cowitch
Gujrati	:	Kaucha, Kavach
Hindi	:	Kevanch, Kaunch, Khujanee
Kannada	:	Nasukunnee, Nasuganni, Nayisonanguballi
Kashmiri	:	--
Malayalam	:	Shoriyanam, Naykkorana, Naykkuran
Marathi	:	Khajkuhilee
Oriya	:	Baikhujnee
Punjabi	:	Aalkushee, Kavanch
Tamil	:	Punaik-Kalee, Punaikkalee, Punaippidukkam
Telugu	:	Piliyadugu, Pillee adugu
Urdu	:	Kaunch

DESCRIPTION

a) Macroscopic

Root long, 7 mm or more in thickness, hard, having lateral roots, dark brown to black; fracture, fibrous; odour and taste not distinct.

b) Microscopic

Root shows a narrow cork consisting of 4 or 5 rows of tangentially elongated cells; secondary cortex narrow consisting of 2 to 5 rows of thin-walled, parenchymatous cells, a few containing brownish contents; secondary phloem wide, forming bulk of the bark in the form of long, radial strips that are conical due to the medullary rays funneling out in the phloem region; phloem fibres are arranged in groups or occasionally single; phloem rays uni to biseriate; cambium distinct 1 or 2 layered; secondary xylem very wide composed of usual elements, vessels large as well as small, surrounded by xylem parenchyma and fibres; medullary rays in the xylem also mostly uniseriate, somewhat wavy, consisting of radially elongated thin-walled cells.

Powder - Grey to dark brown; shows fragments of cork, fibres singly or groups and xylem vessels.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	6	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	5	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' plate using n-Butanol : Acetic acid: Water (4:1:5) shows under UV (366 nm) four fluorescent zones at Rf. 0.33, 0.51, 0.66 and 0.86 (all blue). On exposure to Iodine vapour seven spots appear at Rf. 0.10, 0.20, 0.38, 0.48, 0.59, 0.77 and 0.86 (all yellow). On spraying with Ninhydrin and on heating the plate at 110° C for ten minutes four conspicuous spots appear at Rf. 0.38, 0.48, 0.59 and 0.86 (all light pink).

CONSTITUENTS - Choline

PROPERTIES AND ACTION

Rasa	:	Tikta, Kaṣāya
Guna	:	Guru, Snigdha
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Pittahara, Vṛṣya, Bṛṃhana, Balya, Yōnisamkīrnakara, Vājīkarana

IMPORTANT FORMULATIONS - (No Formulations)

THERAPEUTIC USES - Śīta Pitta, Kṛṣata, Pakvātīsāra, Raktapitta, Vātavyādhi, Yoni Śithilata, Duṣta Vraṇa, Kuṣṭha

DOSE - 3-6 g of the drug in the powder form for decoction

6. Bilva (St.Bk)

BILVA (Stem Bark)

Bilva consists of dried stem bark of *Aegle marmelos* Corr. (Fam. Rutaceae), an armed, medium sized tree occurring in the plains and upto 1000 m in the hills as well as cultivated throughout the country, particularly in sacred groves.

SYNONYMS

Sanskrit	:	Śr̄iphala
Assamese	:	Bael, Vael
Bengali	:	Bela, Bilva
English	:	Bengal Quince, Bael
Gujrati	:	Bill, Bilum
Hindi	:	Bela, Sriphal, Bel
Kannada	:	Bilva
Kashmiri	:	--
Malayalam	:	Koovalam
Marathi	:	Bel, Baela
Oriya	:	Bela
Punjabi	:	Bil
Tamil	:	Vilvam
Telugu	:	Maredu
Urdu	:	Belgiri, (Bael)

DESCRIPTION

a) Macroscopic

Bark occurs as pieces of about 0.5 to 1 cm thick, flat or channelled; surface rough and warty due to a number of lenticels, ridges and furrows; fracture tough, gritty in outer and fibrous in inner region; odour and taste, not characteristic.

b) Microscopic

Cork stratified, tangentially elongated, lignified, with four to eight bands alternating with smaller cells of 2 to 16 layers and larger cells of 2 to 20 layers; secondary cortex wide, consisting of parenchyma, and a large number of groups of, or some times single, thick walled, lignified, stone cells showing transverse striations due to radiating canals; smaller ones 16 to 64 µ wide and 48 to 160 µ long and larger ones 32 to 110 µ wide and 160 to 640 µ long; secondary phloem consisting of fibres, sieve elements and crystal fibre, traversed by phloem rays; phloem fibres long, tapering, sharply pointed to blunt; fibre groups arranged in rings; phloem rays uni to triseriate, biseriate rays being more common, uniseriate rays 3 to 6 cells high, while biseriate rays 6 to 25 cells high.

Powder - Yellowish; fragments of rectangular elongated, lignified cork cells; pieces of fibres with pointed or blunt ends; sieve elements and crystals fibre pieces; uni to biseriate phloem rays; lignified, thick-walled stone cells in groups or singly, with narrow lumen showing striations and measuring 16 to 640 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	10	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	9	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Toluene: Ethyl acetate (95:5) shows under U.V. (366 nm) five fluorescent spots at Rf. 0.07 (greenish blue), 0.14 (greenish blue), 0.25, 0.39 and 0.67 (all blue). On exposure to Iodine vapour three spots appear at Rf. 0.14, 0.25 and 0.97 (all yellow). On spraying with Dragendorff reagent one spot appears at Rf. 0.25 (orange).

CONSTITUENTS - Coumarins and Sterols.

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta, Kaṣāya
Guna	:	Laghu, Rukṣa, Tīkṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Pittakara, Vātahara, Dīpaniya, Saṅgrāhi, Viśaghna

IMPORTANT FORMULATIONS - Aṇu Taila, Puśyānuga Cūrṇa, Grahani Mihira Tāila, Sudarśana Curṇa, Candnādi Taila

THERAPEUTIC USES - Śūla, Mēḍōrōga, Vātavyādhi, Chardi, Śōtha, Atisāra, Raktātisāra, Kukśiśūla, Āmaśula, Arṣa, Grahaṇirōga, Madhumēha, Pravāhika

DOSE - 15-30 ml

7. Champaka (Fl.)

CAMPAKA (Flower)

Campaka consists of dried buds and flowers, including calyx, of *Michelia champaca* Linn. (Fam. Magnoliaceae), a tall, ever green tree, usually upto 30 m in height and 3.5 m in girth with a straight trunk, found in eastern Himalayas, North-East India and Western Ghats; it is planted throughout India in gardens and near temples.

SYNONYMS

Sanskrit	:	Campēya, Hamapuṣpa
Assamese	:	--
Bengali	:	Champaka, Champa
English	:	Golden Champa
Gujrati	:	Raichampo, Pilo Champo
Hindi	:	Champa
Kannada	:	Sampige
Kashmiri	:	--
Malayalam	:	Campakappuv
Marathi	:	Sonachanpha
Oriya	:	--
Punjabi	:	Champa
Tamil	:	Sampagi
Telugu	:	Chattu Sampangi
Urdu	:	Champa

DESCRIPTION

a) Macroscopic

Drug consists of broken pieces of pedicel, sepal, petal, anthers, gynophore (torus), flowers solitary, fragrant, crumbled, blackish-brown in colour; sepal brown, linear, acute; petal dark brown, oblong; stamens numerous; anther linear, adnate, introrse; gynophore, 2.5-4 cm long; curved style with beak-shaped simple stigma.

b) Microscopic

Pedicel -Shows ridges and furrows in outline with a single layered epidermis having a few unicellular hairs; cortex composed of a wide zone of collapsed, thin-walled, parenchymatous cells having a few oil globules; collateral vascular bundle and secretory cells are present; pith consisting of thin-walled, oval to polygonal, parenchymatous cells; irregular, elongated, lignified stone cells isolated or in groups, having narrow lumen and pits, found in cortex and pith.

Sepal - Single layered epidermis, slightly sinuous in surface view, present on both

surfaces, a few unicellular hairs are in outer surface; ground tissue composed of thin-walled, oval to polygonal, parenchymatous cells having a few prismatic crystals of calcium oxalate; a few vascular bundles present in ground tissue.

Petal -Epidermis single layered of rectangular cells, slightly sinuous in surface view, present on both surfaces; a few fibro-vascular bundles present in ground tissue along with a few cluster crystals of calcium oxalate.

Powder - Dark-brown; shows fragments of parenchymatous cells, broken unicellular hairs, vessels with spiral thickening, a few prismatic and cluster crystals of calcium oxalate; a few irregular shaped, elongated, lignified, stone cells with narrow lumen in singles or groups; fairly large circular to spherical, brown coloured, numerous smooth pollen grains measuring 67-82 μ in dia. having clear exine and intine and a few oil globules.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	11	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	9	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	12	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' using Toluene: Ethylacetate (9:1) shows under UV (366 nm) one fluorescent spot at Rf. 0.92 (blue). On exposure to Iodine vapour nine spots appear at Rf. 0.20, 0.25, 0.35, 0.40, 0.51, 0.57, 0.77, 0.88 and 0.92 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and on heating the plate for ten minutes at 105°C seven spots appear at Rf. 0.20, 0.25, 0.40, 0.51, 0.57, 0.77 and 0.92 (light violet).

CONSTITUENTS - Volatile Oil

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta, Kaṣāya
Guna	:	Laghu, Rukṣa
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Hṛdya, Pittajit, Kaphapittasra Nāśaka, Viṣaghna

IMPORTANT FORMULATIONS - Candanabalalakṣādi Taila, Baladhātryādi Taila

THERAPEUTIC USES - Vraṇa, Kṛmi, Mūtrakṛchra, Vātarakta, Kuṣṭha, Kandu

DOSE - Puṣpa Cūrṇa 1-3 gm

8. Chicha (Ft. Pl.)

CIÑCĀ (Fruit Pulp)

Ciñcā consists of fruit pulp without seeds of Tamarindus indica Linn. (Fam. Fabaceae), a moderate sized to large evergreen tree upto 24 m in height and 7 m in girth, cultivated throughout India, or self sown in waste places and in forest lands; also planted as avenue trees

SYNONYMS

Sanskrit	:	Amlika, Tintiḍika
Assamese	:	Tamar, Teteli
Bengali	:	Tetula, Tentul, Ambli
English	:	Tamarind Tree
Gujrati	:	Anvali
Hindi	:	Imli
Kannada	:	Hunisemale
Kashmiri	:	--
Malayalam	:	Puli, Amlam
Marathi	:	Chinch
Oriya	:	Koina, Omlika
Punjabi	:	Imli, Amli
Tamil	:	Puli, Aanvilam
Telugu	:	Chint, Chinta
Urdu	:	Imli

DESCRIPTION

a) Macroscopic

Fruit pulp occurs as a reddish-brown, moist, sticky mass, in which yellowish-brown fibres are readily seen; odour, pleasant; taste, sweetish and acidic.

b) Microscopic

Fruit pulp consists of thin-walled, elongated to polygonal, parenchymatous cells of considerable size, traversed by a number of long fibro-vascular bundles and having a very few small starch granules, and numerous prismatic crystals of calcium oxalate.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	4	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	46	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	59	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica Gel 'G' using n-Butanol : Acetic acid : Water (5:1:4) shows under U.V. (366 nm) two spots at Rf. 0.27 and 0.46 (both yellowish blue). On exposure to Iodine vapour five spots appear at Rf. 0.27, 0.46, 0.57, 0.65 and 0.87 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate at 105°C for ten minutes five spots appear at Rf. 0.46, 0.57. 0.65, 0.71 and 0.87 (all grey)

CONSTITUENTS - Inorganic acids, Sugars, Saponin and bitter principle - Tamarindinca

PROPERTIES AND ACTION

Rasa	:	Madhura, Amla, Kaṣāya
Guna	:	Guru, Rukṣa, Sara
Virya	:	Uṣṇa
Vipaka	:	Amla
Karma	:	Kaphavātanuṭ, Dīpana, Bastiśuddhikara, Bhēdi, Viṣṭambhi, Dīpana, Hṛdya

IMPORTANT FORMULATIONS - Śankha Drāvaka, Śankhavaṭi

THERAPEUTIC USES - Uḍararoga, Agnimāndya, Arōcaka, Paktiśūla, Tṛṣa, Klama, Śrama, Bhrānti, Karṇaśūla, Nāḍivraṇa

DOSE - 4-10 g of the drug

9. Dadima (Fr.Fruit.)

DĀḌIMA (Fresh Fruit)

Dāḍima consists of fresh fruit of *Punica granatum* Linn. (Fam. Punicaceae), a large deciduous shrub or a small tree; found growing wild in the valley and outer hills of Himalayas, between 900 and 1800 m and cultivated in many parts of the country.

SYNONYMS

Sanskrit	:	Dantabīja, Lōhitapuṣpa
Assamese	:	Dalim
Bengali	:	Dadima, Dalimgach, Dalim
English	:	Pomenagrate
Gujrati	:	Dadam, Dadam phala
Hindi	:	Anar, Anar-ke-per
Kannada	:	Dalimba, Dalimbe haonu
Kashmiri	:	--
Malayalam	:	Mathalam
Marathi	:	Dalimba
Oriya	:	Dalimba
Punjabi	:	Anar
Tamil	:	Madulam Pazham
Telugu	:	Dadimbakaya, Dadimma
Urdu	:	Anar

DESCRIPTION

a) Macroscopic

Fruit a balausta, globose, 4 to 8 cm diam; depressed, bluntly 5 to 8 angled and tipped with persistent calyx alongwith withered stamens; coriaceous, smooth; yellowish brown or red; odour, not distinct; carpel four to five, with papery, thin-walled, fused in 2 whorls, seeds numerous, compressed with a whitish-pink or bright red, transparent, fleshy testa; taste, sour to sweet; seed appears hard, angular, white to buff with an astringent taste.

PROPERTIES AND ACTION

Rasa	:	Madhura, Amla, Kaṣāya
Guna	:	Laghu, Snigdha
Virya	:	Uṣṇa
Vipaka	:	Madhura
Karma	:	Balya, Dīpana, Hṛdya, Kaphahara, Mēdhya, Pittahara, Vātahara, Pacana, Rucya, Mukhagandhahara, Śramahara, Śukrala, Tarpaka, Varcōvibandhanīya, Grāṭhi

IMPORTANT FORMULATIONS - Dadhika Ghṛta, Dādimāṣṭaka Cūrṇa, Bhāskaralavaṇa Cūrṇa, Bṛhacchāgalādya Gṛta

THERAPEUTIC USES - Arōcaka, Atisāra, Dāha, Āmavāta, Jvara, Kasa, Raktapitta, Tṛṣna

DOSE - 15-30 ml.

10. Dadima (Ft. Rind.)

DĀḌIMA (Fruit Rind)

Dāḍima consists of dried fruit rind (pericarp) of *Punica granatum* Linn. (Fam. Punicaceae), a large deciduous shrub or a small tree, found wild in the warm valleys of the outer hills of Himalayas between 900 to 1800 m and also cultivated in many parts of the country.

SYNONYMS

Sanskrit	:	Lōhiṭapuṣpa, Danṭabīja
Assamese	:	Dalim
Bengali	:	Dadima, Dalim, Dalimgach
English	:	Pomenagrate
Gujrati	:	Dadam, Dadam phala
Hindi	:	Anar, Anar-ke-per
Kannada	:	Dalimba, Dalimbe haonu
Kashmiri	:	--
Malayalam	:	Mathalam
Marathi	:	Dalimba
Oriya	:	Dalimba
Punjabi	:	Anar
Tamil	:	Madulam Pazham
Telugu	:	Dadimbakaya, Dadimma
Urdu	:	Anar

DESCRIPTION

a) Macroscopic

Drug occurs in 0.1 to 0.5 cm thick, more or less concave, salver- shaped pieces, some pieces showing residual carpel walls and some having persistent toothed calyx tube alongwith withered stamens, styles and a few seeds; coriaceous, tough and nearly smooth; brown to reddish-brown externally and brownish-yellow internally; bearing impressions left by seeds; fracture, short; odour not distinct; taste, astringent.

b) Microscopic

Epicarp single layered covered with thick cuticle; mesocarp consists of a wide zone of oval to polygonal thin walled parenchymatous cells; a few fibro-vascular bundles, tanniniferous vessels, secretory canals, oil globules, single and a number of groups of round or oval to elongated stone cells, simple and compound starch grains having 2 or 3 components with concentric striations and central hilum, and rosette crystals of calcium oxalate present in mesocarp.

Powder - Yellowish-brown; shows single or groups of stone cells; oval to polygonal, parenchymatous cells in surface view; vessels with scalariform thickening, tanniniferous vessels and a few rosette crystals of calcium oxalate and rounded to oval starch grains, measuring 3 to 5 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	4	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.4	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	9	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	20	per cent, Appendix	2.2.7.

T.L.C.

T.L.C of alcoholic extract on Silica gel 'G' plate using Chloroform: Ethylacetate : Formic acid (5:4:1) shows in visible light one spot at Rf. 0.74 (bluish grey). Under U.V. (366 nm) one fluorescent zone is visible at Rf. 0.74 (dark blue). On exposure to Iodine vapour two spots appear at 0.74 (dirty yellow) and 0.95 (yellow). On spraying with 10% aqueous Ferric chloride reagent one spot appears at Rf. 0.74.(blue). On spraying with 5% Mathanolic-Sulphuric Acid and heating the plate for ten minutes at 110°C two spots appear at Rf. 0.74 (brownish grey) and 0.95 (violet)

CONSTITUENTS - Tannic acid, Sugar and Gum

PROPERTIES AND ACTION

Rasa	:	Amla, Kaṣāya
Guna	:	Laghu, Snigdha
Virya	:	Anusna
Vipaka	:	Kaṭu
Karma	:	Grāhi, Vāta Kaphahara, Vraṇarōpaka

IMPORTANT FORMULATIONS - Khadirādi Gutika, Mṛtasañjīvani Sura, Kalyanaka Ghṛta, Maaricādi Gutika, Nilikadya Taila

THERAPEUTIC USES - Dāha, Jvara, Kāsa, Pravāhika, Raktapitta, Raktavikāra, Kantharoga, Mukhadaurgandha, Aruci, Amlapitta, Atisāra

DOSE - Powder 3-6 g

11. Dadima (Lf.)

DĀḌIMA (Leaf)

Dāḍima Dadima consists of dried leaf of *Punica granatum* Linn. (Fam. Punicaceae), a small deciduous shrub or small tree, found wild in the warm valleys of the outer hills of Himalayas between 900 to 1800 m and also cultivated in many parts of the country.

SYNONYMS

Sanskrit	:	Lōhitapuṣpa, Danṭabīja
Assamese	:	Dalim
Bengali	:	Dadima, Dalim, Dalimgach
English	:	Pomenagrate
Gujrati	:	Dadam, Dadam phala
Hindi	:	Anar, Anar-ke-per
Kannada	:	Dalimba, Dalimbe haonu
Kashmiri	:	--
Malayalam	:	Mathalam
Marathi	:	Dalimba
Oriya	:	Dalimba
Punjabi	:	Anar
Tamil	:	Madulam Pazham
Telugu	:	Dadimbakaya, Dadimma
Urdu	:	Anar

DESCRIPTION

a) Macroscopic

Leaves 2 to 8 cm long, 0.7 to 2.0 cm broad, oblong, lanceolate, acute, entire, glabrous, greyish-green to yellowish-green.

b) Microscopic

Leaf-

Petiole - shows single layered epidermis covered by thin cuticle, epidermis followed by 2 or 3 layered collenchymatous hyodermis; single, bicollateral, crescent-shaped, vascular bundle situated in centre; rest of the tissues between vascular bundle and hypodermis consists of 3 layers or more, oval to polygonal, thin-walled, parenchymatous cells, some having rosette and a few prismatic crystals of calcium oxalate.

Midrib -shows single layered epidermis covered by a thin cuticle, epidermis followed by 2 or 3 layers of round to angular collenchymatous cells; beneath collenchyma 3 or 4

layers of parenchyma present, some containing a few rosette and prismatic crystals of calcium oxalate, simple and compound starch grains, consisting of 2 or 3 components, round to oval shaped, measuring 5.5 to 8.5 μ in dia.; vascular bundle situated centrally, similar to that of petiole.

Lamina -shows epidermis on both surfaces, single layered; palisade single layered; spongy parenchyma 3 or 4 layered; idioblast containing very large solitary crystal of calcium oxalate; a few small solitary calcium oxalate crystals also present in spongy parenchyma; palisade ratio 4 to 6; stomatal index 12 to 25; anomocytic stomata, present only on lower surface.

Powder - Greyish-green; shows spiral vessels, palisade and spongy parenchyma cells, rosette and prismatic crystals of calcium oxalate; fragments of upper and lower epidermis with beaded straight walled and sinuous walled respectively in surface view, simple, round to oval, starch grain measuring 5.5 to 8.5 μ in dia., and co5mpound starch grains having 2 or 3 components.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2 per cent, Appendix	2.2.2.
Total Ash	Not more than	10.5 per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	2 per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	12 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	25 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using Benzene: Ethylacetate (9: 1) v/v shows in visible light four spots at Rf. 0.06 (light green), 0.48 (light green), 0.68 (light green) and 0.79 (green). Under U.V. (366 nm) four fluorescent zones visible at Rf. 0.06, 0.14, 0.54 and 0.94 (all blue). On exposure to Iodine vapour nine spots appear at Rf. 0.02, 0.09, 0.38, 0.62, 0.66, 0.76, 0.87, 0.91 and 0.97 (all yellow). On spraying with 5% Methanolic-Phosphomolybdic acid reagent and heating the plate at 105°C for ten minutes nine spots appear at Rf. 0.06, 0.10, 0.33, 0.41, 0.54, 0.62, 0.79, 0.89 and 0.97 (all grey).

CONSTITUENTS - Tannins and β-Sitosterol

PROPERTIES AND ACTION

Rasa	:	Kaṣāya, Tikta
Guna	:	Laghu
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Dīpana, Kaphahara, Rucya

THERAPEUTIC USES - Aruci, Atisāra, Jvara, Kāsa, Kṛmi, Pravāhika, Raktapitta, Agnimāndya, Mukhapāka

DOSE - Patra Svarasa : 5-10 ml.
Patra Kalka : 5-10 g.

12. Devadaru (Ht.Wd.)

DEVADĀRU (Heart Wood)

Devadāru consists of dried heart wood of *Cedrus deodara* (Roxb.) Loud. (Fam. Pinaceae), a very large and tall ever green tree, upto 75m in height and ranging from 2.4 to 3.6 m in girth, occasionally even upto 13.5 m in girth, found in North Western Himalayas from Kashmir to Garhwal, between 1200 to 3000 m and also cultivated in Kumaon.

SYNONYMS

Sanskrit	:	Bhadradāru, Surabhūruha, Amaradāru, Dēvakāṣtha, Dāru, Suradāru, Amarataru
Assamese	:	Shajar Tuljeen
Bengali	:	Devdaroo
English	:	Deodar, Himalayan Cedar
Gujrati	:	Devdar, Teliyo Devdar
Hindi	:	Devdar, Devdaroo
Kannada	:	Deevdar
Kashmiri	:	--
Malayalam	:	Devtaram
Marathi	:	Devdar, Telya Dedaroo
Oriya	:	--
Punjabi	:	Diyar, Dewdar
Tamil	:	Devdaroo
Telugu	:	Devdari Chettu, Devdaree
Urdu	:	Deodar

DESCRIPTION

a) Macroscopic

Wood moderately hard, light yellowish-brown to brown; wood splits readily longitudinally; annual rings well marked; medullary rays appear as whitish lines; resin canals, if present, arranged in long tangential rows, showing up as dark, narrow line on the radial surface of the wood pieces; odour, aromatic; taste, not distinct.

b) Microscopic

Mature wood almost entirely of narrow, quadrangular or rarely five or six sided tracheids, having very thick-wall with pits and a narrow lumen; xylem rays very fine, numerous and run straight throughout the region, uniseriate and 2 to 16 cells high in tangential section; vessels absent.

Powder - Brownish-yellow in colour and oily, shows entire or fragments of tracheids and xylem ray cells.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	2	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	7	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	1.5	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' using Toluene: Ethylacetate (9:1) shows under U.V. (366 nm) six fluorescent zones at Rf. 0.11. 0.18. 0.32. 0.46, 0.65 and 0.75 (all blue). On exposure to Iodine vapour seven spots appear at Rf. 0.14. 0.42. 0.51, 0.67, 0.78, 0.84 and 0.92 (all yellow). On spraying with Methanolic-Sulphuric acid reagent and on heating the plate for ten minutes at 105°C eight spots appear at Rf. 0.10 (violet), 0.18 (violet), 0.52 (grey), 0.64 (violet), 0.71 (violet). 0.78 (violet). 0.89 (violet), 0.92 (green).

CONSTITUENTS - Terpenoids, Flavonoids and Glycosides.

PROPERTIES AND ACTION

Rasa	:	Tikta
Guna	:	Laghu, Snigdha
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Vātahara, Duṣṭavraṇa Śodhaka

IMPORTANT FORMULATIONS - Khadirāriṣṭa, Daṣamūlāriṣṭa, Dēvadārvariṣṭa, Mṛtasañjīvanisura, Karpurādyarka, Pramēhamihira Taila, Candanādi Cūrna, Sudarśana Cūrṇa, Nārayana Taila, Pradarantaka Lauha, Vātaraktanaka Lauha, Mahaviśagarbha Taila

THERAPEUTIC USES - Śotha, Jvara, Kṛmi, Kandu, Pīnasa, Vibandha, Ādhmāna, Tandra, Hikka, Pramēha, Kasa, Kuṣṭha, Āmavāta, Raktavikara, Sutikārōga

DOSE - 3-6 g of the drug in powder form

13. Dhattura (W.P.)

DHATTŪRA (Whole Plant)

Dhattūra consists of dried whole plant of *Datura metel* Linn. Syn. *D. fastuosa* L.; (Fam. Solanaceae), occurring wild throughout the country.

SYNONYMS

Sanskrit	:	Kanaka, Unmatta, Dhustura
Assamese	:	Dhatura
Bengali	:	Dhatura
English	:	White Thorn Apple
Gujrati	:	Dhanturo
Hindi	:	--
Kannada	:	Ummatti, Madagunaki, Dathura
Kashmiri	:	--
Malayalam	:	Umman, Ummatt, Ummattu
Marathi	:	Dhotra
Oriya	:	Dudura
Punjabi	:	Dhatura
Tamil	:	Umattai
Telugu	:	Tella-ummettha
Urdu	:	Dhatura

DESCRIPTION

a) Macroscopic

Root - Cylindrical with lateral branches, brown coloured, rough due to fissures and root scars; fracture, splintery; odour, not characteristic; taste, bitter.

Stem - Dichotomously branched, cylindrical, blackish-dark to purple colour, internode very short; fracture, short; odour, not characteristic; taste, bitter.

Leaf - Petiolate, pubescent; 6 to 11 cm long, 2 to 8 cm broad; ovate, acute, repand and dentate, but sometimes entire, base unequal, odour, not characteristic; taste, bitter.

Flower - Stalked, stalk finely pubescent, calyx upto 10 cm long, tubular, lobes acuminate; corolla purple or purple tinged outside, upto 15 cm long, usually double, sometime triple (3 whorls), funnel-shaped, lobes 5 for each whorl; stamen -5, epipetalous with-connivent anthers, anther 10 to 12 mm long; gynoecium-bicarpellary, carpels placed obliquely in relation to mother axis, placentation axile, placenta swollen, ovule numerous.

Fruit - Capsule, ovate to obovate with persistent reflexed calyx; about 4 cm long, 3 cm wide, covered with short, stout, spines; taste, bitter and acrid.

Seed - Light brown, reniform, compressed, flattened, 0.4 to 0.5 cm long, and 0.4 cm wide, foveate, surface finely pitted; taste, bitter and acrid (warning -poisonous).

b) Microscopic

Root - Shows 4 to 7 layers of thin-walled, rectangular cork cells; secondary cortex composed of 3 to 4 layers, thin-walled, parenchymatous, tangentially elongated cells; secondary phloem composed of usual elements, traversed by phloem rays; secondary xylem composed of usual elements; vessels two types with spiral thickening or with bordered pits; xylem rays 1 to 4 cells wide; sandy microsphenoidal crystal of calcium oxalate scattered in the secondary cortex and phloem parenchyma.

Stem - Shows a single layered, epidermis covered by striated, thick cuticle having a few unicellular trichomes, followed by 2 or 3 layered, ruptured, rectangular cork cells; secondary cortex consisting of 4 to 7 layered, collenchymatous and 2 to 5 layered parenchymatous cells; endodermis distinct, containing starch grains; pericycle consists of 1 or 2 layers of parenchyma and pericyclic fibres in singles or groups of 2 or 3 or more; secondary phloem composed of sieve elements and parenchyma but no fibres; secondary xylem composed of vessels, tracheids, fibres and parenchyma; vessels with spiral thickening and pits; sandy crystals of calcium oxalate are found scattered in secondary cortex and phloem parenchyma; starch grains oval to rounded, simple, measuring 3 to 7 μ in dia., present in secondary cortex and phloem parenchyma.

Leaf

Petiole - shows plano-convex outline, cuticularised single layered epidermis, followed by cortex composed of 7 or 8 rows of round to polygonal, thick-walled, collenchyma cells and 2 or 3 rows of thin-walled, round to polygonal, parenchyma cells; vascular bundles bicollateral in a discontinuous ring, number of sandy microsphenoidal, a few rosette and prismatic crystals of calcium oxalate present in cortex and pith region.

Midrib - shows similar structure to that of petiole; collenchyma well developed in basal region and poorly in middle and upper region; cortex and endodermal cells containing simple and compound, oval to round, mostly eccentric starch grains measuring 2 to 4 μ in dia. with 2 or 3 components; cortical cells large hexagonal to round, without any crystals.

Lamina - shows cuticularised single layered epidermal cells bearing both glandular and non-glandular trichomes on both surfaces; non-glandular trichomes uniseriate, mostly multicellular; a few unicellular trichomes with warty surface; glandular trichomes short, stalked with multicellular, globose head; mesophyll differentiated into palisade

parenchyma of single layer and spongy parenchyma of 6 to 8 layers, having numerous rosette and a few micro sphenoidal crystals of calcium oxalate; stomata anisocytic, present on both surfaces; stomatal index 16 to 17 on upper surface, 17 to 23 on lower surface; palisade ratio 5 to 6; vein islet number 19 to 22 per sq. mm.

Seed - Shows an outline with bulges at 3 places, single layered epidermis with elongated cells; seed coat consists of thick-walled, lignified, sclerenchymatous cells, forming club shaped structure, followed by 3 to 5 layered, more or less tangentially elongated, parenchymatous cells; endosperm composed of polygonal, thin-walled, parenchymatous cells filled with aleurone grains and abundant oil gloubles, embryo more or less curved.

Powder - Greyish-brown; shows fragments of both glandular and non-glandular trichomes; glandular trichomes short stalked with multicellular globose heads; non glandular trichomes unbranched, long, mostly multicellular, a few unicellular trichomes with warty surfaces; anisocytic stomata, vessels with spiral thickening, a few sandy micro sphenoidal and rosette crystals of calcium oxalate; simple, oval to round starch grains measuring 2 to 7 μ in dia., and compound starch grains with 2 or 3 components.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	16	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	4	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	15	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Chloroform: Methanol (80:20) shows under U.V. (366 nm) three fluorescent zones at Rf. 0.65 (blue), 0.67 (pink) and 0.98 (pink). On exposure to Iodine vapour nine spots appear at Rf. 0.07, 0.15, 0.37, 0.48, 0.61, 0.67, 0.83, 0.89 and 0.98 (all yellow). On spraying with Dragendorff reagent followed by sodium nitrite solution, two spots appear at Rf. 0.11 and 0.98 (both orange yellow).

CONSTITUENTS - Alkaloids (Hyoscine) and two withanolide Glucosides (Dhaturametelin A & B)

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta, Kaṣāya
Guna	:	Guru, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Varṇya, Madakāri, Agni Vṛddhikara, Jangama Viṣahara

IMPORTANT FORMULATIONS - Kanakāsava, Ekāngavīra Rasa, Puṣpadhanva Rasa, Tribhuvana Kīrti Rasa, Śri Jayamaṅgala Rasa, Laghu Viśagarbha Taila, Viṣatinduka Taila, Dhattura Taila

THERAPEUTIC USES - Śvāsa, Jvara, Kṛmi, Kandu, Kasa, Kuṣṭha, Unmāda, Vṛṇa, Mutrakṛccha, Tvaka Dōṣa, Yika Likṣa, Alarka Viṣa, Karma, Nādi, Indralupta, Padadāha, Sthanusthita Pīda

DOSE - 100 - 200 mg.

14. Durva (W.P.)

DŪRVA (Whole Plant)

Dūrva consists of dried whole plant of *Cynodon dactylon* (Linn.) Pers. (Fam. Poaceae), an elegant, tenacious, perennial, creeping grass growing throughout the country and ascending to 2440 m.

SYNONYMS

Sanskrit	:	Śataparva, Śatavalli, Nīladūrva
Assamese	:	Ushb
Bengali	:	Doorva, Neel Doorva
English	:	Creeping Cynodon, Dhub Grass
Gujrati	:	Dhro, Khaddhro, Leelodhro, Neeladhro
Hindi	:	Doob, Neelee Doob
Kannada	:	Garikai-Hallu, Garike, Garik Hallu
Kashmiri	:	--
Malayalam	:	Karuk, Karukappullu
Marathi	:	Harlee, Neel durva, Haryali
Oriya	:	--
Punjabi	:	Dubea
Tamil	:	Arukampillu
Telugu	:	Doolu, Harvali, Garichgaddi
Urdu	:	Doob Ghas

DESCRIPTION

a) Macroscopic

Root -Fibrous, cylindrical, upto 4 mm thick, minute hair-like roots arise from the main roots; cream coloured.

Stem -Slender, prostrate, upto 1.0 mm thick, jointed, leafy, very smooth, yellowish green in colour.

Leaf - 2 to 10 cm long and 1.25 to 3 mm wide, narrowly linear or lanceolate, finely acute more or less glaucous, soft, smooth, usually conspicuously distichous in the barren shoots and at the base of the stems; sheath light, glabrous or sometimes bearded, ligule a very fine ciliate rim.

b) Microscopic

Root - Mature root shows epiblema or piliferous layer composed of a single layer of thin-walled, radially elongated to cubical cells; hypodermis composed of 1 or 2 layered, thin-walled, tangentially elongated to irregular shaped cells; cortex differentiated into

two zones,. 1 or 2 layers of smaller, thin-walled, polygonal, lignified sclerenchymatous and 4 to 6 layers of larger thin-walled, elongated parenchymatous cells; endodermis quite distinct, single layered, thick-walled, tangentially elongated cells; pericycle 1 or 2 layers composed of thin-walled sclerenchymatous cells; vascular bundles consisting of xylem and phloem, arranged in a ring on different radials; xylem exarch, having usual elements; centre occupied by wide pith, composed of oval to rounded thick-walled parenchymatous cells containing numerous simple, round to oval or angular starch grains measuring 4 to 16 μ in dia., and compound starch grains having 2 to 4 components

Stem - Oval in outline with a little depression on one side, shows a cuticularised epidermis single layered, having lignified walls; hypodermis 1 or 2 layers, sclerenchymatous; cortex composed of 3 to 5 layers of round to oval thin walled parenchymatous cells; endodermis not distinct; pericycle present in the form of continuous ring of 2 to 5 layers of sclerenchymatous fibres; vascular bundle collateral, closed and scattered throughout the ground mass of parenchyma, each surrounded by sclerenchymatous sheath; vessels simple, spiral, scalariform, and annular; medullary rays not distinct; fibres short, thick walled, having narrow lumen and pointed tips; starch grains simple and compound having 2 to 4 components, present in cortex and ground tissue, simple grains measuring 4 to 16 μ in dia.

Leaf - Lamina shows nearly square to oval epidermis having irregularly cutinised outer wall, bulliform cells present on the dorsal side which are grouped together and lie at the bottom of a well defined groove in between the veins; these are thin walled and lack chlorophyll, extend deep into the mesophyll; mesophyll not differentiated into palisade and spongy parenchyma; row of vascular bundles nearly alike, except that the median bundle is larger; bundle sheath single, and consists of thin-walled more or less isodiametric parenchyma cells containing chloroplast; mesophyll tissue broken by 1 or 2 thin-walled colourless cells which extend from bundle sheath to the thin walled parenchymatous band of stereome near upper and lower epidermis.

Powder - Yellowish-green; simple pitted, scalariform, annular and spiral, vessels; short lignified, thick walled, pointed fibres, paracytic stomata; epidermis in surface view, of elongated, rectangular long cells and nearly square small cells having sinuous walls; simple and compound starch grains, measuring 4 to 16 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	9	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	4.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	3	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	9.5	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using Toluene: Ethylacetate (90 : 10) shows in visible light five spots at Rf. 0.1 (green), 0.40 (yellow), 0.45 (green), 0.51 (yellow) and 0.57 (green). On exposure to Iodine vapour six spots appear at Rf. 0.22, 0.40, 0.45, 0.51, 0.57 and 0.64 (all yellow in colour). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate at 105°C for ten minutes six spots appear at Rf. 0.22, 0.40, 0.45, 0.51 (all grey), 0.57 (green) and 0.64 (grey).

CONSTITUENTS - Phenolic Phytotoxins (Ferulic, Syringic, P-coumaric, Vanillic, P-Hydroxybenzoic and O-Hydroxyphenil acetic acid)

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta, Kaṣāya
Guna	:	Laghu
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Kaphahara, Pittahara, Śramsana, Rucya

THERAPEUTIC USES - Atisāra, Chardi, Dāha, Jvara, Raktapitta, Tṛṣa, Murccha, Visarpa, Taktavikāra, Tvaka Rōga, Kaphaja Jvara, Vātaja Jvara, Nāsagata Taktapitta

DOSE - Svarasa 10-20 ml.

15. Gambhari (St.Bk.)

GAMBHĀRĪ (Stem Bark)

Gambhārī consists of dried stem bark of *Gmelina arborea* Linn. (Fam. Verbenaceae), a large deciduous tree, mostly found in southern peninsula and upto Kashmir

SYNONYMS

Sanskrit	:	Kaśmari, Kaśmarya, Śrīparṇi
Assamese	:	Gamari
Bengali	:	Gamar
English	:	Candhar Tree
Gujrati	:	Shivani hannu, Shewan
Hindi	:	Gambhar Khambhari
Kannada	:	Shivani, Shivanigida
Kashmiri	:	--
Malayalam	:	Kumizhu, Kumbil, Kumpil, Kumizhin
Marathi	:	Shivan
Oriya	:	Gambhari
Punjabi	:	Gumhar, Kumhar
Tamil	:	Nilakumizh
Telugu	:	Peggumudu, Peggumaddi
Urdu	:	--

DESCRIPTION

a) Macroscopic

Mature stem bark 0.2 to 0.7 cm thick, channelled pieces, ribbed, quilled at some places; outer surface yellowish-brown in colour and rough due to some longitudinal and horizontal cracks, inner surface fairly smooth and reddish-brown to black in colour; fracture, short; odour and taste not distinct.

b) Microscopic

Shows a wide zone of cork consisting of rectangular, thick-walled, lignified cells; cork cambium 1 or 2 layers, filled with reddish-brown contents; secondary cortex consists of 2 or 3 layers, tangentially elongated, elliptical, thin-walled, parenchymatous cells; secondary phloem composed of sieve elements, parenchyma and phloem rays; parenchyma rectangular to polygonal, phloem rays 1 to 7 cells wide, 3 to 16 cells high; rays 4 or 5 cells wide and 8 to 10 cells high more common; stone cells oval to elliptical, lignified, pitted, with wide lumen; stone cells and lysigenous cavities present throughout phloem.

Powder - Reddish-brown; shows fragments of cork cells, thick-walled, elliptical, lignified, pitted stone cells with wide lumen.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	11	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.3	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	8	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	23	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using Chloroform Methanol (95:5) shows under U.V. (366 nm) no fluorescent spot. On exposure to Iodine vapour two spots appear at Rf. 0.20 and 0.60 (both yellow).

CONSTITUENTS - Alkaloids, in traces.

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta
Guna	:	Guru
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Dīpana, Kaphahara, Mēdhya, Śōthahara, Pācana, Bhēdana, Viśahara, Dāha, Prasamana

IMPORTANT FORMULATIONS - Candnāsava

THERAPEUTIC USES - Śūla, Śōtha, Arśa, Bhrama, Jvara, Raktapitta, Tṛṣa

DOSE - 3-5 gm.

16. Ikshu (Rt. Stock.)

IKṢU (Root Stock)

Ikṣu consists of root stock of *Saccharum officinarum* Linn. (Fam. Poaceae), a plant generally cultivated in all hotter parts of the country for extraction of sugar.

SYNONYMS

Sanskrit	:	Asipatra, Bhurirasa, Dīrghacchada, Gudamula, Tṛṇarasa
Assamese	:	Kuhiyare
Bengali	:	Akh, Ganna
English	:	Sugar-cane
Gujrati	:	Sheradi
Hindi	:	Ganna, Ikh
Kannada	:	Ikshu, Kabbu
Kashmiri	:	--
Malayalam	:	Karimpu
Marathi	:	Us
Oriya	:	--
Punjabi	:	Ganna
Tamil	:	Karumbu Ver
Telugu	:	Cheraku, Cheruku
Urdu	:	Ganna, Naishkar

DESCRIPTION

a) Macroscopic

Drug occurs in form of root stock with attached yellowish-brown stem portion, having 10 to 15 cm long, numerous grey to blackish-brown fibrous roots; solid, jointed, more or less cylindrical, 2 to 2.5 cm thick and varying in length, rough; fracture, splintery; odour and taste, not distinct.

b) Microscopic

Root Stock - Shows single layered epidermis followed by 3 to 4 layers of oval to elliptical, lignified, thick-walled more or less radially elongated, sclerenchymatous cells; cortex consists of upper 12 to 15 layers oval to polygonal, thin-walled and lower 5 layers, elliptical, parenchymatous cells; endodermis single layered; pericycle 3 or 4 layers, sclerenchymatous; fibro-vascular bundle, covered with sclerenchymatous sheath, scattered throughout the ground mass of parenchymatous cells.

Root - Shows single layered epidermis of thin-walled, rectangular cells, followed by a layer of hypodermis of thin-walled, rectangular cells, outer cortex composed of 2 or 3 layers of thick-walled, polygonal to circular, sclerenchymatous cells filled with dark

brown or blackish pigment, inner cortex composed of large aerenchymatous cells; endodermis composed of barrel-shaped, thin-walled cells, enclosing a layer of pericycle consisting of rectangular cells having inner wall thickened, and vascular tissue; xylem and phloem form an equal number of separate bundles. arranged in a ring; centre occupied by a large pith, composed of circular to oval, parenchymatous, thin-walled cells.

Powder - Blackish in colour; shows sclerenchymatous cells of cortex, xylem vessels and fibres, groups of spindle-shaped, elongated, epidermal cells in surface view.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	8	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	7	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica Gel 'G' using n-Butanol : Acetic acid : Water (4:1:5) shows under visible light two spots at Rf. 0.80 and 0.96 (both grey). Under U.V. (366 nm) four fluorescent zones are visible at Rf. 0.67 (light blue). 0.80 (dark blue). 0.86 (light blue) and 0.96 (dark blue). On exposure to Iodine vapour several spots appear out of which three spots are conspicuous at Rf. 0.30. 0.80 and 0.96 (all yellow). On spraying with 5% Methanolic- Sulphuric acid reagent and heating the plate for ten minutes at 110°C several spots appear out of which three are conspicuous at Rf. 0.10. 0.86 and 0.96 (all grey).

PROPERTIES AND ACTION

Rasa : Madhura
Guna : Guru, Sara, Snigdha
Virya : Śīta
Vipaka : Madhura
Karma : Balya, Pittahara, Bṛmhana, Vṛśya, Vātaśāmaka, Kaphakara, Mūtrala

IMPORTANT FORMULATIONS - Tṛnapancamūla Kvātha, Sukumara Ghṛta, Brahma Rasāyana

THERAPEUTIC USES - Raktapitta, Visarpa, Mūtrakṛccra, Ōjokśya, Nāsa Rakta srāva, Grahaṇi, Pāṇḍu, Kṣataja Kāsa

DOSE - 15-30 gm in decoction form.

17. Kadali (Fl.)

KADALĪ (Flower)

Kadalī Kadali consists of dried flower of *Musa paradisiaca* Linn. (Fam. Musaceae), a monoecious herb, cultivated widely in the country in most of the states.

SYNONYMS

Sanskrit	:	Mouca, Varana, Ambusāra
Assamese	:	Kal, Talha
Bengali	:	Kela, Kala, Kanch Kala
English	:	Banana
Gujrati	:	Kela
Hindi	:	Kela
Kannada	:	Bale gadde, Kadubale, Kattebale, Kadali
Kashmiri	:	--
Malayalam	:	Kadali, Ksetrak
Marathi	:	Kel, Kela
Oriya	:	Kadali, Kadila
Punjabi	:	Kela
Tamil	:	Vazhai, Pazham
Telugu	:	Arati chettu
Urdu	:	Kela (Mouz)

DESCRIPTION

a) Macroscopic

Flower -Inflorescence spike, drug occurs in cut and crumpled pieces, 2.5 to 4.0 cm long sessile, unisexual; calyx and corolla present; calyx 2.5 to 4 cm long crumpled, tubular spathaceous, dark brown having ridges and furrows; corolla 1.5 to 2.5 cm long, connate, crumpled, boat-shaped creamish-yellow, membranous, toothed at apex; stamens 5 + 1 rudimentary, 0.8 to 1.2 cm long dark brown; filament erect, strongly filiform; anthers linear, bithecous; carpels 3, syncarpous, ovary inferior, trilocular, each with several ovules; axile placentation; style 3.0 to 4.5 cm long light brown, filiform; stigma capitate or sub globose, 3 or 4 lobed, greyish-brown; taste arid odour not characteristic.

b) Microscopic

Calyx- Shows thin-walled, single layered, upper and lower epidermis, followed by thin walled, parenchymatous mesophyll, embedding vascular bundle, having usual elements surrounded by some large, thin-walled, specialised cells containing oleo-resin ducts, tannin cells and a few oil globules.

Corolla -Shows thin-walled, striated single layered epidermis on either surface and oval to polygonal in surface view; mesophyll 2 or 3 layered consisting of thin-walled, parenchymatous cells; numerous prismatic crystals of calcium oxalate present in mesophyll.

Androecium - Filament shows single layered epidermis, followed by ground tissues consisting of oval to polygonal, thin-walled, parenchymatous cells having crescent shaped vascular bundles and oleo-resin cells; anther lobe shows two layered wall, 4 to 6 celled tapetum; pollen grains spherical measuring 26 to 47 μ in diam., smooth, yellowish-brown, having clear, thick-walled, pigmented exine, thin-walled, colourless intine.

Gynoecium-Ovary shows single layered, cuticularised epidermis followed by ground tissue consisting of oval, polygonal, thin-walled, parenchymatous cells embedding a few thickened pitted cells; stigma consists of 6 chambers having single layered epidermis.

Powder - Brown, shows fragments of straight walled, polygonal, thin walled epidermal, cells, simple pitted cells, vessels with spiral thickening, anisocytic stomata, a few prismatic crystals of calcium oxalate, spherical, smooth, yellowish-brown pollen grains, having clear exine and intine and measuring 26 to 47 μ in dia., a few oil globules, and oleoresin cells; a few simple, oval or irregular starch grains measuring upto 65 μ in length and 35 μ in width.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	15	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	3	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	18	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' using Toluene: Ethylacetate (9 :1) shows under U.V. (366 nm) six fluorescent zones at Rf. 0.09 (blue), 0.23 (grey), 0.31 (blue), 0.36 (violet), 0.66 (blue) and 0.97 (violet). On exposure to Iodine vapour five spots appear at Rf. 0.23, 0.31, 0.33, 0.66 and 0.97 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate at 105°C for ten minutes four spots appear at Rf. 0.09, 0.23, 0.66 and 0.97 (all blue).

CONSTITUENTS - Saponins, Tannins, reducing and non-reducing Sugars, Sterols and Triterpenes.

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta, Kaṣāya
Guna	:	Dīpana, Mṛdu, Grāhi
Virya	:	Uṣṇa
Vipaka	:	Madhura
Karma	:	Balya, Vṛśya, Pittanaśaka, Ruca, Kaphaghna, Sthambhaka

IMPORTANT FORMULATIONS - Hemanātha Rasa

THERAPEUTIC USES - Kṛmi, Raktapitta, Śvāsa Roga, Pradara

DOSE - 10-20 gm.

18. Karchura (Rz.)

KARCŪRA (Rhizome)

Karcūra consists of dried pieces of rhizome of *Curcuma zedoaria* Rose, (Fam. Zingiberaceae), a large perennial herb with underground tuberous root-stock, growing wildly in eastern Himalayas and in moist deciduous forests of the central region of Karnataka; also cultivated throughout the country.

SYNONYMS

Sanskrit	:	Kaccura, Dravida
Assamese	:	Katuri
Bengali	:	Sali, Ekangi, Sari, Kachura
English	:	Zedoary
Gujrati	:	Kachuro, Shatakachuro
Hindi	:	Kacura
Kannada	:	Kachora
Kashmiri	:	--
Malayalam	:	Kachalam
Marathi	:	Kachora
Oriya	:	Kachoramu, Gandha Sunthi, Karchura
Punjabi	:	Kachur
Tamil	:	Kichili, Kizhangu, Kitchiliki Zhangu, Padam Kizhangu
Telugu	:	Kachoramu, Kichili Gadda
Urdu	:	Zarambad

DESCRIPTION

a) Macroscopic

Drug occurs as whole or longitudinally and tangentially cut pieces; the whole drug 2 to 6 cm long, cylindrical; transversely cut pieces 2 to 3.5 cm in dia., surface rough due to longitudinal wrinkles and occasional protuberances; nodes and internodes distinct, a few pieces bear thin root and root scars at places; colour externally greyish-buff and internally cream; odour, camphoraceous; taste, slightly bitter.

b) Microscopic

Shows a thin zone of cork composed of 4 to 7 layers of thin-walled, tangentially elongated, rectangular cells, sometimes epidermis intact with cork having uniseriate covering trichomes; ground tissue consist of thin-walled, circular, oval or polygonal, parenchymatous cells, mostly filled with simple starch grains but some cells also contain yellow oleo-resin; stelar region demarked from cortex by somewhat collapsed cells of endodermis and consists of rounded and oval to polygonal cells mostly filled with starch grains but some having yellow masses of oleo-resin; vascular bundles closed and

collateral, distributed throughout cortical and stelar region, consisting of a few xylem and phloem elements; vascular bundles found in the form of a ring in the cortical region and in the stelar region, just below endodermis; most of the vascular bundles in rest of the stelar region smaller in size and scattered; number of vessels in each bundle varies from 2 to 10, bundle with single vessels being very rare; starch grains round to oval, a few with slight projection at one end striations distinct, numerous; hilum cleft, indistinct at the narrow end, 20 to 70 μ in length and 15 to 35 μ in width.

Powder - Greyish-yellow; aromatic; shows fragments of cork, oleo-resin cells, simple circular to oval, abundant starch grains measuring 20 to 70 μ in length and 15 to 35 μ in width.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	7	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	2	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	10	per cent, Appendix	2.2.7.
Volatile oil	Not less than	2	per cent, Appendix	2.2.10

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Toluene Ethylacetate (93 : 7) v/v shows under U.V. (366 nm) five fluorescent zones at Rf. 0.25, 0.47, 0.76 (all light blue), 0.83 (blue) and 0.97 (light blue). On exposure to Iodine vapour eight spots appear at Rf. 0.25, 0.34, 0.47, 0.58, 0.67, 0.76, 0.83 and 0.97 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for ten minutes at 110°C eight spots appear at Rf. 0.25 (violet), 0.34 (light violet), 0.47 (violet), 0.58 (violet), 0.67 (light brown), 0.76 (bluish grey), 0.83 (violet) and 0.97 (light brown).

CONSTITUENTS - Essential Oil and Resin.

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta
Guna	:	Laghu, Tikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Dīpana, Kaphahara, Rucya, Vātahara, Mukhavaiśadyakara

IMPORTANT FORMULATIONS - Karpurādyarka, Karcūrādi Cūrṇa (Karcūrādi Lepa), Sūtasēkara Rasa

THERAPEUTIC USES - Arṣa, Hikka, Jvara, Kāsa, Kṛmi, Kuṣṭha, Vṛṇa, Svāsa, Gulma, Plīha, Galagaṇḍa

DOSE - 1-3 gm of the drug in powder form.

19. Kasturilatika (Sd.)

KASTŪRĪLATIKĀ (Seed)

Kastūrīlatkā consists of seed of *Hibiscus abelmoschus* Linn. Syn. *Abelmoschus moschatus* Medik (Fam. Malvaceae), an evergreen shrub about 1.22 m in height cultivated in hotter parts of India.

SYNONYMS

Sanskrit	:	--
Assamese	:	--
Bengali	:	Latakasturi
English	:	--
Gujrati	:	Bhindo, Bhinda
Hindi	:	--
Kannada	:	Kasturi Kande, Kadu Kastuar
Kashmiri	:	--
Malayalam	:	Kattu Kasthuri, Kasturi Kanda
Marathi	:	Kasturbhendi
Oriya	:	--
Punjabi	:	Mushak Dana, Lata Kasturi
Tamil	:	Kasturi-vendai
Telugu	:	Kasturi Benda
Urdu	:	--

DESCRIPTION

a) Macroscopic

Seeds greyish-brown and blackish, not velvety to touch, kidney-shaped, slightly compressed with shallow depressions on both sides, marked with minute parallel ridges and furrows; hilum small and distinct; odour, musk-like; no taste.

b) Microscopic

Shows two integuments, outer integument forms ridges and furrows; epidermis consists of single layered tangentially elongated cells, followed by 1 to 3 layers of thin-walled tangentially elongated cells in the region of furrows; 1 to 4 rows of rounded, thick-walled cells containing yellowish-brown masses with 1 or 2 of the upper most rows thin-walled, tangentially elongated and pointed cells present in the region of ridges; inner integument represented by palisade like cells, containing some granular masses followed by thin and thick-walled parenchyma; the thick-walled being 4 to 8 layered, compactly arranged, tangentially elongated, having reddish-brown contents, followed by the thin-walled and colourless cells; 8 to 12 layers of cells large, isodiametric to oval; a single layer of tangentially elongated cells present; cotyledons two, consisting of single

layered cubical to irregular cells of epidermis covered by cuticle and followed by a single layered palisade like cells; the rest of the cotyledons consists of 4 to 6 rows of thin-walled, isodiametric cells filled with granular masses; lower epidermis composed of a single layer of cells covered with cuticle.

Powder - Greyish-brown; shows brown coloured parenchyma cells, rounded, thick walled cells, a few palisade cells and polygonal and straight walls epidermal cells in surface view

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	5	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.3	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	10	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	9	per cent, Appendix	2.2.7.
Fixed Oil	Not less than	10	per cent, Appendix	2.2.8

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' plate using Toluene: Ethylacetate (9: 1) under UV (366 nm) shows two fluorescent zones at Rf. 0.36 and 0.93 (both blue). On exposure to Iodine vapour five spots appear at Rf. 0.19, 0.31, 0.53, 0.71 and 0.93 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for about ten minutes at 110°C five spots appear at Rf. 0.19, 0.31, 0.53, 0.71 and 0.93 (all grey). On spraying with 5% Vanillin-Sulphuric acid reagent and heating the plate for ten minutes at 110°C five spots appear at Rf. 0.19, 0.31, 0.53, 0.71 and 0.93 (all grey).

CONSTITUENTS - Fixed Oil and Volatile Oils

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta
Guna	:	Laghu
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Cakṣusya, Kaphahara, Vṛṣya, Cedini, Mukhadaurgandhyanaṣaka, Vasti Viṣōdhani

IMPORTANT FORMULATIONS - Karpurādyarka

THERAPEUTIC USES - Tṛśna, Mukha Rōga, Vasti Rōga

DOSE - 2-4 gm of the drug in powder form.

20. Kataka (Sd.)

KATAKA (Seed)

Kataka consists of dried seed of *Strychnos potatorum* Linn. f.(Fam. Loganiaceae), a tall tree occurring plentifully in deciduous forests in most of the parts of the country upto 400m.

SYNONYMS

Sanskrit	:	Nirmali, Payah Prasadisa
Assamese	:	--
Bengali	:	Nirmali
English	:	Clearing nut
Gujrati	:	Nirmali
Hindi	:	Chillikavi
Kannada	:	Katakam, Tetramabaral
Kashmiri	:	--
Malayalam	:	Katakam
Marathi	:	Nirmal
Oriya	:	--
Punjabi	:	Nirmali
Tamil	:	Kottai
Telugu	:	Chilla
Urdu	:	--

DESCRIPTION

a) Macroscopic

Seed upto 8 mm dia., circular, bluntly lenticular, shiny with short, appressed silky hairs; cream-white in colour with a slightly prominent ridge round the border, no bitterness, (Seeds of *Strychnos nux-vomica* bitter).

b) Microscopic

Shows testa, consistmg of 2 or 3 layers, thick-walled, elongated, lignified sclerenchymatous cells covered with numerous, cylindrical, unicellular, lignified, trichomes having basal portion ramified; outer endosperm composed of 3 to 8 layers of thick-walled, elongated palisade-like cells arranged in rows, an inner endosperm composed of thin-walled, oval to polygonal, parenchymatous cells having numerous small aleurone grains and oil globules.

(In seed of *Strychnos nux-vomica* base of trichome is pitted, bulbous, ramified with a projection normally elongated and thick-walled).

Powder - Creamish-yellow and oily; shows fragments of testa, trichomes, endosperm cells and oil globules.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	2	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	1	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	5	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G" plate using Toluene: Ethylacetate : Diethylamine (70:20: 1 0). On spraying with Dragendorff reagent with tartaric acid two spots appear at Rf. 0.38 (orange and corresponding to that of Brucine) and at Rf. 0.55 (faint orange and corresponding to that of Strychnine).

CONSTITUENTS - Alkaloids.

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta, Kaṣāya
Guna	:	Śīta, Guru
Virya	:	Uṣṇa
Vipaka	:	Madhura
Karma	:	Cakṣusya, Vātahara, Śleṣmahara, Vicaghṇa, Pittala, Aśu D ṛṣṭiprasadakṛt (Kaśyapa), Jala Prasadakara

IMPORTANT FORMULATIONS - Daṣamūlāriṣṭa, Niruryādi Guṭika

THERAPEUTIC USES - Aruci, Kṛmi, Pramēha, Mutrakṛcchra, Mutrāśmari, Tṛsṇa, Śula. Nētrarōga, Śarkara Mēha, Rakta Abhiśyanda, Vṛscika Viṣa, Apasmāra

DOSE - 3-6 gm.

21. Kharjura (Drd. Ft.)

KHARJURA (Dried Fruit)

Kharjura consists of dried fruit, with seeds removed, of *Phoenix dactylifera* Linn. (Fam. Araceae), a tall tree upto 36 m high, cultivated or occasionally self-sown in arid parts of the country.

SYNONYMS

Sanskrit	:	Pinḍa Kharjura
Assamese	:	Tamar
Bengali	:	Sohara
English	:	Dried Dates
Gujrati	:	Kharek, Kharika
Hindi	:	Chuhara, Chohara
Kannada	:	Karinchula, Khajura
Kashmiri	:	--
Malayalam	:	Intappazham, Inthappana
Marathi	:	Kharika, Kharik Phala, Khajur, Kharik
Oriya	:	Kharjjuri, Khajur
Punjabi	:	Khajur
Tamil	:	Pericham, Karchuram, Perichehantay
Telugu	:	Kharjura, Kharjuramu
Urdu	:	Khurma (Khajoor)

DESCRIPTION

a) Macroscopic

Fruit an oblong berry, 2.5 to 7.5 cm long, wrinkled, hard, reddish-brown, and sweet

b) Microscopic

Shows a wide pericarp consisting of a single layered epidermis covered with striated cuticle; below epidermis 3 to 5 layers of tangentially elongated, tabular, thin walled cells followed by a layer of stone cells with narrow lumen, thick walled, 28 to 55 μ in dia., with clear striations; below this a wide zone of oval to elongated, thin-walled parenchymatous cells present; cells of outer 10 layers more elongated than the inner ones; some vascular bundles, groups of tanniniferous idioblasts and oil globules present scattered in this region.

Powder - Reddish-brown; shows groups of thin-walled parenchyma; stone cells, oil globules and tanniniferous idioblasts.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	3	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	20	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	74	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' using n-Butanol : Acetic acid : Water (5:1:4) shows in visible light one spot at Rf. 0.12 (grey). On exposure to Iodine vapour two spots appear at Rf. 0.12 and 0.25 (both yellow). On spraying with 5% Methanolic-Sulphuric acid reagent four spots appear at Rf. 0.12, 0.25 (both black), 0.33 and 0.62 (both grey).

CONSTITUENTS - Sugars, Tannins and Vitamins.

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṣāya
Guna	:	Guru, Snigdha
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Balya, Hṛdya, Kaphahara, Pittahara, Vātahara, Vṛśya, Tarpaṇa, Bṛmhaṇa, Śukrala

IMPORTANT FORMULATIONS - Drākṣādi Curṇa, Ēlādya Mōḍaka, Elādi Guṭika, Śiva Guṭika (Laghu)

THERAPEUTIC USES - Śrama, Dāha, Gulma, Hikka, Jvara, Kāsa, Murccha, Pramēha, Raktapitta, Svāśa, Kṣaya, Ksata Kṣaya, Tṛśṇa, Madātyaya, Abhighāta, Mukha, Pittaśūla, Vairasya

DOSE - 10-15 gm.

22. Kharjura (Fr. Ft)

KHARJURA (Fresh Fruit)

Kharjūra consists of ripe and mature fruit with seed removed, of *Phoenix dactylifera* Linn. (Fam. Araceae), a tall palm tree upto 36 m high, cultivated or occasionally self-sown in arid parts of the country

SYNONYMS

Sanskrit	:	Aharjūra, Piṇḍa Kharjrūra
Assamese	:	--
Bengali	:	Khejur
English	:	Date
Gujrati	:	Khajur
Hindi	:	Khajur, Pinda, Khajur
Kannada	:	Kharjura, Pinda Kharajura
Kashmiri	:	--
Malayalam	:	Prantha Puzam
Marathi	:	Khajur
Oriya	:	Khejuri
Punjabi	:	Pinda Khajur
Tamil	:	Pericham Pazham
Telugu	:	Khajur pupandu
Urdu	:	Khurma (Khajoor)

DESCRIPTION

a) Macroscopic

Fruit a berry, oval to oblong, compressed, of varying shapes; 2 to 3 cm long, smooth or slightly wrinkled, reddish-brown to yellowish-brown; pulp fleshy, sticky, soft, viscous; odour, not distinct; taste, sweet.

b) Microscopic

Fruit shows single layered epidermis with striated cuticle, containing heavily cutinized cells and having stomata; below epidermis, 4 or 5 layered tangentially elongated, thin-walled, parenchymatous hypodermis present, followed by a row of stone cells with narrow lumen, thick-walled, 28 to 55 µ in dia., with clear striations; mesocarp differentiated into two zones, outer consisting of thin-walled parenchyma cells with scattered tannin, and oil globules, inner consisting of collapsed, crushed and disorganized cells appearing as loose, shining, 'fibrous' mass, representing the so called "rag." scattered sclerosed cells also occur in this region; endocarp composed of single layered inner epidermis together with underlying compact tissues.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	3	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	20	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	65	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica Gel 'G' using n-Butanol : Acetic acid : Water (5:1:4) shows in visible light one spot at Rf. 0.12 (grey). On exposure to Iodine vapour two spots appear at Rf. 0.12 and 0.25 (both yellow). On spraying with 5% Methanolic-Sulphuric acid reagent four spots appear at Rf. 0.12, 0.25 (both black), 0.33 and 0.62 (both grey).

CONSTITUENTS - Sugars, Protein and Vitamins

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṣāya
Guna	:	Guru, Snigdha
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Balya, Hṛdya, Kaphahara, Pittahara, Tarpaka, Vātahara, Mamsavardhaka, Śukrakara, Rucikara, Kōṣṭhagata Vāyunāśaka, Vāmaka, Kṣudha Śramahara

IMPORTANT FORMULATIONS - Drākṣādi Cūrṇa, Ēlādya Modaka, Ēlādi Guṭika, Śiva Guṭika (Lagu)

THERAPEUTIC USES - Abhighāta, Dāha, Kāsa, Madātyaya, Raktapitta, Svāśa, Tṛṣa, Kṣata Kṣaya, Jvarātīsara, Mūrccha

DOSE - 10-50 gm.

23. Krishna Sariva (Rt.)

KṚṢṆASĀRIVĀ (Root)

Kṛṣṇasāriva consists of dried roots of *Cryptolepis buchanani* Roem. & Schult. (Fam. Asclepiadaceae), a perennial, much branched climber with milky juice, found throughout the country from Western Kashmir to Assam, ascending to 1200 m in the Himalayas and in south upto Kerala.

SYNONYMS

Sanskrit	:	Jambu Patra, Śyāma, Kṛṣṇavalli, Kṛṣṇamūli
Assamese	:	--
Bengali	:	Shyamalata, Krishna Saarivaa
English	:	--
Gujrati	:	--
Hindi	:	Kaleesar, Kalee Anantmool
Kannada	:	Karccumbu
Kashmiri	:	--
Malayalam	:	Kalipalvalli
Marathi	:	Mothi Kawalee, Kallee Kawalee
Oriya	:	--
Punjabi	:	--
Tamil	:	--
Telugu	:	Naltig, Adavipalatige, Rokallipala
Urdu	:	--

DESCRIPTION

a) Macroscopic

Roots vary in length and are 1 to 1.5 cm thick; slender, cylindrical, dark brown or blackish; rough due to fine longitudinal ridges and wrinkles running sinuously lengthwise; thicker roots show a few transverse cracks, fissures and longitudinal wrinkles with remnants of rootlets and a few lenticels; cork easily peelable; fracture, short and fibrous; odour, slightly aromatic; taste, sweet and astringent.

b) Microscopic

Shows thin cork consisting of 4 to 14 layers of thin-walled, rectangular to tangentially elongated cells, arranged radially; cork cambium single layered, followed by a wide zone of secondary cortex composed of polyhedral, oval to tangentially elongated cells having fibres in single or in groups of two to ten; fibres long, thick-walled but very occasionally appear also as elongated stone cells; secondary phloem wide consisting of sieve elements, phloem parenchyma, fibres and a few crysta1 fibres, and traversed by phloem rays; phloem fibres occur in small groups or rarely in singles, somewhat similar

in shape to those of secondary cortex with comparatively thicker walls; crystal fibres elongated, thick-walled and divided into chambers, usually 7 to 17 in number, each chamber containing a prismatic crysta1 of calcium oxalate; medullary rays urn-to triseriate; cambium 2 to 4 layered; secondary xylem composed of vessels, tracheids, fibre-tracheids, fibres and parenchyma and traversed by xylem rays; vessels with bordered pits, and filled with tyloses; tracheids long and narrow having bordered pits, and moderately thick-walls; xylem parenchyma usually rectangular in shape with pitted walls but some of the pits become T or Y shaped with reticulate thickening; xylem elements thick-walled and lignified; simple and compound starch grains found in abundance in all parenchymatous cells simple being elliptical to oval, measuring 3 to 19 μ in dia., with central hilum and compound with 2 or 3 components.

Powder - Light grey; shows fragments of cork cells, vessels having bordered pits, tracheids, fibres, prismatic crystals of calcium oxalate, starch grains numerous, simple and compound, elliptical to oval, measuring 3 to 19 μ in dia., with central hilum and compound with 2 or 3 components.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	6	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	8	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	7	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Chloroform: Methanol (90 : 10) shows under U.V. (366 nm) ten fluorescent zones at Rf. 0.05, 0.10, 0.22, 0.30 (all blue), 0.39 (yellow), 0.49, 0.60, 0.72, 0.80 (all blue) and 0.88 (violet). On exposure to Iodine vapour nine spots appear at Rf. 0.09, 0.17, 0.26, 0.35, 0.43, 0.61, 0.74, 0.88 and 0.96 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for about ten minutes at 110°C eight spots appear at Rf. 0.09, 0.17 (both gery), 0.26 (blue), 0.35, 0.43, 0.49, 0.61 and 0.96 (all violet).

CONSTITUENTS - Alkaloids.

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta
Guna	:	Guru, Snigdha
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Tridōṣahara, Tṛṣṇahara, Ama Viṣaghna, Śukrakara, Viṣaghna, Kaphanaśaka, Sangrāhi, Rakta Vikara Naṣaka, Rucya

IMPORTANT FORMULATIONS - Candanādi Taila, Śatāvari Guḍa, Kalyanaka Gṛa, Triphala Ghṛta, Bṛhata Phala Ghṛta, Maha Kalyanaka Ghṛta, Maha Tiktaka Ghṛta, Maha Pancagavya Ghṛta, Vastyamayantaka Ghṛta, B ṛhatcchāgalyādi Ghṛta

THERAPEUTIC USES - Agnimāndya, Aruci, Atisāra, Jvara, Kṣaya, Kuṣṭha, Pradara, Pramēha, Raktapitta, Svāśa, Kāśa, Mukha Daurgandhya, Kaṇdu, Vāta Rakta, Dēhadurgandha

DOSE - 5-10 gm.

24. Kunduru (Exud.)

KUNDURU (Exudate)

Kunduru consists of exudate of *Boswellia serrata* Roxb. (Fam. Burseraceae), a moderate sized, deciduous tree, upto 18 m in height and upto 2.4 m in girth, commonly found in the dry forests from Punjab to West Bengal and in peninsular India.

SYNONYMS

Sanskrit	:	Śallaki
Assamese	:	Sallaki
Bengali	:	Luban, Salai, Salgai
English	:	--
Gujrati	:	Shaledum, Saleda, Saladi, Gugal, Saledhi
Hindi	:	Salai, Labana
Kannada	:	Madimar, Chilakdupa, Tallaki, Maddi
Kashmiri	:	Kunturukkam, Samprani
Malayalam	:	--
Marathi	:	Salai cha dink
Oriya	:	--
Punjabi	:	Salai Gonda
Tamil	:	Parangi Sambrani
Telugu	:	Parangi sambrani, Anduga, Kondagugi tamu
Urdu	:	Kundur

DESCRIPTION

a) Macroscopic

Drug occurs in stalactitic, transparent, tears forming agglomerates of various shapes and sizes, brownish-yellow, upto 5 cm long, 2 cm thick, fragrant, fracture brittle; fractured surface waxy and translucent; burns readily and emanates an agreeable characteristic, balsamic resinous odour; taste, aromatic and agreeable.

b) Microscopic

Debris of fibres, rectangular cork cells, very few yellowish oil globules and numerous, small or large, oval to round or rhomboidal crystalline fragments present.

Identification - Trituration with water forms an emulsion; when immersed in alcohol (90%) a tear of' Kunduru is not altered much in form but becomes almost opaque and white; when a drop of con. H_2S04 is added on a freshly fractured surface, it becomes cherry red which, when washed with water changes to a white emulsion, then turn to a buff colour.

Fluorescence Test - Brownish-yellow colour in day light; aqueous extract under U.V. light (366 nm) light green and in (254 nm) shows dark blue colour; alcoholic extract under U.V. light (366 nm) is colourless and in (254 nm) shows light green colour.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	5	per cent, Appendix	2.2.2.
Total Ash	Not more than	10	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	8	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	45	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	28	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica Gel 'G' using Toluene : Ethylacetate (9: 1) shows under U.V. (366nm) four fluorescent zones at Rf. 0.23 (light blue), 0.79 (light blue), 0.91 (blue) and 0.96 (blue). On exposure to Iodine vapour nine spots appear at Rf. 0.08, 0.23, 0.29, 0.41, 0.47, 0.55, 0.82, 0.91 and 0.96 (all yellow). On spraying with Vanillin Sulphuric acid reagent and heating the plate for ten minutes at 110°C tailing with four conspicuous spots appear at Rf. 0.23, 0.55, 0.79 and 0.91 (all violet).

CONSTITUENTS - Oleo-gum-resins.

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta
Guna	:	Guru, Snigdha, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Madhura
Karma	:	Balya, Kaphahara, Vātahara, Kaphapittahara, Rakta Stambhahar, Svēdahara

IMPORTANT FORMULATIONS - Karpuradyarka, Jirakādi Modaka, Bala Tila, Bala Guducyādi Tāila

THERAPEUTIC USES - Jvara, Pradara, Svāśa, Pittabhiśyanda, Sarkaramēha, Vṛśana Śūla, Mukharoga, Uka

DOSE - 1-3 gm.

25. Kumkuma (Sty & Stg.)

KUNKUMA (Style and Stigma)

Kunkuma consists of dried style and stigma from the flowers of *Crocus sativus* Linn. (Fam. Iridaceae), a small bulbous perennial, 15 to 25 cm high and cultivated by corms in the Kashmir valley, specially in the Pampor plateau, at about 1600 m.

SYNONYMS

Sanskrit	:	Kēśara, Ghuśiṇa, Kāśmīra, Rakta
Assamese	:	Kumkum
Bengali	:	Jafran
English	:	Saffron
Gujrati	:	Keshar, Kesar
Hindi	:	Keshar, Keshara
Kannada	:	Kunkuma, Kesari
Kashmiri	:	--
Malayalam	:	Kunkuma Puvu
Marathi	:	Keshar
Oriya	:	--
Punjabi	:	Kesar, Keshar
Tamil	:	Kungumapuvu
Telugu	:	Kunkuma Puvvu
Urdu	:	Zafran

DESCRIPTION

a) Macroscopic

Yellowish style, broken or intact along with trifid stigma; stigma is dark red or reddish-brown, cornucopia shaped, with fimbriate margin, and about 25 mm long; broken style are very thin, upto about 10 mm ong; odour, strongly aromatic; taste, slightly bitter.

b) Microscopic

Stigma composed mostly of elongated, thin-walled, parenchyma cells containing colouring matter; at the upper end numerous cylindrical papillae or trichomes up to 150 microns long present; pollen grains, a few, spherical, nearly smooth, from 40 to 120 microns in dia; occasionally germinated and exhibiting pollen tubes.

Powder - Pale reddish-brown; aromatic, shows elongated, thin-walled, parenchymatous cells, unicellular trichomes, a few spherical, smooth, pollen grains measuring 40 to 120 μ in dia. and xylem vessels with annular and spiral thickenings.

IDENTITY, PURITY AND STRENGTH-

Identification

i. When sprinked on sulphuric acid, the stigmas turn blue immediately, gradually changing to purple and finally purplish red.

ii. Stamens of safflower and florets of marigold should be absent; should be free from artificially dyed corn silk or fibres.

Organic dyes:

i. Digest about 0.1 g in 10 ml of water for 15 minutes with frequent shaking, filter and add 1 g of decolorising charcoal to the filtrate; shake and allow to stand for 10 minutes; filter; the fitrate is colourless.

ii. Macerate 10 mg in 5 ml of alcohol (95 per cent) or methanol; a distinct greenish yellow colour is imparted to the liquid; with corresponding quantities of Kunkuma in ether or chloroform the solvents remain almost colourless; so also with xylene, benzene or carbon tetrachloride.

Absence of Fixed oil or glycerin: Press between clear filter paper, the paper does not display translucent oily spots.

Foreign organic matter - Not more than 2 per cent. Styles not more than 10 per cent.

Loss on drying: Loses not more than 14 per cent of its weight, when dried at 100°C.

Ash: Not more than 7.5 per cent.

Acid-insoluble ash: Not more than 1 per cent.

Assay: Weigh accurately 0.1 g in moderately fine powder and macerate at room temperature in 100 ml of water for 3 hours with frequent shaking. Filter immediately, adding sufficient water through the filter to make 100 ml. Dilute 10 ml of this filtrate, accurately measured, to 100 ml with water. Immediately compare the colour of this solution in Nessler tubes or in a colorimeter, with the colour of N/100 potassium dichromate. The colour of the solution approximates that of the N /100 potassium dichromate, and the strength of the colour is not less that of an equal depth in mm of the N /100 potassium dichromate.

CONSTITUENTS - Essential Oils, Bitter Glycoside, Picrocrocin and Crocin

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta
Guna	:	Snigdha
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Vātahara, Varṇya, Viśaghna, Slēṣmahara, Rasayana, Jantuhara

IMPORTANT FORMULATIONS - Karpuradyarka, Bālarka Rasa, Yakuti, Kunkumadya Taila, Mahanārāyaṇa Taila, Puśyanuga Cūrṇa

THERAPEUTIC USES - Chardi, Kāsa, Vraṇa, Vyanga, Śiroroga, Dṛṣti Rōga, Kantha Rōga, Sidhma, Mutraśōtha, Udāvartta, Mutraghāta, Suryavartta, Ardhava Bhedaka.

DOSE - 25-50 mg.

26. Kushmanda (Ft.)

KŪSMĀṆḌA (Fruit)

Kūśmāṇḍa consists of the dried piece of fruits of *Benincasa hispida* (Thunb.) Cogn. (Fam. Cucurbitaceae), an extensive trailing or climbing herb cultivated throughout the plains of India and on the hills upto 1200 m altitude, as a vegetable.

SYNONYMS

Sanskrit	:	Puśpaphalam, Bṛihatphalam
Assamese	:	Kumra
Bengali	:	Chal Kumra
English	:	White guard melon
Gujrati	:	Safed Kohalu, Bhuru, Kohalu, Bhuru Kolu
Hindi	:	Kushmand, Petha
Kannada	:	Boodi Humbala
Kashmiri	:	--
Malayalam	:	Kumbalanga
Marathi	:	Kohala
Oriya	:	Kakharu, Panikakharu
Punjabi	:	Petha
Tamil	:	Pooshanikkai
Telugu	:	Boodida Gummadi
Urdu	:	Petha

DESCRIPTION

a) Macroscopic

Drug occurs in deformed, compressed, cut pieces of various sizes; epicarp cream coloured with light yellowish to brownish mesocarp; taste, slightly acidic.

b) Microscopic

Mature fruit shows cuticularised epicarp consisting of single layered, squarish or slightly tangentially elongated cells of epidermis, outer tangential walls of epidermis thickened and cuticularised; a few epidermal cells divide periclinally and become 2 or 3 layered; mesocarp has a heterogenous structure consisting of multilayered hypodermis composed of tangentially elongated, thin-walled, parenchymatous cells; immediately within this is a zone of thick-walled, multilayered, lignified sclereids with the outer one to three layers thicker than the inner 2 to 6 or more layers; beneath this zone, thin-walled tangentially elongated, parenchymatous cells present, their size gradually increasing from those at periphery to those inside of mesocarp, the latter becoming circular having conspicuous intercellular spaces; vascular bundles poorly developed, bicollateral, found scattered throughout mesocarp.

Powder - Dirty brown; shows numerous fragments of thin-walled, tangentially elongated and circular parenchymatous cells, numerous sclereids in groups and singles and a few fragments of xylem vessels having spiral thickenings.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	12	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	10	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	24	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Benzene: Ethylacetate (9:1) shows under U.V. (366nm) two fluorescent zones at Rf. 0.71 and 0.79 (both violet). On exposure to Iodine vapour eight spots appear at Rf. 0.07, 0.18, 0.28, 0.40, 0.50, 0.59, 0.71 and 0.79 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate at 105°C for ten minute six spots appear at Rf. 0.07, 0.18, 0.40, 0.50, 071 and 0.79 (all violet).

CONSTITUENTS - Fatty Oil

PROPERTIES AND ACTION

Rasa	:	Madhura, Amla
Guna	:	Laghu
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Balya, Dīpana, Hṛdya, Vṛśya, Bastiśōdhaka, Mēhana, Tridoṣahara, Jīrṇāṅga Puṣti Prada, Bastiśōdhaka, Śramsana, Arōcakahara, Vātapittajit

IMPORTANT FORMULATIONS - Vastyamayantaka Ghṛta, Kuśmāndaka Rasāyana, Dhātryādi Ghṛta

THERAPEUTIC USES - Mutraghāta, Mutrakṛcchra, Pramēha, Tṛśṇa, Aśmari, Mānasa Vikara, Malabandha

DOSE - 5-10 gm.

27. Madayanti (Lf.)

MADAYANTĪ (Leaf)

Madayantī consists of dried leaves of *Lawsonia inermis* Linn. (Fam. Lythraceae); a small, elegant bush with fragrant flowers, cultivated and naturalised all over the country.

SYNONYMS

Sanskrit	:	Nil Madayantika
Assamese	:	--
Bengali	:	Mehadi
English	:	Henna
Gujrati	:	Mendi
Hindi	:	Mehandi
Kannada	:	Goranta, Korate, Madarangi
Kashmiri	:	--
Malayalam	:	Mailanelu
Marathi	:	Mendi
Oriya	:	--
Punjabi	:	Mehndi
Tamil	:	Marudum
Telugu	:	Gorinta
Urdu	:	Mehendi, Hina

DESCRIPTION

a) Macroscopic

Leaves simple, 2 to 3 cm in length, 1 to 1.5 cm in width, greenish-brown to dull green; entire, lanceolate; apex mucronate, base tapering, petiole short and glabrous; odour, aromatic when crushed; taste, sweet, mucilaginous and slightly astringent.

b) Microscopic

Petiole -shows concavo-convex outline; epidermis consisting of single layered cells covered by thick, striated cuticle; below epidermis 2 to 4 layered collenchyma and 3 to 4 layered parenchyma having intercellular spaces; pericycle 2 to 4 layered, stele bicollatera1; cambium a thin strip present between xylem and phloem; phloem consisting of usual elements; xylem mostly composed of tracheids and vessels.

Midrib -shows upper and lower epidermis covered externally by thick and striated cuticle; epidermis followed by 2 to 4 layers of collenchymatous cells, circular in shape with angular thickening; beneath which are 3 or 4 layers of parenchymatous cells, isodiametric with intercellular spaces; stele crescent-shaped, consisting of usual elements traversed by medullary rays; phloem fibres seen in the phloem region; a few

parenchymatous cells contain rosette and prismatic crystals of calcium oxalate.

Lamina - shows upper and lower epidermis composed of tangentially elongated cells covered externally by a thick striated cuticle; some large epidermal cells form mucilage sacs projecting into adjacent palisade zone; anomocytic stomata distributed on both surfaces; mesophyll composed of 1 to 3 layers of palisade tissue and 2 to 4 layers of spongy parenchyma; palisade cells filled with chloroplasts, spongy parenchyma oval to circular in shape, oil globules present in palisade and spongy parenchyma; rosette and prismatic crystals of calcium oxalate also present in spongy parenchyma; mesophyll traversed by vascular strands composed of xylem surrounded by phloem with a patch of sclerenchymatous fibres on abaxial side; average stomatal index 10 to 15 and 15 to 18 in upper and lower surface the respectively; palisade ratio 5 to 8 on both surfaces; vein islet number 30 to 45.

Powder - Dark brown; shows fragments of thin-walled, parenchyma cells, wavy thin-walled epidermal cells in surface view, anomocytic stomata, rosette and prismatic crystals of calcium oxalate, a few oil globules, and vessels showing spiral thickenings.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	11	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	3	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	18	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	25	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using Toluene : Ethylacetate (9:1) shows in the visible light three spots at Rf. 0.35, 0.60 and 0.63 (all grey). Under U.V. (366 nm) seven spots appear at Rf. 0.18, 0.26, 0.35, (all violet), 0.39, 0.61, 0.68 (all reddish violet) and 0.73 (violet). On spraying with 5% Methanolic Sulphuric acid regent and heating the plate at 105°C for ten minutes five grey colour spots appear at Rf. 0.09, 0.41, 0.61, 0.70 and 0.95.

CONSTITUENTS - Glycosides, colouring matter (Lawsone), Hennotannic acid, Essential Oil containing β-Ionone.

PROPERTIES AND ACTION

Rasa	:	Tikta, Kaṣāya
Guna	:	Laghu, Rukṣa
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Kaphaśāmaka, Pittaśāmaka

IMPORTANT FORMULATIONS - Madayanyādi Cūrṇa

THERAPEUTIC USES - Bhrama, Jvara, Kandu, Kuṣṭha, Raktapitta, Kāmala, Raktapittahara, Mūtrakṛcchra, Vraṇa.

DOSE - 5-10ml (Svarasa)

28. Mahanimba (St.Bk.)

MAHĀNIMBA (Stem Bark)

Mahānimba consists of dried stem bark of *Melia azedarachta* Linn. (Fam. Meliaceae), a moderate sized deciduous tree, 9 to 12 m high with a cylindrical bole, naturalized throughout the country and occurring wild in the sub-Himalayan tracts upto 1800 m.

SYNONYMS

Sanskrit	:	Ramyaka, Drēka
Assamese	:	Khammaga
Bengali	:	Ghoranim
English	:	Persian Lilac
Gujrati	:	Bakan Limado, Bakai Nimbu
Hindi	:	Bakain, Drek
Kannada	:	Kadu bevu
Kashmiri	:	--
Malayalam	:	Malaveppu
Marathi	:	Bakana Nimb
Oriya	:	--
Punjabi	:	Dharek, Bakain, Drek
Tamil	:	Malaivembu
Telugu	:	Turakavepa
Urdu	:	Neem

DESCRIPTION

a) Macroscopic

Bark comparatively thin, about 0.2 to 0.6 cm thick; outer surface black and rough being slightly fissured and exfoliating in small slightly woody pieces light and dark-grey to greyish-black in colour; inner bark made up of creamy layer alternating with whitish ones; fracture, fibrous; taste, extremely bitter.

b) Microscopic

Mature bark shows outer zone of rhytidoma, formed of alternating strips of dark brown cork cells and dead secondary phloem; cork cells compressed, almost rectangular and many layered; secondary phloem multilayered and compressed; cork cambium and secondary cortex almost absent; beneath rhytidoma a wide zone of secondary phloem present, with sieve tubes with compound sieve plates, and with groups of fibres; phloem parenchyma oval to irregular, thin-walled, colourless with intercellular spaces; phloem rays 2 to 5 cells wide; rosette and prismatic crystals of calcium oxalate present in phloem parenchyma and ray cells; a few very small, simple, round to oval, starch grains

measuring 5 to 11 μ in dia., having 2 or 3 components.

Powder - Greyish-yellow; shows fragment of cork cells, phloem fibres, rosette and prismatic crystals of calcium oxalate and small, simple round to oval, starch grains measuring 5 to 11 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	11	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	6	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	7	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Chloroform: Methanol (9: 1) under U.V. (366 nm) shows eight fluorescent zones at Rf. 0.10, 0.26, 0.34, 0.50, 0.68, 0.76, 0.86 (all blue) and 0.95 (bluish green). On exposure to Iodine vapour nine spots appear at Rf. 0.10, 0.18, 0.26, 0.34, 0.50, 0.64, 0.76, 0.86 and 0.95 (all yellow). On spraying with Dragendorff reagent followed by 5% Methanolic-Sulphuric acid reagent two spots appear at Rf. 0.26 and 0.95 (both orange).

CONSTITUENTS - Tannins and Alkaloids.

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta, Kaṣāya
Guna	:	Rukṣa
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Grahi, Kaphajita, Pittajita, Rakta Vikārajita, Dāhanāśaka, Pittakaphahara, Raktadāhahara

IMPORTANT FORMULATIONS - Bṛhanmanjiṣādi Kvatha Cūrna, Maha Viṣagarbha Taila.

THERAPEUTIC USES - Arṣa, Bhrama, Chardi, Gulma, Kuṣṭha, Pramēha, Svāśa, Hṛllāsa, Muśika Viśa, Viśuci, Viṣamajvara.

DOSE - 5-10 gm.

29. Mandukaparni (W.P.)

MANDŪKAPARṆI (Whole Plant)

Mandūkaparṇī consists of dried whole plant of *Centella asiatica* (Linn.) Urban. Syn. Hydrocotyle asiatica Linn. (Fam. Apiaceae), a prostrate, faintly aromatic, stoloniferous perennial herb, commonly found as a weed in crop fields and other waste places throughout India upto an altitude of 600 m.

SYNONYMS

Sanskrit	:	Manduki, Darduracchada
Assamese	:	Manimuni
Bengali	:	Jholkhuri, Thalkuri, Thankuni
English	:	Indian Pennywort
Gujrati	:	Khodabrahmi, Khadbhrammi
Hindi	:	Brahma Manduki, Brahmi
Kannada	:	Ondelaga, Brahmi soppu
Kashmiri	:	--
Malayalam	:	Kodangal
Marathi	:	Karivana
Oriya	:	--
Punjabi	:	Brahmi
Tamil	:	Vallarai
Telugu	:	Saraswati Aku, Vauari
Urdu	:	Brahmi

DESCRIPTION

a) Macroscopic

Small creeping herb with slender stem, rooting at nodes giving rise to thin, brownish-grey, roots of about 2.5 to 6.0 cm in length; leaves 1 to 3 from each node, orbicular-reniform, crenate, base cordate, petioles channelled with adnate stipules; flowers fascicled umbels each carrying 3 or 4 flowers, short stalked; fruits cremocarp, ovoid, with laterally compressed seeds.

b) Microscopic

Root - Shows wavy outline, consisting of 3 to 5 layered, rectangular, cork cells having exfoliated cells, followed by 3 or 4 layers of parenchyma cells containing oval to round, simple, starch grains measuring 8 to 16 μ in dia., having centric hilum and microsphenoidal crystals of calcium oxalate; secondary cortex composed of thin-walled, oval to polygonal, parenchymatous cells; secretory cells present, scattered towards periphery region; secondary phloem and secondary xylem consisting of usual elements; vessels lignified with reticulate and spiral thickening; pith nearly obliterated.

Stem - More or less concave-convex outline, shows single layered epidermis composed of round to cubical cells covered by striated cuticle; below this 2 or 3 layers of collenchymatous cells, followed by 6 to 8 layers of thin-walled, isodiametric, parenchymatous cells with intercellular spaces present; vascular bundles collateral, open, arranged in a ring, capped by patches of sclerenchyma and traversed by wide medullary rays; vessels with spiral thickening present, resin duct present in parenchymatous cells of cortex and generally one in between vascular bundles; pith of isodiametric, parenchyma with intercellular spaces.

Leaf-

Petiole - shows a characteristic outline due to two projections adjacent to ventral groove; epidermis single layered, cells cubical covered by a thick cuticle; inner walls of epidermal cells adjoining the cortex much thickened; hairs absent; collenchyma 2 or 3 layered, absent on the projections, a broad zone of more or less rounded parenchyma cells present with intercellular spaces, and a few containing rosette crystals of calcium oxalate; resin canal present on dorsal side of each vascular bundle except in the vascular bundles occurring projecting arms; vascular bundles seven in number, two of which less developed and present in projections.

Midrib - show a single layered epidermis, 2 or 3 layered collenchyma on both surfaces, 4 or 5 layered parenchyma, mostly devoid of chloroplasts; central zone occupied by vascular bundles differentiated into xylem towards ventral side and phloem towards dorsal side; phloem consisting of sieve tubes, companion cells and phloem parenchyma; xylem consisting of radial rows of vessels with xylem parenchyma in between.

Lamina -shows an epidermis of tangentially elongated cells on both surfaces, larger on the upper surface, covered by striated cuticle; mesophyll differentiated into 2 or 3 layers of palisade cells, 5 to 7 layers of loosely arranged, somewhat isodiametric spongy parenchyma; rosette crystals of calcium oxalate present in a few cells; stomata more on the lower surface, anisocytic in general, but anomocytic type also occurs on both surfaces, palisade ratio 3 to 5, stomatal index on upper surface, 9 to 12, and lower surface 11 to 17.

Fruit - Shows several ridges in outline; epicarp consists of single layered epidermis covered externally with thick cuticle; mesocarp consists of polygonal, thin walled parenchymatous cells having patches of sclerenchymatous cells on both lateral side; each ridge having a vittae and patch of sclerenchyma; endocarp consists of columnar shaped sclereids arranged in wavy layers; endosperm and embryo composed of oval to polygonal, thin-walled parenchymatous cells.

Powder - Green to greenish-brown, shows fragments of epidermal cells polygonal in surface view with stomata, palisade cells, vessels with spiral, reticulate and annular

thickening; microsphenoidal and rosette crystals of calcium oxalate; simple, oval to round starch grains measuring 8 to 16 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	17	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	9	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	20	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Chloroform : Methanol (80 :20) shows under U.V. (366 nm) two fluorescent zones at Rf. 0.72 and 0.85 (both blue). On exposure to Iodine vapour six spots appear at Rf. 0.08, 0.16, 0.32, 0.72, 0.85 and 0.96 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate at 105°C for ten minutes seven spots appear at Rf. 0.08 (grey), 0.16 (blue), 0.23 (grey), 0.32 (violet), 0.72, 0.85 (both violet) and 0.96 (violet).

CONSTITUENTS - Glycosides - Saponin Glycosides

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta, Kaṣāya
Guna	:	Laghu, Sara
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Balya, Dīpana, Hṛdya, Kaphapittahara, Mēdhya, Varṇya, Viṣaghna, Svarya, Rasayāna, Ayuṣya, Smṛtiprada

IMPORTANT FORMULATIONS - Brahma Rasāyana

THERAPEUTIC USES - Śōtha, Aruci, Jvara, Kāsa, Kandu, Kuṣṭha, Pra Raktapitta, Mēha, Svaśa, Pāndu, Raktadōṣa

DOSE - 3-6 gm.

30. Mayyaku (Gall.)

MĀYYAKU (Gall)

Māyakku consists of dried galls found on *Quercus infectoria* Olivo (Fam. Fagaceae), a small tree or shrub, 2 to 5 m high, native of Greece, Asia Minor, Syria and Iran. The galls are excrescences on the twigs, resulting from insect attack of the growing, rudimentary leaves; they are imported into India.

SYNONYMS

Sanskrit	:	Māyaphala
Assamese	:	Aphsa
Bengali	:	Majoophal, Majuphal
English	:	Oak-Gall
Gujrati	:	Muajoophal, Mayfal
Hindi	:	Maajoophal, Majuphal
Kannada	:	Machikaai, Mapalakam
Kashmiri	:	--
Malayalam	:	Majakaanee, Mashikkay
Marathi	:	Maayaphal
Oriya	:	Mayakku
Punjabi	:	Maju
Tamil	:	Machakaai, Masikki, Mussikki
Telugu	:	Machikaaya
Urdu	:	Mazu, Mazuphal

DESCRIPTION

a) Macroscopic

Galls spherical or pear-shaped, hard and brittle 1.2 to 2.5 cm in diameter having a short basal stalk and numerous rounded projections on the upper part of the gall; they usually sink in water; surface, smooth, rather shining, bluish-green, olive green or white brown, a few galls show the escape route of insect, in the form of a small rounded hole leading to a cylindrical canal which passes to the centre of the gall; taste, astringent, followed by sweetness; average weight of ten galls picked at random should not be less than 2.5 g.

b) Microscopic

Gall shows outer most zone of small thin-walled parenchymatous cells, irregular in shape; a ring of large, oval-shaped sclerenchymatous cells and a small inner zone of thick-walled parenchymatous cells present near the central cavity; outer zone of the parenchyma differentiated into three type of cells; uppermost small, irregular, thin-walled, middle large, oval, and inner long parenchymatous cells, all having intercellular

spaces; vascular bundles irregularly distributed in this region, consisting of small patches of xylem and phloem; vessels with spiral and reticulate thickening; around the central cavity, a ring of sclerenchyma of great variation in shape and size, present, with rectangular, ovoid, elongated, small sclereids, having heavily thickened striated walls with numerous pits, lumen large, usually filled with dense brown material, large sclereids are much elongated; a few rosette crystals of calcium oxalate in outer and middle region and prismatic crystals in inner parenchymatous cells present; starch grains simple and compound with central hilum, compound grains consisting of 2 to 5 or sometimes more components, simple grains round to oval, measuring upto 25 μ in dia, present abundantly in innermost zone of parenchyma.

Powder - Cream colour; shows fragments of palisade-like thin-walled and oval to polygonal, thin-walled parenchymatous cells; sclereids with thickened and striated walls with numerous pits and vessels with reticulate and spiral thickening; simple, round to oval starch grains, measuring upto 25 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Nil	Appendix	2.2.2
Total Ash	Not more than 2 per cent,	Appendix	2.2.3.
Acid-insoluble ash	Not more than 0.5 per cent,	Appendix	2.2.4.
Alcohol-soluble extractive	Not less than 60 per cent,	Appendix	2.2.6.
Water-soluble extractive	Not less than 55 per cent,	Appendix	2.2.7.
Total Tannin content	Not less than 50 per cent, when determined by the following method:		

ASSAY

Approximately 2 gms. of powdered fruit, accurately weighed, was refluxed twice for two hrs. with alcohol (95%) on a water bath and filtered. The extract was concentrated almost to dryness, the residue was taken up in 50 ml of water in a separating funnel and extracted four times with 20 ml of solvent ether, collecting the upper ethereal layer in each case in a separating funnel. The combined ethereal layer was extracted twice with 10 ml of water and aqueous extract was combined with original aqueous extract. The combined aqueous extract was saturated with sodium chloride and shaken with successive quantities of 25, 20, 20, 15 ml of ethyl acetate until complete extraction of the tannins was effected (tested by Ferric chloride reagent).

The combined ethylacetate layer containing the tannins was filtered through a cotton plug (previously soaked with ethyl acetate). The filter was washed with 5 ml of ethylacetate and mixed with the original filtrate. The solvent was then distilled on a water bath and when the volume was reduced to about 10 ml, it was quantitatively transferred to a tared glass dish, the solvent removed on a boiling water bath and residue dried to constant weight at 90°C. The residue gives the weight of the tannins present in the drug.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' using Chloroform: Ethylacetate : Formic acid (5:4:1) shows in visible light three spots at Rf. 0.60, 0.69 & 0.78 (all grey). Under U.V. (366 nm) three fluorescent zones are visible at Rf. 0.60, 0.69 & 0.78 (all grey). On exposure to Iodine vapour five spots appear at Rf. 0.60, 0.69, 0.78, 0.84 & 0.96 (all yellow). On spraying with Ferric chloride reagent four spots appear at Rf. 0.13, 0.60, 0.69 & 0.78 (all greyish blue).

CONSTITUENTS - Tannic Acid, Starch and Sugars

PROPERTIES AND ACTION

Rasa	:	Kaṣāya
Guna	:	Laghu, Rukṣa
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Pittahara, Dīpani, Grāhi

IMPORTANT FORMULATIONS - Madayantyādi Cūrna

THERAPEUTIC USES - Arśa, Atisāra, Grahaṇi, Mukha Rōga, Pravahika, Danta Roga, Yōni Kanda, Sveta Pradara

DOSE - 1-3 gm of the drug in powder form.

31. Mudgaparni (W.P.)

MUDGAPARṆI(Whole Plant)

Mudgaparṇi consists of dried whole plant of *Vigna trilobata* (L.) Verde. Syn. *Phaseolus trilobus Ait.* (Fam. Fabaceae), a prostrate or twining perennial herb, found wild, but also occasionally cultivated throughout the country as a forage crop.

SYNONYMS

Sanskrit	:	Suryaparṇi, Saha
Assamese	:	--
Bengali	:	Muganee
English	:	--
Gujrati	:	Janglee Maga
Hindi	:	Janglee Mung
Kannada	:	Abaregid
Kashmiri	:	--
Malayalam	:	Kattuppayaru
Marathi	:	Ranmug
Oriya	:	--
Punjabi	:	Mugvan
Tamil	:	Kattuppayaru, Panippayavu
Telugu	:	Pilla pesara
Urdu	:	--

DESCRIPTION

a) Macroscopic

Root - Occurs in 2.5 to 15.0 cm long, 0.1 or 0.2 cm thick; cylindrical pieces, external surface brownish-grey, rough due to secondary roots; fracture, fibrous.

Stem - Occurs in 12.0 to 55.0 cm long, 0.1 or 0.2 cm thick pieces, more or less cylindrical, grooved, slender, glabrous, pale green; fracture, fibrous

Leaf - Leaves alternate, pinnately trifoliate, petioled; leaflets palmately 3-lobed; 1.3 to 2.5 cm long; mid lobe large, obovate spathulate, lateral lobe oblique and small, margin ciliate, apiculate, pale green in colour.

Flower - Sessile or very shortly pedicelled; small, yellow with conspicuous persistent bracts and bracteole; calyx, gamosepalous, campanulate, 1 or 2 mm long, pale yellow, five toothed; corolla papilionaceous.

Fruit - A pod; 2.5 to 6 or 7 cm long, 3 mm thick; greyish-black; linear or rarely oblong,

torose, subcylindrical, smooth glabrous, recurved or reflexed, 6 to 12 seeded.

Seed - Grey, smooth, with 2 punctate, shortly linear hilum and without strophiole.

b) Microscopic

Root - Shows a wavy outline, having single layered epidermis, consisting of thick walled, parenchymatous cells, covered by thick cuticle; secondary cortex composed of 3 to 6 layered, thin-walled, oval to polygonal, parenchymatous cells; peri cyclic fibres are present in a discontinuous ring; vascular bundles arranged in a ring; secondary phloem composed of thin-walled cells with brownish contents; secondary xylem consisting of usual elements; radially arranged, lignified, vessels with pitted or reticulate thickening, followed by pith consisting of thin-walled, oval to polygonal, parenchymatous cells.

Stem - Shows a more or less wavy outline; epidermis single layered consisting of thin walled, parenchymatous cells; secondary cortex consisting of 2 to 5 layers collenchyrnatous and 1 or 2 layers of parenchymatous thin walled cells; peri cycle present in form of a discontinuous ring; vascular bundles arranged in a ring; secondary phloem consisting of compactly arranged, thick-walled cells, having usual elements traversed by phloem rays; secondary xylem composed of usual elements; lignified vessels radially arranged, showing pitted and spiral thickenings; crystal fibres absent; xylem fibres moderately thick walled with narrow lumen and blunt tips, central region occupied by pith consisting of thin-walled, circular, parenchymatous cells.

Leaf-

Midrib - shows single layered epidermis having a few unicellular, pointed hairs on both surfaces, 6 or 7 layers, polygonal collenchyma cells on upper and 5 or 6 layers, thick walled, collenchyma on lower surface; a single layered thick-walled, lignified polygonal, sclerenchymatous cells present on either side of 'C' shaped vascular bundle having usual elements.

Lamina - isobilateral, shows single layered, elongated, baloon-shaped, thin-walled, epidermis cells on both surfaces, a few unicellular hairs similar as in midrib present on both surfaces; stomata paracytic, present on both surfaces; palisade 2 or 3 layered on upper epidermis, 1 or 2 layered on lower epidermis; palisade ratio 6 or 7 on lower surface, 7 or 8 on upper surface; vein islet number 34 to 45; veinlet termination number 20 to 33; stomatal index, 30 to 36 per sq. mm on lower surfaces, 20 to 27 per sq. mm on upper surface.

Seed - Shows testa consisting of 2 or 3 layered, thick-walled, elongated, lignified stone cells having striations and narrow lumen; cotyledon composed of oval to polygonal, thin walled, parenchymatous cells.

Powder - Light greyish-green; shows fragments of parenchyma, unicellular pointed broken hairs; lignified, simple pitted, reticulate or spiral vessels; paracytic stomata, epidermal cells in surface view with wavy outline.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2 per cent, Appendix	2.2.2.
Total Ash	Not more than	11.5 per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1.5 per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	3 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	11 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica Gel 'G' using n-Butanol : Acetic acid: Water (4:1:5) shows under UV (366 nm) five fluorescent zones at Rf. 0.35, 0.42, 0.58, 0.70 and 0.82 (all blue). On exposure to Iodine vapour six spots appear at Rf. 0.30, 0.42, 0.50, 0.58,0.70 and 0.82 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and on heating the plate for ten munutes at 105° C five spots appear at Rf. 0.30, 0.42, 0.58, 0.70 and 0.82 (all yellow).

CONSTITUENTS - Sterols.

PROPERTIES AND ACTION

Rasa : Madhura, Tikta
Guna : Laghu, Rukṣa
Virya : Śīta
Vipaka : Madhura
Karma : Pittahara, Śukrala, Cakṣusya, Kaphahara, Rasayana, Viṣaghna, Śukrad ōṣahara, Garbhasthāpana

IMPORTANT FORMULATIONS - Mahanārāyaṇa Taila, Amṛtaprāśa Ghṛta, Aśōka Ghṛta, Vidāryadi Ghṛta, Dhānvantara Taila, Brahma Rasayana, Bala Taila, Ratnagiri Rasa

THERAPEUTIC USES - Jvara, Kāsa, Kṛmi, Kṣaya, Kuṣṭha, Pradara, Vātarakta, Daha, Pitta Dāha, Muśika Viṣa, Kṣata Śōtha, Madya Tṛṣṇa.

DOSE - 3-5 gm.

32. Munditika (W.P.)

MUNDĪTAKĀ (Whole Plant)

Mundītakā consists of dried whole plant of *Sphaeranthus indicus* Linn. (Fam. Asteraceae), an aromatic, much branched herb, 30 to 60 cm high found abundantly in damp places throughout the country, ascending to an altitude of 1,500 m.

SYNONYMS

Sanskrit	:	Mundi, Sravani, Bhumikadamba
Assamese	:	Kamadarus
Bengali	:	Surmuriya, Mudmudiya
English	:	--
Gujrati	:	Gorakhmundi
Hindi	:	Mundi, Gorakhmundi
Kannada	:	Mudukattanagida, Karande
Kashmiri	:	--
Malayalam	:	Manni
Marathi	:	Mundi, Gorakhmundi
Oriya	:	Bhuikadam
Punjabi	:	Gorakhmunda
Tamil	:	Karandai
Telugu	:	Bodasarumu Badataramu
Urdu	:	Mundi

DESCRIPTION

a) Macroscopic

Root - Pieces 5 to 15 cm long and 0.3 to 0.5 cm thick, a few branching; smooth, slender, somewhat laterally flattened, greyish-brown; fracture, short; odour not characteristic; taste, slightly bitter.

Stem - Pieces 10 to 30 cm long, 0.2 to 0.4 cm thick, branched, cylindrical or somewhat flattened with toothed wings, rough due to longitudinal wrinkles, externally brownish black to brownish-green, internally creamish-grey; fracture, fibrous; odour nil, taste, bitter.

Leaf - Sessile, decurrent, 2 to 7 cm long, 1 to 1.5 cm wide, obovate-oblong, narrowed at the base, dentate or serrate, hairy, greenish-brown; odourless; taste, bitter.

Flower - Globose, head about 1.5 cm long and about one cm in diameter; purplish-brown with linear involucral bracts which are shorter than the head and ciliate at apex; peduncle with toothed wings; outer female flowers 12 to 16, inner bisexual 2 or 3, corolla of female 2 toothed, ovary, inferior, carpels 2, style - arms connate.

Fruit - Achene, smooth, stalked.

b) Microscopic

Root - Epidermis single layered, rectangular; secondary cortex composed of oval to tangentially elongated, thin-walled, parenchymatous cells having aerenchyma; secondary phloem composed of thin-walled, oval to polygonal cells, a large number of groups of lignified phloem fibres found scattered in this zone; central portion occupied by lignified, secondary xylem having usual elements; vessels simple pitted; starch grains simple, round to oval with concentric striations and distinct hilum. measuring 13 to 27 μ in dia., present in secondary cortex.

Stem - Epidermis single layered covered with thick cuticle; cortex consisting of 4 to 6 layers of oval to polygonal, thin-walled, parenchymatous cells; endodermis single layers of barrel-shaped cells; pericyclic fibres, lignified arranged in discontinuous ring; secondary phloem narrow, having usual elements; groups of cellulosic fibres found scattered in this zone; secondary xylem composed of usual elements; vessels with spiral thickening or simple pitted; pith very wide composed of oval to polygonal, thin-walled, parenchymatous cells.

Leaf-

Midrib - epidermis single layered, followed by 4 to 6 layered collenchyma and 3 or 4 layered parenchyma cells present on both surfaces; trichomes both non-glandular and glandular, present on both surfaces, glandular trichomes 2 or 3 cells high, uni or biseriate stalk, having a multicellular head; non-glandular trichomes uniseriate with 2 to 5 cells, vascular bundle 3 or 4, situated centrally having usual elements.

Lamina - epidermis single layered having numerous non-glandular and glandular trichomes similar to those present in midrib; mesophyll composed of oval to polygonal thin walled parenchymatous cells and not differentiated into palisade and spongy parenchyma cells, anisocytic stomata present on both surfaces; stomatal index 32 to 38 on lower surfaces, 20 to 29 on upper surfaces; stomatal number 47 to 54 per sq. mm on lower surfaces, 15 to 22 per sq. mm on upper surfaces; vein islet number 20 to 26.

Powder - Greyish-yellow; shows fragments of thin-walled, oval to polygonal aerenchyma cells; thin-walled, sinuous, elongated epidermal cells; small pieces of glandular trichomes; a few anisocytic stomata; vessels with spiral and pitted thickening; fibres short, thick walled, lignified with wide lumen and blunt tips having simple pits; oval to round, elliptic, simple starch grains with centric hilum and striations, measuring 13 to 27 μ in diameter.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	23	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	9	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	2	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	6	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' using Toluene .: Ethylacetate (9:1) shows under U.V. (366 nm) two fluorescent spots at Rf. 0.54 and 0.76 both green. On exposure to Iodine vapour one spot appears at Rf. 0.44 (brown). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for 10 minutes at 105°C five spots appear at Rf. 0.20 (violet), 0.25 (blue), 0.44, 0.54 and 0.59 (all violet).

CONSTITUENTS - Essential Oil, Sterols and Alkaloids

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta, Kaṣāya
Guna	:	Laghu
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Mēdhya, Rasayana, Rucya, Svarya, Vātahara, Viṣaghna, Kaphapittanuta

IMPORTANT FORMULATIONS - Ratnagiri Rasa, Mundi Arka, Vātagajānkuśa Rasa, Nava Ratnraya Mṛgānka Rasa

THERAPEUTIC USES - Apasmāra, Chardi, Kāsa, Mūtrakṛcchra, Pāṇḍu, Pramēha, Vātarakta, Apau, Kṛmi Rōga, Yōni Rōga, Āmātīsāra, Slīpada, Pliharōga, Mēdōrōga, Guda Rōga

DOSE - 10-20 ml Svarasa

33. Nyagrodha Jata (Ar.Rt.)

NYAGRODHA JAṬA (Aerial Root)

Nyagrodha Jaṭa consists of dried aerial of *Ficus bengalensis* Linn. (Fam. Moraceae), a very large tree with spreading branches, occurring throughout the country, and also planted on road sides and in gardens.

SYNONYMS

Sanskrit	:	Vata Jaṭa, Bahupāda
Assamese	:	--
Bengali	:	Bar, Bot
English	:	Banyan Tree
Gujrati	:	Vad Vadavai
Hindi	:	Baragada jata, Valajatta
Kannada	:	Alada Chirugu
Kashmiri	:	--
Malayalam	:	Peralveru
Marathi	:	Vada Paranika
Oriya	:	Bara gachha
Punjabi	:	Bardajattu
Tamil	:	Alamvizhuthu
Telugu	:	Peddamatti, Marri Udalu
Urdu	:	Bargad

DESCRIPTION

a) Macroscopic

Drug occurs in cut pieces, 4 to 8 cm long, 0.1 to 1.2 cm thick, cylindrical, unbranched or branched; rough due to longitudinal and transverse cracks and transverse rows of lenticels; external surface grey; cut surface reddish-brown; fracture, fibrous in bark portion and tough and short in wood portion.

b) Microscopic

Aerial root shows cork consisting of 4 to 6 or more rows of narrow, tangentially elongated cells; secondary cortex consisting of a zone of 4 or 5 rows of stone cells, followed by wide zone of thin-walled parenchymatous cells, filled with reddish-brown contents; a number of large groups of stone cells, oval to elliptical, elongated, thick-walled, with wide lumen and clear pit canals found scattered throughout secondary cortex; secondary phloem a wide zone consisting of sieve tubes, phloem fibres and phloem parenchyma, traversed by phloem rays; phloem fibres numerous, arranged in tangential bands alternating with sieve elements; secondary xylem very wide consisting of pitted xylem vessels, fibres and xylem parenchyma, all elements being lignified;

vessels single or in groups, xylem parenchyma numerous, xylem fibres numerous, thick-walled with blunt tips and wide lumen; xylem rays numerous, uni to tetraseriate.

Powder - Reddish-brown; shows oval to elliptical, elongated, thick-walled stone cells with wide lumen and clear pit canals; fibres, thick-walled with blunt tips and wide lumen; xylem vessels showing pitted thickening.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	7	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	3	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	4	per cent, Appendix	2.2.7.

T.L.C.

T.L.C of alcoholic extract on Silica gel 'G' using Toluene: Ethyl acetate (7:3) shows under U.V. (366 nm) three fluorescent zones at Rf. 0.34 (sky blue), 0.63 (sky blue) and 0.78 (blue). On spraying with 10% Methanolic-Sulphuric acid regent and on heating the plate for about ten minute at 105°C three spots appear at Rf. 0.63 (grey), 0.78 (brownish grey) and 0.96 (brown).

PROPERTIES AND ACTION

Rasa : Madhura, Kaṣāya
Guna : Guru, Rukṣa
Virya : Śīta
Vipaka : Madhura
Karma : Grāhi, Sthambhaka, Pittahara, Kaphahara, Varṇa, Bhaghnasandhānakara, Śōdhana, Rōpana, Kēśya

IMPORTANT FORMULATIONS - Kumkumādi Taila, Rasa Sindhura, Abhraka Bhasma (Māraṇa), Svarṇa Sindhura, Nāga Bhasma, Vanga Bhasma (Jaraṇārtha), Taila Moorchana

THERAPEUTIC USES - Dāha, Visarpa, Rakta Pitta, Tṛṣna, Yōniroga, Medōroga, Bhagandara

DOSE - 2-5 gm of the drug in powder form.

34. Nimbu (Fr.Ft.)

NIMBŪ (Fresh Fruit)

Nimbū consists of fresh fruit of *Citrus limon* (Linn.) Burm. f. Syn. *C. medica* var. limonum (Fam. Rutaceae); a straggling bush or small tree, 3 to 4 m high with thorny branches, cultivated in many parts of the country in orchards.

SYNONYMS

Sanskrit	:	Jambīra, Māha Nimbu
Assamese	:	--
Bengali	:	Patinebu, Kagghinebu, Baranebu
English	:	The lemon of India, Lemon
Gujrati	:	Limbu
Hindi	:	Nimbu, Bara Nimbu, Pakari Nimbu
Kannada	:	Nimbe, Lime hannu, Nimbe hannu
Kashmiri	:	--
Malayalam	:	Cherunakaram, Vadukappulinarakam
Marathi	:	Nimbu
Oriya	:	--
Punjabi	:	Nimbu
Tamil	:	Elumichai, Elumichangai, Elumicchai, Cherunaranka
Telugu	:	Pedda Nimma, Jambira, Nimmu, Bijapuram
Urdu	:	Limu, Neebu

DESCRIPTION

a) Macroscopic

Fruit a berry, hesperidium, yellow when ripe, ovoid or globose, 5 to 10 cm long; external surface even or rugged showing openings of oil glands; usually with 9 mammillate extremity and thin rind; transversely cut surface shows thin rind and an inwardly grown endocarp forming 10 to 12 segments, each containing 2 or 3 seeds with pulp formed by succulent hairs; juice acidic.

PROPERTIES AND ACTION

Rasa	:	Amla
Guna	:	Laghu
Virya	:	Uṣṇa
Vipaka	:	Amla
Karma	:	Dīpana, Kaphahara, Pittakara, Vātahara, Pācana

IMPORTANT FORMULATIONS - Vāriśōṣaṇa Rasa, Vasanta Mālati Rasa, Vanga Bhasma, Kāsīsa Bhasma, Gandhaka Vaṭi, Śankha Vaṭi, Aj īrnakanaka Rasa, Kalakūta Rasa, Mahaśaṅkha Vati, Nāsika Cūrṇa

THERAPEUTIC USES - Agnimāndya, Aruci, Chardi, Kṛmi, Tṛṣa, Vibandha, Vātika Śūla, Udara Roga, Viśūcika

DOSE - 6-12 gm of the drug in juice form.

35. Nirgundi (Rt.)

NIRGUNḌI (Root)

Nirgunḍi consists of dried root of *Vitex negundo* Linn. (Fam. Verbenaceae), a large aromatic shrub or sometimes a small tree, upto 4.5 m in height, common throughout the country ascending to an altitude of 1500 m in the lower Himalayas.It is common in waste places around village, river bank, moist localities and deciduous forests.

SYNONYMS

Sanskrit	:	--
Assamese	:	Aslak
Bengali	:	Nirgundi, Nishinda
English	:	Five leaved chaste, Indian Privet
Gujrati	:	Nagod
Hindi	:	Nirgundi
Kannada	:	Lakkigida, Nekkigida, Lakkimara
Kashmiri	:	--
Malayalam	:	Indranee
Marathi	:	Lingad, Nigad
Oriya	:	--
Punjabi	:	Sambhalu
Tamil	:	Karuno chchil
Telugu	:	Nallavavilli
Urdu	:	Sambhalu

DESCRIPTION

a) Macroscopic

Roots cylindrical, hard, tough with irregular fractures; external surface rough due to longitudinal, narrow, cracks and small rootlets; cut surface shows cork region greyishbrown, middle region greyish-white, and xylem region cream coloured; bark thin, easily separates from wood; wood hard, forming major part of root.

b) Microscopic

Root shows 10 to 18 or more tangential rows of rectangular to cubicular, moderately thick-walled cork cells with a few rows of radially arranged cork cells also being present, inner 3 to 5 rows of cork cells thin-walled; cork cambium consists of single row of squarish to transversely elongated cells; secondarycortex composed of 4 to 12 rows of rectangular to elongated cells, some contain starch grains; numerous, small groups of stone cells found scattered in this zone; stone cells vary in shape and size; secondary phloem consists of sieve tubes with companion cells, fibres and phloem parenchyma traversed by phloem rays; distal portion of phloem conical, due to dilating

phloem rays; each band of phloem composed of thin-walled, phloem tissues alternating with transverse strips of thick-walled phloem fibres; a few tangential strips of obliterated phloem tissues also present in outer-phloem region; each fibre group composed of 6 to 60 or more thick-walled, long and short fibres, short fibres comparatively thick-walled, a few fibres show forked tips; inner zone of phloem composed of intact, thin-walled, phloem tissues mainly sieve tubes, companion cells and phloem parenchyma; cambium composed of one, or sometimes two, rows of cells; central major part of root consists of xylem; vessels varying in size, scattered throughout xylem region, either in small groups of 2 to 4 or singly; a few xylem vessels show tail on one or both the ends; xylem fibres long, having thick-walls and pointed tips; xylem parenchyma contains starch grains similar to those found in cortical region; medullary rays are uni-to triseriate, almost straight, extend from pith to cork, medullary rays in xylem region radial while in phloem region they dilate; cells contain starch grain, simple and compound, oval to circular, having 4 components and measuring 8 to 12 μ in dia.

Powder - Pale yellow; shows parenchymatous cells containing simple oval to round and compound starch grains with 4 components, measuring 8 to 12 μ in dia; stone cells elongated, rectangular and squarish in shape with wide and narrow lumen, radiating canals and conspicuous striations; xylem vessels with pitted thickening, xylem and phloem fibres with thick walls.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	3	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.2	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	5	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	9	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' using Chloroform: Methanol (8:2) shows in visible light two spots at Rf. 0.14 and 0.95 (both yellow). Under U.V. (366 nm) six fluorescent zones are visible at Rf. 0.14 (dirty yellow), 0.14 (blue), 0.66 (blue), 0.82 (light blue), 0.90 (blue) and 0.95 (bluish green). On exposure to Iodine vapour five spots appear at Rf. 0.14, 0.04, 0.66, 0.82 and 0.95 (all yellow). On spraying with Dragendorff reagent followed by 5% Methanolic-Sulphuric acid reagent two spots appear at Rf. 0.03 and 0.95 (both orange).

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta, Kaṣāya
Guna	:	Laghu, Rukṣa
Virya	:	Uṣṇa (Nila), Śīta
Vipaka	:	Kaṭu
Karma	:	Vātahara, Pittavināśana, Keśya, Netrya, Slēṣmaha, Pīdāhara

IMPORTANT FORMULATIONS - Māhaviṣagarbha Taila, Mānasa Mitra Vaaka

THERAPEUTIC USES - Ādhmāna, Kāsa, Kṛmi Rōga, Kuśṭha, Pradara, Śūla Rōga, Kaṇḍu, Śleṣmaja Jvara

DOSE - 10-20 ml.

36. Palasa (Fl.)

PALAŚA (Flower)

Palaśa consists of dried flower of *Butea monosperma* (Lam.) Kuntze, Syn. *B. frondosa* Koeing ex Roxb. (Fam. Fabaceae), an erect deciduous tree 12 to 15 m high with crooked trunk and irregular branches, commonly found throughout the greater part of the country upto about 915 m altitude.

SYNONYMS

Sanskrit	:	Kimśuka, Brahma Vṛkṣa
Assamese	:	Palash
Bengali	:	Palas, Palash Gaccha
English	:	Flame of the Forest
Gujrati	:	Khakharo, Kesuda
Hindi	:	Dhak, Tesu, Paras
Kannada	:	Muttug, Muttulu
Kashmiri	:	--
Malayalam	:	Palashinsamatha
Marathi	:	Kakracha, Palas
Oriya	:	Porasu, Kijuko
Punjabi	:	Tesh
Tamil	:	Purasu
Telugu	:	Modyga Puvvu
Urdu	:	Dhak (Tesu)

DESCRIPTION

a) Macroscopic

Drug available in about 3.0 to 4.5 cm long racemes of orange to yellow coloured flowers; bracts and bracteoles small, pedicels about twice as long as the calyx, densely brown-velvety; calyx 0.8 to 1.2 cm long, sepals 5, campanulate, densely velvety outside, clothed with silky hairs within; corolla about 2.0 to 7.0 cm long, petals 5, polypetalous, unequal keel, clothed outside with silky silvery hairs, orange or salmon coloured, keel semicircular, beaked, veined; stamens 10, diadelphous, anthers 2 celled; carpel superior unilocular; style one and stigma one.

b) Microscopic

Pedicel - Shows more or less wavy outline, single layered epidermis covered with thick cuticle, unicellular, 2 or 3 celled trichomes, followed by ground tissue consisting of 6 to 8 celled, thin-walled, oval to polygonal parenchymatous cells; endodermis single layered; vascular bundle radially arranged, collateral, consisting of usual elements.

Sepal - Shows single layered epidermal cells, uniseriate, multicellular trichomes and club shaped secretory ducts present on lower surface, epidermis followed by 3 or 4 layered, thin-walled, loosely arranged parenchymatous cells on both surfaces, thin walled, wavy epidermal cells showing on the surface view.

Petal - Shows single layered, thin-walled, epidermal cells, covered with numerous, unicellular, pointed trichomes and a few glandular hairs; thin-walled, capitate or cone shaped papillae present on both surface; mesophyll consisting of thin-walled, loosely arranged, parenchymatous cells; a large number of larger and smaller vein found scattered in this region, some of the cells contain a few of oil globules.

Powder - Yellowish-brown; shows fragments of parenchyma, epidermis with stomatal cells; numerous, pointed, multicellular trichomes and a few oil globules.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	7	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	7	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	20	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using n-Butanol Acetic Acid: Water (4:1:5) shows in visible light six spots at Rf. 0.42 (light brown), 0.48 (brown), 0.58 (yellow), 0.82 (brown), 0.88 (yellow) and 0.96 (light brown). On spraying with phosphomolybdic acid reagent and heating the plate at 105°C for about ten minutes nine spots appear at Rf. 0.08 (blue), 0.19 (blue), 0.32 (blue), 0.42 (blue), 0.48 (yellow), 0.58 (blue), 0.82 (yellow), 0.88 (blue) and 0.96 (blue). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate at 105°C for about fifteen minutes seven spots appear at Rf. 0.19 (light red), 0.32 (light red), 0.42 (light red), 0.58 (red), 0.82 (red), 0.88 (red) and 0.96 (grey).

CONSTITUENTS - Glycosides and Flavonoids

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta, Kaṣāya
Guna	:	Laghu, Rukṣa, Sara
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Tṛṣṇasamaka, Dīpana, Grāhi, Kaphahara, Pittahara, Vātahara, Rakta Stambhana, Mūtrala, Kuṣṭaghna, Sandhāniya, Dāhapraśamana

IMPORTANT FORMULATIONS - Kuṅkumadi Taila, Vanga Bhasma (Jāraṇa(b))

THERAPEUTIC USES - Arṣa, Dāha, Grahaṇi, Gulma, Kṛmi, Kuṣṭha, Mēha, Mutrakṛcchra, Raktapitta, Raktavikāra, Tṛṣa, Vāta Rakta, Grāṭhi, Plīharoga, Nētraśūla, Kaṇḍu

DOSE - 3-6 gm of drug in powder form.

37. Palasa (Gum.)

PALAŚA (Gum)

Palaśa consists of dried gum exuding from natural cracks and artificial incisions in the stem bark of *Butea monosperma* (Lam.) Kuntze Syn. *B. frondosa* Koen. ex Roxb. (Fam. Fabaceae), a medium sized tree with somewhat crooked trunk, 12 to 15 m high with irregular branches commonly found throughout greater parts of the country upto 915 m altitude.

SYNONYMS

Sanskrit	:	Kimśuka, Triparṇa
Assamese	:	Palash
Bengali	:	Palas
English	:	Flame of forest, Bengal Kino
Gujrati	:	Khakharo, Kesudo
Hindi	:	Dhak, Palas, Teshu
Kannada	:	Mattuga, Muthuga
Kashmiri	:	--
Malayalam	:	Palashu
Marathi	:	Palas
Oriya	:	--
Punjabi	:	Dhak
Tamil	:	Purasu
Telugu	:	Moduga, Modugu
Urdu	:	Dhak (Tesu)

DESCRIPTION

a) Macroscopic

Drug occurs in pieces, flattish, brittle, perfectly transparent, smooth and shining, ruby red to dark brown; buff coloured pieces of bark attached; no peculiar odour; taste, astringent.

b) Microscopic

Angular fragments, opaque in transmitted light; shows plants debris form thick-walled rectangular cork and polygonal, thin-walled cortex, and phloem parenchymatous cells, depved from the parent plant.

Identification: It dissolves partially in boiling alcohol and freely, almost completely, in cold water, forming. a milky solution; when treated with 5% aqueous solution of perchloride of iron (Ferric chloride) it gives greyish-green precipitate and with lead acetate gives white precipitate.

Fluorescence: Colour of 5% aqueous solution light brown in day light and greyish green in U.V. light (366 nm); colour of 5% alcoholic solution reddish-brown in daylight, and light green in U.V. light (366 nm).

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	3	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	69	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	63	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' plate using n-Butanol : Acetic acid: Water (5:1:4) shows in visible light six spots at Rf. 0.30, 0.42, 0.67, 0.74, 0.84 and 0.92 (all yellowish brown). Under U.V. (366 nm) three blue fluorescent zones are visible at Rf. 0.74, 0.84 and 0.92. On exposure to Iodine vapour eight spots appear at Rf. 0.07, 0.23, 0.30, 0.42, 0.67, 0.74, 0.84 and 0.92 (all yellow). On spraying with 5% MethanolicSulphuric acid reagent and heating the plate for about ten minutes at 110°C eight spots appear at Rf. 0.07, 0.23, 0.30, 0.42, 0.67, 0.74, 0.84 and 0.92 (all violet).

CONSTITUENTS - Anthocyanins and Tannins.

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta, Kaṣāya
Guna	:	Sara, Snigdha
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Śleṣmahara, Dīpana, Vātahara, Vṛṣya, Bhagnasandhanakṛt

IMPORTANT FORMULATIONS - Bala Taila

THERAPEUTIC USES - Arśa, Grahaṇi, Gulma, Kṛmi Rōga, Gudarōga, Asthibhagna, Vrana, Plīha Rōga.

DOSE - 0.5 to 1.5 gm.

38. Palasa (Sd.)

PALAŚA (Seed)

Palaśa consists of dried seed of *Butea monosperma* (Lam.) Kuntze, Syn. *B. frondosa* Koen. ex Roxb. (Fam. Fabaceae), a medium sized tree with a somewhat crooked trunk, 12 to 15 m high with irregular branches, commonly found throughout the greater part of the country upto about 915 m altitude.

SYNONYMS

Sanskrit	:	Brahma Vṛkṣa, Kimśuka, Rakta Puṣpaka, Kṣāra Śreṣa
Assamese	:	--
Bengali	:	Palash Gachha
English	:	Bengal Kinotree
Gujrati	:	Kesudo, Khakharo
Hindi	:	Dhak, Palash
Kannada	:	Muttuga
Kashmiri	:	--
Malayalam	:	Palashu
Marathi	:	Palash
Oriya	:	--
Punjabi	:	Dhak, Palash, Tesoo, Kesoo
Tamil	:	Purashu
Telugu	:	Moduga mada
Urdu	:	Dhak (Tesu)

DESCRIPTION

a) Macroscopic

Seed flat, kidney-shaped, 2.5 to 4 cm long, 1 to 3 cm wide, dark reddish-brown, thin, glossy; hilum clear, situated near middle of concave edge 'of seed; odour, faint; taste, slightly acrid and bitter.

b) Microscopic

Shows a wide zone of testa, consisting of a layer of palisade cells, a row of bearer cells and many layers of parenchymatous cells; palisade cells compactly arranged, columnar shaped and covered with thick cuticle, followed by a single row of bearer cells; parenchymatous layers consisting of many rows of cells, filled with reddish-brown contents; a number of vascular bundles occur in a row, in middle region of parenchymatous zone; cotyledons consists of a single layered epidermis, composed of square to oval cells, covered with cuticle; mesophyll cells bear hyaline walls, oval to irregular shaped with small intercellular spaces; simple, oval to round, starch grains with concentric striations, and centric hilum, compound grains having 2 to 4

components measuring 8 to 16 μ in dia., present in cotyledons.

Powder - Cream or grey; shows fragments of testa, bearer cells, numerous simple oval to round starch grains with concentric striations and a centric hilum, and also compound starch grains having 2 to 4 components, measuring 8 to 16 μ in diameter.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	7	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	9	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	25	per cent, Appendix	2.2.7.
Hexane soluble extractive (By soxhlet extraction)	Not less than	15	per cent.	

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using Toluene: Ethylacetate (9:1) shows under U.V. light (366 nm) three fluorescent at Rf. 0.41, 0.49 to 0.65 (elongated and light blue) and 0.91 (blue). On exposure to Iodine vapour six spots appear at Rf. 0.04, 0.19, 0.28, 0.41, 0.49 to 0.65 (elongated) and 0.91 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for about ten minutes at 110°C six spots appear at Rf. 0.04, 0.19, 0.28, 0.41, elongated spot (0.49-0.65) and 0.91 (all violet). On spraying with Dragendorff reagent followed by 5% Methanolic-Sulphuric acid reagent three spots appear at Rf. 0.41, 0.49 to 0.65 (elongated) and 0.91 (all light orange).

CONSTITUENTS - Fixed Oil, Enzymes and small quantities of Resins and Alkaloids.

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta, Kaṣāya
Guna	:	Sara, Snigdha
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Dīpana, Kaphahara, Pittahara, Sangrāhi, Vātahara, Vṛṣya, Asthisandhānaka

IMPORTANT FORMULATIONS - Ayaskṛti, Kṛmimudgara Rasa, Khrimikuthāra Rasa, Palāśa Bīja Cūrṇa, Palāśa Arka

THERAPEUTIC USES - Arṣa, Grahaṇi, Gulma, Kaṇḍu, Pramēha, Vraṇa, Kṛmiroga, Basti Roga, Plīha Roga, Dadru, Tvak Roga, Timira Roga, Nētrābhiṣyanda, Garbhadhananivāraṇārtha.

DOSE - 3 gm of the drug in powder form.

39. Parpata (W.P.)

PARPAṬA (Whole Plant)

Parpaṭa consists of dried whole plant of *Fumaria parviflora* Lam. (Fam. Fumaraceae), a pale green, branched, annual, diffuse herb, about 60 em high, distributed as a weed of cultivated fields over the greater parts of the country, and also commonly growing on road sides during cold season.

SYNONYMS

Sanskrit	:	Varāṭika, Sukṣmapatra
Assamese	:	Shahtaraj
Bengali	:	Vanshulpha, Bansulpha
English	:	--
Gujrati	:	Pittapapada, Pitpapado, Pittapapado
Hindi	:	Pittapapada, Dhamgajra, Pittapapara
Kannada	:	Kallu Sabbasige, Parpatu, Chaturasigide
Kashmiri	:	--
Malayalam	:	--
Marathi	:	Pittapapada, Shatara, Parpat
Oriya	:	--
Punjabi	:	Shahtara, Pittapapara
Tamil	:	Tura, Tusa
Telugu	:	Parpatakamu
Urdu	:	Parpata

DESCRIPTION

a) Macroscopic

Root - Buff or cream coloured, branched, about 3 mm thick, cylindrical; taste, bitter.

Stem - Light green, smooth, diffused, hollow, about 2 to 4 mm thick; taste, bitter and slightly acrid.

Leaf - Compound, pinnatifid, 5 to 7 cm long, divided into narrow segments; segments 5 mm long and about 1 mm broad, linear or oblong, more or less glaucous, acute or subacute; petiole, very thin, 2.5 to 4.0 cm long; taste, bitter.

Flower - Racemes with 10 to 15 flowers, peduncle upto 3 mm, pedicels about 2 mm, flowers about 7 mm long, bract much longer than the pedicels; sepals 2, white, minute, about 0.5 mm long, triangular ovate, acuminate; corolla in 2 whorls with very small 4 petals, each about 4 mm long; inner petals with a purple or green tip; outer petals with

narrow spur, without purple spots stamens 3+3 , staminal sheath subulate above, about 4 mm long, stigma 2 lipped.

Fruit - Capsule, 2 mm long and slightly broader, subrotund, obovate, obtuse or subtruncate, obscurely apiculate, rugose when dry; nutlets globose, upto 2 mm long, single seeded.

b) Microscopic

Root - Root shows single layered epidermis, followed by 5 or 6 layers of cortex consisting of thin-walled, rectangular, parenchymatous cells, outer I or 2 layers irregular and brown in colour; endodermis not distinct; secondary phloem very narrow and consisting of 2 or 3 rows with usual elements; central core shows a wide zone of xylem and consists of usual elements; vessels mostly solitary having reticulate and spiral thickening, medullary ray less developed and mostly uniseriate; fibres moderately long, thick-walled, having narrow lumen and blunt tips.

Stem - Stem shows a pentagonal outline, having prominent angles composed of collenchymatous cells; epidermis single layered of thin-walled, oblong, rectangular cells, covered with thin cuticle; cortex narrow, composed of 2 to 4 layers of chlorenchymatous cells endodermis not distinct; vascular bundles collateral, 5 or 6 arranged in a ring; each vascular bundle capped by a group of sclerenchymatous cells; phloem consists of usual elements; xylem consists of vessels, tracheids, fibres and xylem parenchyma; vessels much elongated, having reticulate, annular or spiral thickening or simple pits; xylem fibres narrow elongated with pointed ends having a few simple pits; centre either hollow or occupied by narrow pith consisting of thinwalled, parenchymatous cells.

Leaf

Petiole - V -shaped outline; single layer epidermis consisting of thin-walled, parenchymatous cells followed by ground tissue composed of thick-walled round, oval or polygonal, parenchymatous cells, outer cells smaller than inner; collenchymatous cells present at corners; three vascular bundle scattered in ground tissue, one central and two in wings; vascular bundle consists of phloem and xylem, phloem capped with fibrous sheath, lower epidermis single layered.

Lamina - Shows single layer epidermis' on either side, consistmg of thin-walled, rectangular, oval-shaped, parenchymatous cells; mesophyll composed of oval to polygonal thin-walled parenchymatous cells, filled with green pigment and not differentiated into palisade and spongy parenchyma; vascular bundles scattered throughout the mesophyll; stomata anomocytic, present on both surfaces.

Powder - Light greenish-brown; shows fragments of parenchyma; tracheids, fibres, and vessels having simple pits and spiral thickenings; anomocytic stomata and wavy walled epidermal cells in surface view.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	30	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	10	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	7	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	29	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' plate using Chloroform : Methanol (8:2) shows under visible light one spot at Rf. 0.93 (green). Under U.V. (366 nm) eight fluorescent zones are visible at Rf. 0.07 (blue), 0.13 (blue), 0.29 (light blue), 0.50 (light pink), 0.60 (light yellow), 0.67 (yellow), 0.79 (blue) and 0.93 pink). On exposure to Iodine vapour twelve spots appear at Rf. 0.07, 0.10, 0.13, 0.19, 0.29, 0.50, 0.60,0.67,0.74,0.79,0.86 and 0.93 (all yellow). On spraying with Dragendorff reagent followed by 5% Methanolic-Sulphuric acid reagent one spot appears at Rf. 0.07 (orange).

CONSTITUENTS - Alkaloids, Tannins, Sugars and salt of Potassium

PROPERTIES AND ACTION

Rasa	:	Tikta
Guna	:	Laghu
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Pittahara, Samgrāhi, Raktadōṣahara, Rocaka

IMPORTANT FORMULATIONS - Pacanamṛta Kvatha Cūrṇa, Tiktaka Ghṛta, Mahatiktaka Ghṛta, Nalpamarādi Taila, Bhrihatmañjiṣādi Kvatha Cūrna, Paṭōlādi Ghṛta, Parpaṭādi Kvatha, Śadaṅgapanīya, Bṛhata Garbha, Cintāmaṇi Rasa

THERAPEUTIC USES - Bhrama, Chardi, Dāha, Jvara, Raktapitta, Raktavikāra, Tṛṣa, Mada, Glāni

DOSE - 1-3 gm.

40. Patalai (St.Bk.)

PĀṬALAI (Stem Bark)

Pāṭalai consists of dried stem bark of *Stereospermum chelonoides* (L.f.) DC. (Fam. Bignoniaceae), a large deciduous tree upto 18 m high and about 1.8 m in girth with a clear bole of about 9 m, found throughout the moist parts of the country.

SYNONYMS

Sanskrit	:	Paṭala, Khriṣnavṛṇa, Madhudui, Tāmrapuṣpi
Assamese	:	--
Bengali	:	Paarul
English	:	Trumpet Flower Tree, Yellow Snake Tree
Gujrati	:	Paadal
Hindi	:	Paraal, Paatar, Paadree, Paadhal
Kannada	:	Rude, Kalludi, Kaala-adri
Kashmiri	:	--
Malayalam	:	Puppaatiri, Paatiri
Marathi	:	Paadal
Oriya	:	Patudi
Punjabi	:	Paadal
Tamil	:	Paadiri, Pumpaadiri, Paadari
Telugu	:	Kokkosa, Kaligottu
Urdu	:	--

DESCRIPTION

a) Macroscopic

Drug occurs in cut pieces of varying sizes, upto 0.8 cm thick, slightly recurved and very slightly channelled; external surface rough due to ridges, fissures and lenticels; dull brown; when cut across it shows lamellations due to presence of concentric bands of phloem fibres; fracture, tough and short with inner lamellae occasionally peeling off; taste, not characteristic.

b) Microscopic

Cork consisting of about 8 to 22 layers of tangentially elongated, thin-walled, lignified, rectangular cells; cork cambium single layered of narrow cells; secondary cortex very wide, composed of tangentially elongated, thick-walled, polyhedral, isodiametric, parenchymatous cells with intercellular spaces having numerous, mostly groups of stone cells of various sizes, fairly large, thick-walled, lignified, oval to polygonal upto 180 µ long and upto 90 µ wide, pitted with clear striations and with wide lumen; secondary phloem composed of ceratenchyma, phloem parenchyma, fibres and rays cells; ceratenchyma present in the form of thick-walled tangential strips between

two obliquely running rays; phloem fibres mostly in groups arranged in concentric manner; phloem rays mostly multi seriate, fairly large, 2 to 4 cells wide, a few uniseriate rays also occur; micro sphenoidal crystals of calcium oxalate present in phloem parenchyma and ray cells.

Powder - Brown; fragments of thin-walled, rectangular cork cells; single or groups of lignifed, thick-walled, oval to polygonal stone cells upto 180 μ long and upto 90 μ wide, having clear striations with wide lumen and pits; fibres with small tapering and pointed ends; pieces of phloem parenchyma cells and a few microsphenoidal crystals of calcium oxalate.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	8	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	12.5	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	25	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' plate using n-Butanol : Glacial Acetic acid : Water (4: 1 :5) shows under U.V. (366 nm) two fluorescent spots at Rf. 0.48 and 0.81 (both blue). On exposure to Iodine vapour four spots appear at Rf. 0.36, 0.48, 0.60 and 0.81 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate at 105°C for ten minutes six spots appear at Rf. 0.16, 0.36, 0.54, 0.64, 0.81 and 0.89 (all black).

CONSTITUENTS - Gum and a bitter substance.

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta, Kaṣāya
Guna	:	Guru, Viśada
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Dīpana, Hṛdya, Raktadōṣahara, Viṣaghna, Tridōṣahara, Tṛṣaghna, Rāsāyana, Adhodagadosahara

IMPORTANT FORMULATIONS - Amṛtāriṣṭa, Dantyādyariṣṭa, Daśamūlariṣṭa, Indukānṭa Ghṛta

THERAPEUTIC USES - Arōcaka, Ādhmāna, Hikka, Svāśa, Vrana, Svayathu, Sanipāta, Vami, Dagdhavraṇa, Mūtrāghāta, Śotha.

DOSE - 3-6 gm in powder form.10-30 gm for decoction in dividing dose.

41. Pattanga (Ht.Wd.)

PAṬṬAṄGA (Heart Wood)

Paṭṭaṅga consists of dried heart wood of *Caesalpinia sappan* Linn. (Fam. Caesalpiniaceae), a shrub or small tree, about 6 to 9 m in height, found in South India and Bengal; usually cultivated as a hedge plant.

SYNONYMS

Sanskrit	:	Patrāṅga, Paṭṭaṅga
Assamese	:	Baggam, Bakam
Bengali	:	Bokom
English	:	Sappan Wood
Gujrati	:	Patang
Hindi	:	Pagang, Bakam
Kannada	:	Patang
Kashmiri	:	--
Malayalam	:	--
Marathi	:	Patang
Oriya	:	--
Punjabi	:	--
Tamil	:	Anaikuntrumani
Telugu	:	Bukkapuchettu
Urdu	:	Pattang

DESCRIPTION

a) Macroscopic

Drug occurs in pieces, moderately hard, about 2.5 cm thick, smooth, dark brown on one surface and creamish-white on the other, and yellowish-orange in between; fracture, fibrous; odour and taste not characteristic.

b) Microscopic

Shows vessels, tracheids, fibres and xylem parenchyma, traversed by numerous xylem rays; vessels numerous, barrel-shaped with bordered pits, scattered throughout xylem in single or in groups of 2 to 5, a few vessels filled with yellowish pigment; fibres spindle-shaped, pointed at both ends; xylem rays numerous uni to biseriate found more common, 3 to 30 cells high, ray cells round or oval; calcium oxalate crystals and starch grains absent.

Powder - Creamish-white; shows group of fibres and vessels; crystals of calcium oxalate and starch grains absent.

Identification

a) Colour test - i) 5 gram of sample extracted in 100 ml of water, filtered and seen in . daylight is saffron in colour; ii) 5 gram of sample extracted in 100 ml of 95% of alcohol, filtered and seen in daylight is reddish, which becomes carmine on addition of 5% aqueous solution of sodium hydroxide; iii) small fragments of wood impart crimson colour in lime water.

b) Fluorescence - Extract obtained in the test for water soluble extractive greenish brown under U.V. light (254 nm) and brownish-green under (366 nm); extract obtained in the test for alcoholic soluble extractive greenish yellow under U.V. light (254 nm) and dark-brown, under (366 nm).

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	1	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.2	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	2	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	8	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' using n-Butanol : Acetic acid: Water (4:1:5) shows in visible light three spots at Rf. 0.75 (pink), 0.89 (grey), and 0.94 (dirty yellow). Under U.V. (366 nm) four fluorescent zones are visible at Rf. 0.66 (blue), 0.75 (pink), 0.89 (grey) and 0.94 (dirty yellow). On exposure to Iodine vapour four spots appear at Rf. 0.66, 0.75, 0.89 and 0.94 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for about ten minutes at 110°C four spots appear at Rf. 0.66. 0.75 (both light pink), 0.89 (grey) and 0.94 (orange).

CONSTITUENTS - Brasilin, Essential oils, Saponin Glycoside, Amino Acids and Sugars.

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta
Guna	:	Rukṣa
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Pittahara, Varṇya, Dōṣahara

IMPORTANT FORMULATIONS - Karpuradyarka, Arimedādi Taila, Kuṅkumādi Taila

THERAPEUTIC USES - Dāha, Mukharoga, Pradara, Vraṇa, Rakta Dōṣa

DOSE - 5-10 gm.

42. Pippali (Ft.)

PIPPALI (Fruit)

Pippali consists of the dried, immature, catkin-like fruits with bracts of *Piper longum* Linn. (Fam. Piperaceae), a slender, aromatic climber with perennial woody roots, occurring in hotter parts of India from central Himalayas to Assam upto lower hills of West Bengal and ever green forests of Western ghats as wild, and also cultivated in North East and many parts of the South.

SYNONYMS

Sanskrit	:	Kaṇa, Māgadhi, Magadha, Kṛṣṇa, Śauṇḍi
Assamese	:	Pippali
Bengali	:	Pipul
English	:	Long Pepper
Gujrati	:	Lindi Peeper, Pipali
Hindi	:	Pipar
Kannada	:	Hippali
Kashmiri	:	--
Malayalam	:	Pippali
Marathi	:	Pimpali, Lendi Pimpali
Oriya	:	Pipali, Pippali
Punjabi	:	Magh, Magh Pipali
Tamil	:	Arisi Tippali, Thippili
Telugu	:	Pippalu
Urdu	:	Filfil Daraz

DESCRIPTION

a) Macroscopic

Fruit greenish-black to black, cylindrical, 2.5 to 5 cm long and 0.4 to 1 cm thick, consisting of minute sessile fruits, arranged around an axis; surface rough and composite; broken surface shows a central axis and 6 to 12 fruitlets arranged around an axis; taste, pungent producing numbness on the tongue; odour, aromatic.

b) Microscopic

Catkin shows 6 to 12 fruits, arranged in circle on a central axis, each having an outer epidermal layer of irregular cells filled with deep brown content and covered externally with a thick cuticle; mesocarp consists of larger cells, usually collapsed, irregular in shape and thin-walled; a number of stone cells in singles or in groups present; endocarp and seed coat fused to form a deep zone, outer layer of this zone composed of thin-walled cells and colourless, inner layer composed of tangentially

elongated cells, having reddish-brown content; most of endocarp filled with starch grains, round to oval measuring 3 to 8 μ in dia.

Powder - Deep moss green, shows fragments of parenchyma, oval to elongated stone cells, oil globules and round to oval, starch grains, measuring 3 to 8 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	7	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	5	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	7	per cent, Appendix	2.2.7.

T.L.C.

T. L. C. of alcoholic extract of the drug on Silica gel 'G' plate using Toluene: Ethylacetate (90: 10) as mobile phase. Under U.V. (366 nm) six fluorescent zones are visible at Rf. 0.15, 0.26, 0.34, 0.39, 0.50 and 0.80. On exposure to Iodine vapour seven spots appear at Rf. 0.04, 0.15, 0.26, 0.34, 0.39, 0.50 and 0.93 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate at 105°C for ten minutes five spots appear at Rf. 0.04, 0.22, 0.35, 0.43 and 0.82. On spraying with Dragendorff reagent three spots appear at Rf. 0.15, 0.26 and 0.34 (all orange).

CONSTITUENTS - Essential Oil and Alkaloids

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta
Guna	:	Laghu, Snigdha
Virya	:	Anusna
Vipaka	:	Madhura
Karma	:	Dīpana, Hṛdya, Kaphahara, Rucya, Tridoṣahara, Vātahara, Vṛṣya, Rāsayana, Rēcana

IMPORTANT FORMULATIONS - Amṛtāriṣṭa, Ayaskṛti, Cyavanaprāśa Avalēha, Guḍapippali, Aśvagandhādyariṣṭa, Kumāryasava, Candanāsava, Śiva Guṭika, Kaiśora Guggulu

THERAPEUTIC USES - Śūla, Arṣa, Gulma, Hikka, Kāsa, Kṛmi, Kṣaya, Kuṣṭha, Plīha Roga, Pramēha, Svāśa, Tṛṣṇa, Udara Roga, Āma Vāta, Āmadōṣa, Jvara

DOSE - 1-3 gm.

43. Plaksha (Ft.)

PLAKṢA (Fruit)

Plakṣa consists of dried fruit of *Ficus lacor Buch.* -Ham. Syn. *F. lucescens Blu*me., *F. infectoria* Roxb. (Fam. Moraceae), a large spreading tree, with a few occasional aerial roots, found nearly throughout the country and commonly planted as an avenue and ornamental tree

SYNONYMS

Sanskrit	:	Jāti
Assamese	:	Pakar
Bengali	:	Pakar
English	:	--
Gujrati	:	Peep, Pakadee
Hindi	:	Pakhar, Pilkhin
Kannada	:	Karibasari, Kadubasari, Jeevibsari Basa
Kashmiri	:	--
Malayalam	:	Itthy, Kallal
Marathi	:	Pimpari, Paicta
Oriya	:	Pakali, Pakal
Punjabi	:	Pilkhan
Tamil	:	Kallal, Itthi
Telugu	:	Juvvi, Erra-Juvvi
Urdu	:	Pakhar

DESCRIPTION

a) Macroscopic

Fruit a syconus, 0.5 to 1.0 cm in dia., attached with pedicel; sub-globose, wrinkled, glabrous, having three basal bracts; greyish-brown to yellowish-brown; taste, astringent.

b) Microscopic

Fruit shows single layered, thin-walled epidermis followed by a narrow zone of 2 to 5 layers, of round, oval, rectangular, lignified stone cells with wide lumen; rest of mesocarp very wide consisting of oval to polygonal, collenchymatous cells containing brownish contents; a few vascular traces found scattered in this zone; inner zone consisting of stone cells similar in shape and size to those found scattered in outer zone; male and female flower attached to inner layer of mesocarp.

Powder -Dark greyish-brown; shows fragments of epidermal cells; single, or groups of lignified stone cells; collenchymatous cells; a few debris of male and female flowers present.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	9	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	5	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	15	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica Gel 'G' using n-Butanol : Acetic Acid : Water (4: 1 :5) shows in visible light three spots at Rf. 0.27, 0.63 (both grey) and 0.97 (yellowish green). Under U.V. (366 nm) six fluorescent zones are visible at Rf. 0.53, 0.63, 0.84, 0.91, 0.94 (all blue) and 0.97 (pink). On exposure to Iodine vapour twelve spots appear at Rf. 0.12, 0.16, 0.22, 0.27, 0.38, 0.50, 0.63, 0.73, 0.84, 0.91, 0.94 and 0.97 (all yellow). On spraying with Ninhydrin reagent a single spot appears at Rf. 0.97 (brick red).

CONSTITUENTS - Amino Acids.

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṣāya
Guna	:	Śīta
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Pittahara

IMPORTANT FORMULATIONS - (No Formulations)

THERAPEUTIC USES - Śōtha, Śrama, Bhrama, Dāha, Murccha, Raktapitta, Pralapa

DOSE - 5-10 gm.

44. Priyala (St.Bk.)

PRIYĀLA (Stem Bark)

Priyāla consists of dried stem bark of *Buchanania lanz*an Spreng. Syn. *B. latifolia* Roxb. (Fam. Anacardiaceae), an evergreen tree upto 15 m high, found throughout the country in dry deciduous forests.

SYNONYMS

Sanskrit	:	Priyala, Carah, Kharaskandhah
Assamese	:	--
Bengali	:	Chironji, Pial
English	:	Calumpang Nut Tree
Gujrati	:	Chaaroli
Hindi	:	Chiraunji, Piyaar, Chironji
Kannada	:	Kolatmavu, Chalaali
Kashmiri	:	--
Malayalam	:	Priyaalam, Mural maram
Marathi	:	Chaaroli Jhaada
Oriya	:	Char, Charakoli, Priyal
Punjabi	:	Chironji
Tamil	:	Saarapparuppu
Telugu	:	Sarapappu Chettu, Chinna morilli Mori, Saara
Urdu	:	Habb-us-Samena

DESCRIPTION

a) Macroscopic

Bark occurs in 3 to 11 cm long, and about 1.0 cm thick pieces; external surface greyish-brown, rough due to formation of fissures; internal surface reddish-brown and fibrous; recurved, flat or more or less channelled; fracture, fibrous.

b) Microscopic

Shows a wide zone of rhytidoma, consisting of oval thick-walled cork cells, hardened dead cortical cells, having a few oil globules, groups of lignified phloem fibres, stone cells and a large number of lysigenous cavities with yellow contents; secondary phloem a wide zone composed of oval to polygonal, parenchymatous cells containing prismatic crystals of calcium oxalate and a few oil globules; groups of round to oval stone cells having distinct striations with both narrow and wide lumen; phloem rays usually biseriate, composed of round to oval, slightly thick-walled cells.

Powder -Greyish-brown; shows fragments of parenchymatous cells, phloem fibres, stone cells and a few prismatic crystals and oil globules.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	18	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	14	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	15	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using n-Butanol ; Acetic acid Water (4:1:5) shows in visible light two spots at Rf. 0.14 and 0.91 (both grey). Under U.V. (366nm) two fluorescent zones appear at Rf. 0.70 and 0.78 (both blue). On exposure to Iodine vapour two spots appear at Rf. 0.14 and 0.91 (both yellow). On spraying with Ferric chloride solution two spots appear at Rf. 0.14 and 0.91 (both dirty blue).

CONSTITUENTS - Alkaloids, Tannins, Saponins, reducing Sugars, Triterpenoids and Flavonoids

PROPERTIES AND ACTION

Rasa	:	Madhura
Guna	:	Guru, Sara, Snigdha
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Hṛdya, Pittahara, Vātahara, Vṛśya, Dāhahara, Raktaprasadana, Virecanopaga

IMPORTANT FORMULATIONS - Aśōka Ghṛta, Nyagrōḍhādi Kvātha Curna

THERAPEUTIC USES - Jvara, Raktapitta, Tṛṣa, Rakātisāra

DOSE - 5-10 gm.

45. Priyangu (Fruit.)

PRIYAṄGU (Fruit)

Priyaṅgu consists of dried fruit of *Callicarpa macrophylla* Vahl. (Fam.Verbenaceae), a stout shrub, about 1.2 to 1.8 m high, occurring in the sub-Himalayan tracts from Hazara eastwards to Assam upto 1800 m. and in Upper Gangetic and West Bengal plains;

SYNONYMS

Sanskrit	:	Phalini, Vanita
Assamese	:	--
Bengali	:	Priyangu
English	:	--
Gujrati	:	Ghaunla, Priyango
Hindi	:	Priyangu
Kannada	:	Kadu-edi, Sannanathdagida, Proyangu, Navane
Kashmiri	:	--
Malayalam	:	Nazhal, Kadurohini, Njazhal, Jnazhal
Marathi	:	Gauhala, Gahula, Priyangu
Oriya	:	Priyangu
Punjabi	:	Priyangu
Tamil	:	Gnazalpoo
Telugu	:	Prenkhanamu
Urdu	:	--

DESCRIPTION

a) Macroscopic

Fruit globose, 1 to 3 mm in dia., yellowish-brown with or without fruit stalk; 4-toothed, bell-shaped calyx sometimes attached; fruit contains four one seeded pyrenes; taste, astringent; no characteristic odour.

b) Microscopic

Fruit shows pericarp differentiated into an epicarp, a mesocarp and an endocarp; epicarp thin, forms skin of fruit consisting of outer epidermal cells; a few epidermal cells elongate to form short stalked, disc-shaped, 2 to 4 celled glandular hairs; some other epidermal cells form stellate hairs; mesocarp composed of 5 to 8 layered, thin-walled, parenchymatous cells; endocarp hard and stony, consisting of sclerenchymatous cells, which are larger towards inner side and smaller towards outer side; seeds four in each fruit; yellowish coloured; endosperm 2 to 6 layered consisting of isodiametric cells; cotyledons 2, consisting of isodiametric cells.

Powder - Brown; shows fragments of straight walled, lignified cells of seed coat; oval to elongated, elliptical endocarp cells in surface view; single and groups of elongated, oval to rectangular, lignified stone cells having concentric striations, radial canal, with narrow lumen; a few glandular and stellate hairs and pieces of polygonal endosperm cells.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	6.5	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	3	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	10	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' plate using n-Butanol : Acetic acid: Water (4:1:5) shows under U.V. light (366 nm) one conspicuous fluorescent spot at Rf. 0.82 (sky blue). On exposure to Iodine vapour two spots appear at Rf. 0.82 & 0.92 (both yellowish brown). On spraying with Ferric Chloride (10% aqueous solution) two spots appear at Rf. 0.82 & 0.92 (both greyish brown).

CONSTITUENTS - Fixed Oil

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta, Kaṣāya
Guna	:	Śīta, Guru, Rukṣa
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Pittahara, Sangrāhi, Balakṛta, Udrikta Raktaprasādana

IMPORTANT FORMULATIONS - Jīrakādi Mōdaka, Bṛhatphala Ghṛta, Bṛhatcchāgalādya Ghṛta, Vyāghri Taila

THERAPEUTIC USES - Chardi, Dāha, Jvara, Raktadōṣa, Brahma, Vātaroga, Vaktrajādya

DOSE - 1-2 gm. of the durg in powder form.

46. Prishnaiparni (W.P.)

PṚŚNIPARṆI(Whole Plant)

Pṛśniparṇi consists of dried whole plant of *Uraria picta* Desv. (Fam. Fabaceae), an erect, under shrub upto 90 cm high, distributed throughout the country.

SYNONYMS

Sanskrit	:	Citraparṇi, Kalasi, Dhavani, Pṛthakparṇi, Shrigalavinna
Assamese	:	--
Bengali	:	Salpani, Chhalani, Chakule
English	:	--
Gujrati	:	Pithavan
Hindi	:	Pithavan, Dabra
Kannada	:	Murele Honne, Ondele honne, Prushniparni
Kashmiri	:	--
Malayalam	:	Orila
Marathi	:	Pithvan, Prushnipamee
Oriya	:	Prushnipamee, Shankarjata
Punjabi	:	Detedarnee
Tamil	:	Oripai
Telugu	:	Kolakuponna
Urdu	:	--

DESCRIPTION

a) Macroscopic

Root - Occur in pieces of varying size, thickness of 1 to 2 cm, gradually tapering, tough,woody, cylindrical; externally light yellow to buff, internally pale yellow; surface bearing fine longitudinal striations; fracture, splintery or fibrous; taste, slightly acrid.

Stem - About 8.0 to 16.0 cm long, 0.2 to 0.4 cm in diameter, in cut pieces; cylindrical, branched, pubescent, external surface light yellow to brown; transversely cut and smoothened surface shows buff-white colour, mature stem longitudinally wrinkled, leaf scar present at nodes; fracture, fibrous.

Leaf - Very variable, imparipinnate, upto 20 cm or more long, upto 2 cm wide; leaflets on the upper part of the stem 5 to 7, rigidly sub-coriaceous, linear-oblong, acute, blotched with white; glabrous above, finely reticulately veined and minutely pubescent beneath, base rounded; leaflets on the lower part of the stem 1 to 3, sub-orbicular or oblong.

b) Microscopic

Root - Shows 5 or 6 layers of thin-walled, tabular, regularly arranged cork cells; cork cambium single layered; secondary cortex composed of 4 to 6 layers of oval, tangentially arranged, thin-walled, parenchymatous cells, a few fibres present singly or in groups; secondary phloem composed of sieve elements, parenchyma and fibres traversed by phloem rays; sieve elements somewhat collapsed towards periphery but intact in inner phloem region; phloem parenchyma composed of rounded to somewhat oval cells, larger towards periphery; fibres thick-walled, lignified with narrow lumen and tapering ends;phloem rays 1 to 5 cells wide, their cells being oval or rectangular in the portion nearer the wood but broader towards their distal ends; secondary xylem composed of vessels, tracheids, fibres, crystal fibres and parenchyma traversed by xylem rays; vessel very few, mostly confined to inner and outer part of xylem; fibres similar to those of phloem fibres and arranged in close set concentric bands; in isolated preparation vessels are cylindrical, pitted with transverse to oblique perforation; tracheids possess bordered pits; xylem parenchyma mostly rectangular with simple pits; xylem ray cells isodiametric showing simple pits; starch grains simple, round to oval, measuring 6 to 17μ in dia., distributed throughout parenchymatous cells of secondary cortex, phloem and xylem; prismatic crystals of calcium oxalate present in crystal fibres, as well as in many parenchymatous cells of secondary cortex, phloem and ray cells.

Stern - Shows single layered epidermis covered with cuticle, a few epidermal cells elongate outwards forming papillae; cortex 8 to 10 cells wide, consisting of oval to circular, thin walled, parenchymatous cells; groups of pericyclic fibres present in the form of discontinuous ring; phloem consisting of usual elements except phloem fibres; phloem rays 2 to 4 cells wide; xylem consisting of usual elements; vessels mostly simple pitted; fibres simple with blunt tips; xylem rays 1 to 4 cells wide and 2 to 8 cells in height; pith wide, consisting of thin-walled, round to oval parenchymatous cells.

Leaf-

Midrib - single layered epidermis on either surfaces covered with striated cuticle having a few unicellular or bicellular, hooked or straight and pointed tipped hairs present on bothsurfaces but more on lower surface; collenchyma 2 or 3 layered, followed by 2 layers of parenchyma cells; single row of pericyclic fibers present on both sides; vascular bundle located centrally.

Lamina - shows single layered epidermis on either surfaces, a few unicellular or bicellular, hooked or straight, pointed tipped hairs present on lower surface; mesophyll differentiated into single layered palisade and spongy parenchyma; spongy parenchyma cells oval to rounded having small intercellular spaces; numerous paracytic stomata present on lower surface; stomatal index 27 to 36 on lower surface; palisade ratio 4 or 5; vein-islet number 29 to 32 per sq. mm.; vascular bundle present centrally.

Powder - Greenish-yellow; shows simple pitted vessels; fragments of fibres, tracheids, parenchyma cells; pieces of hairs; palisade cells; a few prismatic crystals of calcium oxalate; epidermal cells wavy walled in surface view showing paracyic stomata and starch grains simple, round to oval, measuring 6 to 17 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	11	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	4	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	7	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	8	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Toluene: Ethyl acetate (9:1) shows under U.V. (366 nm) three fluorescent zones at Rf. 0.13 (Red), 0.26 (light blue) and 0.30 (Red). On exposure to Iodine vapour nine spots appear at Rf. 0.07, 0.18, 0.26, 0.30, 0.44, 0.63, 0.86, 0.91 and 0.97 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate at 105°C for ten minutes eight spots appear at Rf. 0.18, 0.26, 0.30, 0.39, 0.44, 0.86, 0.91 and 0.97 (all grey).

CONSTITUENTS -

PROPERTIES AND ACTION

Rasa	:	Madhura, Amla, Kaṭu, Tikta
Guna	:	Laghu, Sara
Virya	:	Uṣṇa
Vipaka	:	Madhura
Karma	:	Dīpana, Saṅgrāhi, Tridōṣahara, Vātahara, Vṛṣya, Sōthahara, Aṅgamardapraśamana, Sandhānīya, Jīvāṇu Nāśaka, Balavardhaka

IMPORTANT FORMULATIONS - Amṛtāriṣṭa, Angamarda Praśamana Kaśaya Cūrṇa, Daśamūla Taila, Vyāghritaila, Madhyama Nārayana Taila, Śiraha Śūlādi Vajra Rasa, Daśamūlāriṣa.

THERAPEUTIC USES - Atisāra, Chardi, Dāha, Jvara, Kāsa, Raktātisāra, Raktavikāra, Svāśa, Unmāda, Vātarakta, Vraṇa, Vātarōga, Raktarśa, Kaphajamadātyaya Tṛṣna, Nataprabala, Ēkāhika Jvara, Pilla (Nētra Rōga) Asthibhagna

DOSE - 20-50 gm powder for decoction.

47. Pushkara (Rt.)

PUṢKARA (Root)

Puṣkara consists of dried root of *Inula racemosa* Hook. f. (Fam. Asteraceae), a stout herb, 0.5 to 1.5 m high, mostly found in Western Himalayas upto 2600 m.

SYNONYMS

Sanskrit	:	Kāśmīra, Pōuṣkara
Assamese	:	Pohakarmul, Puskar
Bengali	:	Pushkara, Pushkaramula
English	:	Orris Root
Gujrati	:	Pushkarmula
Hindi	:	Pohakar Mul
Kannada	:	Pushkara Moola
Kashmiri	:	--
Malayalam	:	Puskara
Marathi	:	Pokhar Mool
Oriya	:	Puskara
Punjabi	:	Pokhar Mool
Tamil	:	Pushkarmulam
Telugu	:	Pushkara Mulamu
Urdu	:	--

DESCRIPTION

a) Macroscopic

Root available in cut pieces, upto about 15 cm long and 0.5 to 2.0 cm in dia.; cylindrical, straight or somewhat curved; surface rough due to longitudinal striations and cracks, scars of lateral rootlets and rhytidoma present, externally brownish-grey and internally yellowish-brown; fracture, short and smooth; odour, camphoraceous and aromatic; taste, bitter and camphoraceous.

b) Microscopic

Mature root shows a wavy outline due to development of rhytidoma; cork composed of 8 to 12 layers of thick-walled, tangentially elongated, rectangular cells, some filled with reddish-brown contents; secondary cortex 1 or 2 layers or absent; secondary phloem consists of sieve elements and parenchyma having secretory cavities and traversed by medullary rays; cambium not distinct; wood occupies bulk of root consisting of vessels, tracheids, fibres, parenchyma, secretory cavities and medullary rays; vessel have reticulate thickenings, a few fibres occur in small patches adjacent to vessels and abundant in xylem parenchyma, thin-walled; a few small tracheids; parenchyma in general contain granular, slightly yellowish or colourless inulin granules

and also a few yellowish oil globules; starch grains either absent or very rarely seen in cortical and ray cells; yellowish resinous masses present in secretory canals.

Powder - Reddish-brown; under microscope shows fragments of cork cells, vessels, fibres and parenchyma cells containing tannin and inulin.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	5	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.6	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	10	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	20	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Benzene: Ethylacetate (9:1) shows on exposure to Iodine vapour nine spots at Rf. 0.23, 0.28, 0.34, 0.39, 0.48, 0.51, 0.64, 0.73 and 0.94 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for about ten minutes at 105° C eight spots appear at Rf. 0.11, 0.28, 0.34, 0.39, 0.48, 0.64, 0.73 and 0.94 (all violet).

CONSTITUENTS - Essential oil

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta
Guna	:	Laghu
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Kaphavātajit

IMPORTANT FORMULATIONS - Kānkāyana Guṭika, Kumāryasava, Mahanārayaṇa Taila, Manasamitravaaka, Daśamūlāriṣta, Lōdrāsava, Rāsnādi Kvātha Cūrṇa

THERAPEUTIC USES - Aruci, Ādhmāna, Hikka, Jvara, Kāsa, Svāsa, Pārsvaśula, Śōpha, Ārdita, Paṇḍu

DOSE - 1-3 gm of the drug in powder form.

48. Rudraksha (Sd.)

RUDRĀKṢA (Seed)

Rudrākṣa consists of seeds of *Elaeocarpus sphaericus* Gaertn. K. Schum (Fam. Elaeocarpaceae), a medium sized, ornamental tree, found in the lower Himalayas and in the Western ghats at higher elevation.

SYNONYMS

Sanskrit	:	Chattu Sampangi
Assamese	:	--
Bengali	:	Rudrakya
English	:	--
Gujrati	:	Rudraksh, Rudraksha
Hindi	:	Rudraki
Kannada	:	Rudrakshi mara, Rudraksh
Kashmiri	:	--
Malayalam	:	Rudraksha
Marathi	:	Rudraksha
Oriya	:	--
Punjabi	:	Rudraksha
Tamil	:	Rudraksha
Telugu	:	Rudraksha
Urdu	:	--

DESCRIPTION

a) Macroscopic

Seed stony, very hard, spherical, obovoid or oval, variable in size, about 1 or 2 cm in dia.; longitudinally grooved, tubercled, brown, divided into five segments.

b) Microscopic

Seed coat consists of multilayered, oval to polygonal stone cells and internally followed by 8 to 10 layers of tangentially elongated, oval-shaped, thin-walled, parenchymatous cells, filled with reddish-brown contents, excepting the middle 2 or 3 layers; endosperm consists of oval to polygonal, thin-walled, parenchymatous cells; rosette crystals of calcium oxalate and oil globules present in this region; embryo slightly curved and consists of oval to polygonal, thin-walled, parenchymatous cells, a few having oil globules.

Powder - Reddish-brown; shows polygonal lignified with narrow lumened stone cells, thin-walled, parenchymatous cells with reddish-brown contents, rosette crystals of calcium oxalate and oil globules.

IDENTITY, PURITY AND STRENGTH

Foreign matter		Nil Appendix	2.2.2.
Total Ash	Not more than	1.2 per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.4 per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	2 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	1 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' using n-Butanol : Acetic acid : Water (4:1 :5) under U.V. (366 nm) shows one fluorescent zone at Rf. 0.91 (violet). On exposure to Iodine vapour three spots appear at Rf. 0.19, 0.31 and 0.52 (all yellow). On spraying with 5% Methnaolic-Sulphuric acid reagent and heating the plate at 105°C for ten minutes a single spot appears at Rf. 0.91(grey).

CONSTITUENTS - Fixed Oil and Fatty Acids.

PROPERTIES AND ACTION

Rasa	:	Madhura
Guna	:	Snigdha, Sthūla
Virya	:	Uṣṇa
Vipaka	:	--
Karma	:	Mēdhya, Rakṣoghna, Arōgyaprada, Hṛdyam (Saumanasya Karah)

IMPORTANT FORMULATIONS - Gōrōcanādi Vaṭi, Cukkumtippalyādi Guṭika, Dhanvantara Guṭika, Svaramukādi Guṭika, M ṛtasanjīvani Guṭika

THERAPEUTIC USES - Matisudhikara, Uccharaktacāpa, Prgyāparādha, Hṛdyarōga, Romāntika, Mānasarōga, Anidra

DOSE - 1-2 gm internally.

49. Saraja (Exud.)

SARJA (Exudate)

Sarja consists of resinous exudate of *Vateria indica* Linn. (Fam. Dipterocarpaceae), a large, evergreen tree, upto 30 m high with a cylindrical bole, indigenous to the evergreen forests of the Western Ghats from North Kanara to Kerala and also extensively planted as an avenue tree in Karnataka; resinous exudate is obtained by making semicircular incisions on the stem through the cork cambium up to the surface of sapwood.

SYNONYMS

Sanskrit	:	Dēvdhūpa, Kārśya, Sasyasumbara, Ajakarṇa
Assamese	:	--
Bengali	:	Shakgachha, Chandras
English	:	White Damar tree, India Cop tree
Gujrati	:	Chandras
Hindi	:	Sandras, Safed Damar
Kannada	:	Rala
Kashmiri	:	--
Malayalam	:	Payin
Marathi	:	Raal
Oriya	:	Sava
Punjabi	:	--
Tamil	:	Kungiliyam, Vellai Kuntarakam, Vellai Kundarakam
Telugu	:	Tellaguggilarnu, Telladamaramu
Urdu	:	Sandaras, Raal

DESCRIPTION

a) Macroscopic

Rough, irregular, solid, brittle masses, breaking into angular pieces, upto 1.5 cm thick, light-yellow to pale yellow in colour; odour fragrant; tasteless.

b) Microscopic

Slightly soluble in alcohol in which it forms ajelly-like mass; insoluble in petroleum ether (40°C-60°C), forming white precipitate; insoluble in carbon-disulphide but yields jelly-like mass, dissolves entirely and gives a dense red colour with concentrated sulphuric acid; dissolves mostly in chloroform giving white or milky solution; (Sal resin dissolves almost entirely in petroleum ether forming a pale cream solution and also dissolves entirely in carbon-disulphide).

Test for presence of Colophony - (Distinction from Sala and Shallaki resin)

1. Dissolve 0.1 g in 10 ml of acetic anhydride by gentle heat, cool, and add I drop of sulphuric acid; a bright purplish-red colour, rapidly changing to violet, is produced.

2. Shake 0.1 g of powder with 10 ml of light petroleum (b.p. 50°-60°), and filter; shake 5 ml of the filtrate with 10 ml of dilute solution of copper acetate; the petroleum layer assumes a bright bluish-green colour.

IDENTITY, PURITY AND STRENGTH

Foreign matter		Nil Appendix	2.2.2.
Total Ash	Not more than	0.1 per cent, Appendix	2.2.3.
Acid-insoluble ash	Negligible		
Alcohol-soluble extractive	Not less than	60 per cent, Appendix	2.2.6.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' using Benzene: Methanol (95:5) shows under UV (366 nm) three fluorescent spots at Rf. 0.04, 0.28 and 0.93 (all blue). On exposure to Iodine vapour seven spots appear at Rf. 0.04, 0.28, 0.48, 0.65, 0.76, 0.85 and 0.93 (all yellow). On spraying with Anisaldehyde-Sulphuric acid reagent and heating the plate for ten minutes at 110°C seven spots appear at Rf. 0.04, 0.28, 0.48, 0.65, 0.76, 0.85 and 0.93 (all violet).

CONSTITUENTS - Resins.

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta, Kaṣāya
Guna	:	Snigdha, Uṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Kaphaghna, Vātahara, Varṇya, Viṣaghna, Kṛmighna, Svēdahara

IMPORTANT FORMULATIONS - Kacchurādi Curṇa Lēpa, Piṇda Taila, Lavangādi Cūrna

THERAPEUTIC USES - Atisāra, Grahaṇi, Kṛmi Rōga, Kaṇḍu, Kuṣṭha, Pramēha, Rakta D ōṣa, Vāta Rakta, Vraṇa, Yōni Rōga, Pāṇḍu, Karna Rōga, Bādhirya, Visphōa, Mēdōroga, Kśudrarōga, Lippa, Mānasa Roga, Muṣika Viṣa, Vidradhi, Dagdhaka

DOSE - 1-2 gm Internal, External.

50. Satavari (Rt.)

ŚATĀVARI (Root)

Śtāvari consists of tuberous roots of *Asparagus recemosus* Willd. (Fam. Liliaceae), an ascending, spinous much branched, perennial climber found throughout the country.

SYNONYMS

Sanskrit	:	Nārāyaṇi, Vāri, Abhīru, Atirasa
Assamese	:	Satmull
Bengali	:	Satamuli, Satmuli, Shatamuli
English	:	Asparagus
Gujrati	:	Satavari
Hindi	:	Satavar, Satamul
Kannada	:	Ashadi poeru, Halavu Bau, Narayani, Makkala
Kashmiri	:	--
Malayalam	:	Satavari Kizhangu
Marathi	:	Shatavari
Oriya	:	--
Punjabi	:	Satavar
Tamil	:	Shimai-Shadvari, Nilichedi Kishangu
Telugu	:	Sima-Shatawari (Dry Root), Pippipichara, Pilliteegalu (Fresh Root)
Urdu	:	Satawari

DESCRIPTION

a) Macroscopic

Root tuberous, 10 to 30 cm in length and 0.1 to 0.5 cm thick, tapering at both ends with longitudinal wrinkles; colour cream; taste, sweetish.

b) Microscopic

Shows an outer layer of piliferous cells, ruptured at places, composed of small, thin-walled, rectangular asymetrical cells, a number of cells elongated to form unicellular root hairs; cortex comprises of 25 to 29 layers, distinct in two zones, outer and inner cortex; outer cortex consists of 6 or 7 layers, compactly arranged, irregular to polygonal, thick walled, lignified cells; inner cortex comprise of 21 to 23 layers, oval to polygonal, thin-walled, tangentially elongated cells with intercellular spaces; stone cells, either singly or in groups, form a discontinuous to continuous ring in the upper part of this region; raphides of calcium oxalate also present in this region; 2 or 3 layers of stone cells encirle the endodermis; endodermis composed of thin-walled parenchymatous cells; pericycle present below endodermis; stele ex arch and radial in position; xylem consist of vessels, tracheids and parenchyma; xylem vessels have pitted thickening; phloem patches consists of usual element; pith composed of circular to oval parenchymatous cells, a few cells slightly lignified.

Powder - Yellowish-cream; fragments of lignified, thick-walled cells; vessels with simple pits, pieces of raphides, numerous, lignified, rectangular elongated' stone cells having clear striations with wide as well as narrow lumen and groups of parenchyma.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	5	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	10	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	45	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using n-Butanol : Acetic acid: Water (4:1:5) *v/v* shows on exposure to Iodine vapour three spots at Rf. 0.07, 0.50 and 0.67 (all yellow). On spraying with 5% methanolic sulphuric acid reagent and heating the plate for ten minutes at 110°C four spots appear at Rf. 0.07 (black), 0.41 (grey), 0.50 and 0.83 (both brownish yellow).

CONSTITUENTS - Sugar, Glycosides, Saponin and Sitosterol.

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta
Guna	:	Guru, Snigdha
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Śukrala, Balya, Hṛdya, Mēdhya, Pittahara, Rasayana, Vṛṣya, Śukraja, Kaphavātaghna, Vātaharaa, Stanyakara, Nētrya, Agnipuṣtikara

IMPORTANT FORMULATIONS - Brahma Rasāyana, Mahanārayaṇa Taila, Ṣatāvari Guḍa, Pūga Khanḍa, Saubhāgyaśuṇhi, Bṛhacchāgalyādi Ghṛta, Śatāvari Ghṛta, Śatāvari Kalpa, Aśvagandhāriṣta, Nārasimha Cūrṇa

THERAPEUTIC USES - Amlapitta, Arṣa, Atisāra, Gulma, Kṣaya, Raktātīsara, Raktapitta, Raktavikāra, Vātarakta, Visarpa, Śōha, Pariṇāma Śūla, Mutrarakta, Vātajvara, Svarabhēda, Naktāndhya, Sūtika Roga, Stanya Dōṣa, Stanya Kṣaya

DOSE - 3-6 gm of the drug.

51. Shigru (Rt.Bk.)

ŚIGRU (Root Bark)

Śigru consists of dried root bark of *Moringa oleifera* Lam. Syn. *Moringa pterygosperma* Gaertn. (Fam. Moringaceae), a small or medium sized tree, found wild in sub-Himalayan tract, and also commonly cultivated throughout the country for its leaves and fruits used as vegetable.

SYNONYMS

Sanskrit	:	Śōbhāñjana, Bahala, Tīkṣṇagandha, Akṣiva, Mōcaka
Assamese	:	Saijna, Sohjna
Bengali	:	Sajina, Sajna
English	:	Horse Radish Tree, Drum-stick Tree
Gujrati	:	Saragavo
Hindi	:	Sahajan
Kannada	:	Neegge, Nugge Kand Chakke
Kashmiri	:	--
Malayalam	:	Muringa
Marathi	:	Sevaga, Segat Sala
Oriya	:	Sajina
Punjabi	:	Sohanjana
Tamil	:	Murungai
Telugu	:	Munaga, Mulaga
Urdu	:	Sohanjana, Sahajan

DESCRIPTION

a) Macroscopic

Drug occuts in pieces of variable sizes, external surface, light greyish-brown, rough, reticulated, marked with transverse row of lenticels; outer bark, thin, peeling off in small bits, internal surface, white.

b) Microscopic

Mature bark shows a very wide zone of cork, consisting of 25 or more rows of rectangular cells, arranged radially, a few inner layers, larger and cubicular in shape; secondary cortex composed of rectangular, thin-walled cells, a few containing starch grains and rosette crystals of calcium oxalate and a few others containing oil globules and coloured resinous matter; starch grains mostly simple and rarely compound, composed of 2 or 3 components, round to oval in shape, measuring 6 to 28 μ in dia., groups of stone cells, round to rectangular, of various sizes, present in secondary cortex; mucilagenous cavities found scattered towards inner secondary cortical region; secondary phloem appreciably wide, consisting mainly of phloem fibres and phloem

parenchyma; phloem fibres in large patches, alternating with phloem parenchyma; numerous starch grains and cell contents as described above also present in phloem cells; phloem rays numerous, long, 2 to 4 seriate, consisting of radially elongated, thin-walled cells containing numerous starch grains, similar to those present in secondary cortex.

Powder - Pinkish-brown; shows stone cells, phloem fibres, starch grains, measuring 6 to 28 μ in dia., rosette crystals of calcium oxalate and oil globules.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	18	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	10	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	3	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	11	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' using Toluene: Ethylacetate (9:1) shows under U.V. (366 nm) two fluorescent zones at Rf. 0.06 and 0.52 (both green). On exposure to Iodine vapour seven spots appear at Rf. 0.06, 0.33, 0.43, 0.54, 0.70, 0.78 and 0.87 (all yellow). On spraying with Vanillin-Sulphuric aeid reagent and heating the plate at 105°C for ten minutes six spots appear at Rf. 0.33, 0.43, 0.54, 0.70, 0.78 and 0.87 (all violet).

CONSTITUENTS - Alkaloids and Essential Oil

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta
Guna	:	Laghu, Rukṣa, Sara, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Cakṣusya, Dīpana, Hṛdya, Kaphahara, Mēdōhara, Pācana, Pittakara, Samgrāhi, Vātahara, Viṣaghna, Sukrala, Śōphaghna, Rōcana

IMPORTANT FORMULATIONS - Prabhañjana Vimardana Taila, Sārasvata Ghṛta, Vastyamayānaka Ghṛta, Kasara Taila, Maṇikya Rasa

THERAPEUTIC USES - Vraṇa Vikāra, Grāṭhi, Gulma, Karṇaśūla, Mēdōrōga, Vidradhi, Visarpa, Śōpha, Kṛmirōga, Plīha Rōga, Galaganḍa, Mukhajādya, Aśmari, Mutra Śarkara, Kuṣṭha, Kṣata, Antarvidradhi

DOSE - 25-50 gm of the drug in powder form.

52. Shigru (Seed.)

ŚIGRU (Seed)

Śigru consists of dried seed of *Moringa oleifera* Lam. Syn. *M. pterygosperma* Gaertn. (Fam. Moringaceae), a small or medium sized tree, found wild in sub-Himalayan tract, and also commonly cultivated all over the plains of the country, for its leaves and fruits used as vegetable.

SYNONYMS

Sanskrit	:	Śōbhāñjana, Akṣiva, Mōcaka
Assamese	:	Saijna, Sohjna
Bengali	:	Sajina, Sajna
English	:	Drum-stick Tree, Horse Radish Tree
Gujrati	:	Sargavo, Sekato
Hindi	:	Sahajana, Munga,
Kannada	:	Neegge, Nugge Beeta
Kashmiri	:	--
Malayalam	:	Muringa, Tiksnggandha
Marathi	:	Shevaga, Shegatabeeja
Oriya	:	Sajana, Munga, Munika
Punjabi	:	Sohaniana
Tamil	:	Muringai, Muringai Virai
Telugu	:	Munaga
Urdu	:	Sahajan, Sohanjana

DESCRIPTION

a) Macroscopic

Seeds hard, trigonous, having short wings; size 0.5 to 1.0 cm long and 0.3 to 0.5 cm wide; colour greyish-cream; odour, not characteristic; taste; slightly bitter.

b) Microscopic

Seed shows 10 to 15 layered, tangentially elongated, thin-walled cells of the testa, followed by a wide zone of cells of cotyledons consisting of round to oval, thin-walled, parenchymatous cells with intercellular spaces and containing mucilage and oil globules.

Powder- Cream coloured; shows groups of elongated, round to oval, parenchymatous cells; oval to elongated, thin-walled cells of testa showing striations in surface view and oil globules.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	5	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.8	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	12	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	24	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica Gel 'G' plate using Chloroforyn : Toluene (75:25) as mobile phase shows under U.V. (366 nm) three fluorescent zones at Rf. 0.52, 0.59 and 0.94 (all blue). On spraying with Anisaldehyde-Sulphuric acid reagent and heating the plate for about ten minutes at 110°C three spots appear at Rf. 0.52, 0.59 and 0.94 (all violet).

CONSTITUENTS - Fixed Oil.

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta
Guna	:	Laghu, Rukṣa, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Cakṣusya, Dīpana, Hṛdya, Kaphahara, Sangrāhi, Vātahara

IMPORTANT FORMULATIONS - Sudarśana Curṇa, Śōthaghna Lēpa, Sarsapādi Pralēpa, Sarvajvarahara Lauha

THERAPEUTIC USES - Śōtha, Gulma, Kṛmirōga, Mēdōrōga, Mukhajādya, Pliharōga, Vātarōga, Vidradhi, Vraṇa, Nētrarōga, Apaci, Galaganda, Śirōrōga, Atinidra

DOSE - 5-10 gm of the drug in powder form.

53. Shigru (St.Bk.)

ŚIGRU (Stem Bark)

Śigru consists of dried stem bark of *Moringa oleifera* Lam. Syn. *M. pterygosperma* Gaertn. (Fam. Moringaceae), a small or medium sized tree, indigenous to the sub-Himalayan tract, found wild in lower Himalayas and cultivated all over the plains of India, for its leaves and fruits used as vegetables.

SYNONYMS

Sanskrit	:	Śōbhāñjana, Bahōla, Śākhapatra
Assamese	:	--
Bengali	:	Sajina, Sajne
English	:	Horse Radish Tree, Drum-stick Tree,
Gujrati	:	Saragave
Hindi	:	Sahijana
Kannada	:	Nugge, Nuggemara, Nuggekoyimara
Kashmiri	:	--
Malayalam	:	Muringya, Murinna
Marathi	:	Shewga
Oriya	:	Munga, Munika, Sajana
Punjabi	:	Sohajana
Tamil	:	Murungai
Telugu	:	Munaga chettu, Mulaya Chetta
Urdu	:	Sahajan, Sohanjana

DESCRIPTION

a) Macroscopic

Mature bark, rough, deeply cracked, grey or dark green; young bark, greenish to greenish-brown, 1 to 3 cm thick or more, depending upon the age of plant; taste, bitter and pungent.

b) Microscopic

Cork region very wide, composed of 15 to 20 layers, thin-walled, radially arranged, rectangular cells with coloured contents; cork cambium consists of a single row of thin-walled, rectangular or tangentially elongated cells; secondary cortex very wide, composed of nearly cubical to rectangular, thin-walled parenchymatous cells containing a few rosette and cubical, rhomboidal or hexagonal crystals of calcium oxalate; several groups of thick walled, lignified, elongated to polygonal stone cells with striations and wide as well as narrow lumen present; a few small, simple, round to oval, starch grains measuring 5 to 14 μ in dia., with concentric striations and hilum, and a few oil globules scattered in cortical region; secondary phloem consists of thin-walled, oval

to polygonal parenchyma, fibres, and phloem rays; phloem parenchyma cells adjoining the sclerenchyma cells containing small rhomboidal or cubical crystals of calcium oxalate and many large lysigenous mucilage cavities filled with mucilage; groups of lignified fibres form nearly concentric, discontinuous zones, separated by phloem rays; rays many, 2 or 3 seriate, occasionally uniseriate; towards the inner phloem regions they are radially elongated but, become tangentially elongated in the outer phloem; most of the cells loaded with simple, starch grains and crystals of calcium oxalate.

Powder - Light brown, fragments of thin-walled, polygonal, sometimes rectangular cork cells; groups or single, thick-walled, lignified, elongated to polygonal stone cells with striations and lumen; a few rhomboidal, rosette crystals of calcium oxalate; a few oil globules; a very small, numerous, simple, oval to round, starch grains measuring 5 to 14 μ in dia., with concentric striations and narrow hilum; pieces of phloem parenchyma, lignified phloem fibres and ray cells.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	11	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	1	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	5	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' using Chloroform : Methanol (85:15) shows under U.V. (366nm) a fluorescent zone at Rf. 0.97 (blue). On exposure to Iodine vapour five spots appear at Rf. 0.15, 0.22, 0.49, 0.81 and 0.97 (all yellow). On spraying with 5% Methanolic- Phosphomolybdic acid reagent six spots appear on heating the plate at 105°C for about fifteen minutes at Rf. 0.15, 0.22, 0.49, 0.66, 0.81 and 0.97 (all grey).

CONSTITUENTS - Sterols and Terpenes.

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta
Guna	:	Laghu, Picchila, Rukṣa, Sara, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Śōphaghna, Śukrala, Cakṣusya, Dīpana, Hṛdya, Kaphaghna, Rōcana, Samgrāhi, Viṣaghna, Vidāhakṛt, Vātaghna, Śirovirēcanopaga, Pittōtklēśaka

IMPORTANT FORMULATIONS - Sārasvata Ghṛta, Vastyamayānaka Ghṛta, Kārpāsāsthyādi Taila, Kṣara Taila, Viṣati ṅduka Taila, Khaṅda Lavana, Sarśapādi Pralēpa, Svēta Karavīra Pallavadya Ṭaila

THERAPEUTIC USES - Akṣirōga, Apaci, Arśa, Bhagandara, Gulma, Kṛmi, Mēdōrōga, Vidradhi, Pliha Rōga, Hṛdya Rōga, Galagaṅda, Vraṇa Śōtha, D ṛsti Roga, Sarvapīda Nivāraṇi

DOSE - Stem Bark juice 10-20 ml.Stem Bark Powder 2-5 gm.

54. Sringataka (Drd.Sd.)

ŚṚṄGĀṬAKA (Dried Seed)

Śṛṅgāṭaka consists of dried seeds of *Trapa natans* Linn. var. *bispinosa* (Roxb.) Makino. Syn. *T. bispinosa* Roxb. *T. quadrispinosa* Wall. (Fam. Trapaceae), a very variable, rooted, aquatic herb occurring throughout the greater part of the country in lakes, tanks and ponds arid also extensively grown

SYNONYMS

Sanskrit	:	Śṛṅgata, Jalaphala, Trikōṇaphala
Assamese	:	--
Bengali	:	Paniphal, Singade, Jalfal
English	:	Water Chestnut
Gujrati	:	Shingoda, Singoda
Hindi	:	Singhara, Singhada
Kannada	:	Singade, Gara, Simgara, Simgoda
Kashmiri	:	--
Malayalam	:	Karimpolam, Vankotta, Jalaphalam, Karimpola
Marathi	:	Shingoda
Oriya	:	Paniphala, Singada
Punjabi	:	Singhade, Gaunaree
Tamil	:	Singhara
Telugu	:	Kubyakam, Singada
Urdu	:	Singhara

DESCRIPTION

a) Macroscopic

Seeds somewhat triangular to 4-angled in shape, with or without shallow groove on both surfaces, 2 to 3.0 cm long and 2.5 to 3.5 cm wide; externally reddish-brown; mostly one surface mottled, smooth in texture.

b) Microscopic

Shows testa of three zones, outer zone consisting of tangentially elongated or somewhat crushed, 3 to 6 layered parenchymatous cells, middle zone of lignified cells, inner zone of rectangular and tangentially elongated thin-walled cells having reddish brown contents; tegmen 2 or 3 layered, comprising of tangentially elongated cells, rest of the seed consisting of thin-walled, parenchymatous cells; starch grains simple, or in groups, oval to round having distinct striations and hilum, measuring 6 to 45 μ in dia, a few vascular strands with vessels showing spiral thickening, found scattered in this region.

Distinction from Arrow root (a possible substitute)- Arrow root *(Maranta arundinacea* Linn.) starch is more irregular in shape, being ellipsoid, pear-shaped or even almost trigonal, occasionally showing small tuberosities; hilum stellar or cleft, slightly eccentric, being situated near the broader end; fine concentric striations are visible in most granules.

Powder - White; numerous simple, solitary and groups of circular to oval starch grains, having concentric striations and distinct hilum in centre, measuring upto 45 μ in dia; a few fragments of testa consisting of oval to polygonal, thin-walled, parenchyma cells in surface view.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	3	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.3	per cent, Appendix	2.2.4.
Water-soluble extractive	Not less than	8	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using n-Butanol : Acetic acid: Water (4:1:5) *vlv* shows under U.V. (366 nm) one fluorescent zone at Rf. 0.60 (blue). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for about ten minutes at Rf. 105°C three spots appear at Rf. 0.30 (grey), 0.43 (grey), and 0.93 (violet).

CONSTITUENTS - Starch and Protein.

PROPERTIES AND ACTION

Rasa	:	Kaṣāya, Madhura
Guna	:	Guru
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Śramahara, Śukrakara, Garbhasthāpana, Grāhi, Pittahara, Vṛṣya, Stanyajanana, Rakta Stambhaka

IMPORTANT FORMULATIONS - Amṛtaprāśa Ghṛta, Saubhāgya Śuṇṭhi, Pugakhaṇḍa

THERAPEUTIC USES - Asthibhagna, Dāha, Mūtrakṛcchra, Pramēha, Raktapitta, Tṛṣa, Visarpa, Garbha Srava, Śopha(external), Vātavyadhi

DOSE - 5-10 mg of the drug in powder form.

55. Sruvavriksha (Lf.)

SRUVAVṚKṢA (Leaf)

Sruvavṛkṣa consists of dried leaf of *Flacourtia indica* Merr. Syn. *F. ramontchi* L Herit. (Fam. Flacourtiaceae), a small deciduous, usually thorny tree or shrub, found in the sub-Himalayan tracts and outer Himalayas upto 1220 m and also common throughout Chota Nagpur, Deccan and South India.

SYNONYMS

Sanskrit	:	Vikankata, Gōpakanta
Assamese	:	--
Bengali	:	Bincha, Bainchi, Bewich
English	:	Governors Plum, Madaraskara Plum
Gujrati	:	Kankata
Hindi	:	Bilangra
Kannada	:	llumanika, Dodda Gejjalakai
Kashmiri	:	--
Malayalam	:	Vavankataku, Vikamkath, Yaliya Nzerinigal, Loloikka
Marathi	:	Kaker
Oriya	:	Kantheikoli, Vaincha, Uincha
Punjabi	:	Kakoa, Kukoya
Tamil	:	Sottaikala, Kat Ukala
Telugu	:	Putregu, Kanavegu Chettu, Vikankata
Urdu	:	--

DESCRIPTION

a) Macroscopic

Leaves simple, sessile, 3 to 5 cm long and 1 to 3 cm wide, ovate to obovate, glabrous above, more or less pubescent beneath, serrate towards apex, and crenate in basal region, greenish-grey.

b) Microscopic

Leaf-

Midrib - Epidermis, single layered, covered externally with thin cuticle; followed by 1 or 2 layers of collenchyma and 3 to 5 layers parenchyma; lower epidermis with 2 or 3 layers of adjacent collenchyma and 2 or 3 layers of parenchyma; vascular bundle single, situated in the centre, covered by fibre sheath on both sides; a few unicellular, hooked, trichomes present on lower surface; a few rosette and prismatic crystals of calcium oxalate scattered in parenchyma cells.

Lamina - Epidermis single layered on both surfaces, covered with thin cuticle; a few simple, unicellular hairs with blunt tips present on lower surface; 2 layers of palisade cells and 2 or 3 layers of spongy parenchyma cells present; rosette and a few prismatic crystals of calcium oxalate present in epidermis, palisade and spongy parenchyma cells; a few veinlets present in between palisade and spongy parenchyma; stomata anisocytic, present on lower surface; palisade ratio 2 or 3; vein islet number 8 to 10 per sq. mm; veinlet termination number 10 to 12 per sq. mm; stomatal index 24 to 26.

Powder - Greenish-grey, shows fragments of collenchymatous, and parenchymatous cells; elongated, thick -walled pointed fibres; sinuous walled epidermal cells in surface view, containing rosette and a few prismatic crystals of calcium oxalate; palisade cells, a few anisocytic stomata, and pieces of unicellular hairs present.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	9	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.6	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	12	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using n-Butanol : Acetic acid: Water (4:1:5) shows under U.V. (366 nm) four fluorescent zones at Rf. 0.26, 0.76, 0.88 (all blue) and 0.98 (red). On exposure to Iodine vapour four spots appear at Rf. 0.26, 0.48, 0.61 and 0.88 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for ten minutes at 105°C six spots appear at Rf. 0.34, 0.48, 0.61, 0.76, 0.88 and 0.98 (all grey).

CONSTITUENTS - Tannin and Sugar.

PROPERTIES AND ACTION

Rasa	:	Madhura, Amla, Tikta
Guna	:	Laghu
Virya	:	Śīta
Vipaka	:	Madhura
Karma	:	Dīpana, Kaphahara, Pittahara, Pācana

IMPORTANT FORMULATIONS - Āragvadhādi Kvātha Curṇa

THERAPEUTIC USES - Śōpha, Kāmala, Raktavikāra

DOSE - 50-100 gm for decoction.

56. Sruvavriksha (St.Bk.)

SRUVAVṚKṢA (Stem Bark)

Sruvavṛkṣa consists of dried stem bark of *Flacourtia indica* Merr. Syn. *F. ramontchi* L Herit. (Fam. Flacourtiaceae), a small deciduous, usually thorny tree or shrub, found in the sub-Himalayan tract and outer Himalayas upto 1220 m and also common throughout Indian deciduous forests.

SYNONYMS

Sanskrit	:	Gōpakanta, Vikankata
Assamese	:	Bainchi, Bewich, Bincha
Bengali	:	Governors Plum, Madaraskara
English	:	---
Gujrati	:	Kankata
Hindi	:	Bilangra
Kannada	:	llumanika, Dodda Gejjala Kai
Kashmiri	:	--
Malayalam	:	Vayankataku, Vikamkath, Yali Nzerinigal
Marathi	:	Kaker
Oriya	:	Kantheikoli, Vaincha, Vinch
Punjabi	:	Kakoa, Kukoya
Tamil	:	Kat Ukala, Sottaikala
Telugu	:	Kanavegu Chettu, Putregu, Vika

DESCRIPTION

a) Macroscopic

Drug occurs in 2 to 5 cm long and 1 to 3 mm thick, curved, quilled or flat pieces; external surface smooth, reddish-grey, having lenticels, internal surface reddish-brown; fracture, short.

b) Microscopic

Mature bark shows 4 to 13 layers of exfoliated cork consisting of tangentially elongated and radially arranged, thin-walled cells, a few containing reddish-brown contents; secondary cortex consisting of oval to elliptical, tangentially elongated, parenchymatous cells, followed by a zone of compactly arranged fibre and groups of stone cells; secondary phloem composed of sieve elements, parenchyma, phloem rays and phloem fibres; lignified phloem fibres oval to polygonal mostly in groups; phloem rays 1 or 2 cells wide and 3 to 10 cells deep, slightly thick-walled; prismatic crystals of calcium oxalate present in secondary cortex and phloem parenchyma; starch grains simple, round to oval measuring 3 to 11 µ in dia.

Powder - Crearnish-brown; shows cork cells, lignified phloem fibres, prismatic crystals of calcium oxalate, numerous, round to oval starch grains measuring 3 to 11 μ in dia,

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1 per cent, Appendix	2.2.2.
Total Ash	Not more than	16 per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.6 per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	6 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	11 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Chloroform : Methanol (9:1) shows under U.V. (366nm) one fluorescent spot at Rf. 0.27 (Sky blue). On exposure to Iodine vapour four spots appear at Rf. 0.13, 0.20, 0.27 and 0.64 (all brownish yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for ten minutes at 105°C five spots appear at Rf. 0.06, 0.13, 0.20, 0.27 and 0.64 (all greyish brown).

CONSTITUENTS - Tannin and Flacourtin, a phenolic glucoside ester.

PROPERTIES AND ACTION

Rasa	:	Tikta
Guna	:	Laghu, Tikṣṇa
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Kaphahara, Pittahara, Dīpana

IMPORTANT FORMULATIONS - Āragvadhādi Kvātha Curṇa

THERAPEUTIC USES - Raktavikāra, Śōpha (Śōtha), Duṣṭa Vraṇa

DOSE - 50-100 gm of the drug for decoction.

57. Talamuli (Rz.)

TĀLAMŪLI (Rhizome)

Tālamuli consists of dried rhizome of *Curculigo orchioides* Gaertn. (Fam. Amaryllidaceae), a small herb, upto 30 cm high with tuberous root stock, occurring wild in sub-tropical Himalayas from Kumaon eastwards, ascending upto 1830 m in Khasi hills, Manipur and the Eastern Ghats, also from Konkan southwards; drug is collected from two year old plants, washed well and cleared of rootlets, sliced and dried in shade.

SYNONYMS

Sanskrit	:	Bhūmitila
Assamese	:	Talmuli, Tailmuli
Bengali	:	Talmalu, Tallur
English	:	--
Gujrati	:	Kalirnusali
Hindi	:	Syahmusali, Kalimusli
Kannada	:	Neltal, Neltathigodde, Nelatale, Nelatelegadde
Kashmiri	:	--
Malayalam	:	Nilappenea
Marathi	:	Kali musali, Bhuimaddi
Oriya	:	Talamuli
Punjabi	:	Syah musali, Musali safed,
Tamil	:	Nilappanai
Telugu	:	Nel tadigadda
Urdu	:	Musali Siyah, Kali Musali

DESCRIPTION

a) Macroscopic

Drug occurs in transversely cut pieces of 2.5 to 5 cm long, cylindrical, straight to slightly curved, cut surface 1.0 to 4.5 cm in dia.; external surface blackish-brown, cut surface cream coloured; surface with numerous shallow wrinkles and transverse cracks; with a few rootlets and root scars; nodes and internodes prominent; taste, mucilaginous and slightly bitter.

b) Microscopic

Shows a narrow strip of cork, consisting of 5 to 7 rows of light brown cubical to rectangular cells; secondary cortex consists of thin-walled, parenchymatous cells, densely filled with starch grains and acicular crystals of calcium oxalate, either isolated or in bundles, in a few cells; a few small, round to tangentially elongated, lysigenous cavities also found scattered in this region; a few vascular bundles found embedded in cortical region with phloem towards outer side, and consisting of a few xylem elements;

ground tissue consists of parenchymatous cells, some of which contain acicular crystals of calcium oxalate; numerous fibro-vascular bundles found scattered throughout the region, mostly towards peripheral region having phloem, almost encircled by xylem vessels having annular and spiral thickenings; starch grains simple, rounded to oval and also compound of 2 to 4 components, measuring 4 to 21 µ in dia., present in cortical and central region, a number of deep red, resin canals found throughout the region, mucilage in the form of colourless mass found in a few cortical parenchymatous cells.

Powder - Greyish; vessels with annular and spiral thickenings; simple, round to oval, starch grains measuring 4 to 21 µ in dia., and compound starch grains having 2 to 4 components and a few acicular crystals of calcium oxalate; mucilage in the form of colourless mass found in a few cortical parenchymatous cells

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	9	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	2	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	3	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	17	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using n-Butanol : Acetic Acid: Water (4:1:5) shows under U.V. (366 nm) four fluorescent zones at Rf. 0.39, 0.77, 0.90 and 0.97 (all yellow). On exposure to Iodine vapour twelve spots appear at Rf. 0.06, 0.13, 0.17, 0.25, 0.39, 0.50, 0.62, 0.70, 0.77, 0.88, 0.90 and 0.97 (all yellow). On spraying with Dragendorff reagent followed by sodium nitrite three spots appear at Rf. 0.39, 0.70 and 0.88 (all light purple).

CONSTITUENTS - Tannin, Resin, Sapogenin and Alkaloid

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta
Guna	:	Guru, Picchila
Virya	:	Uṣṇa
Vipaka	:	Madhura
Karma	:	Śramahara, Dāhahara, Pittahara, Vṛṣya, Bṛhmaṇa, Rasāyana, Puṣtiprada, Balaprada

IMPORTANT FORMULATIONS - Gandharvahastādi Kvātha Curṇa, Candanādi Curṇa.

THERAPEUTIC USES - Arśa, Vātarōga, Kārśya, Kṣtakṣīṇa

DOSE - 3-6 gm of the drug in powder form.

58. Talisa (Drd.Lf.)

TĀLĪŚA (Leaves)

Tālīśa consist of dried needle like leaves of *Abies webbiana* Lindl (Fam. Pinaceae), plant is a tall, evergreen tree with thick, spreading, horizontal branches attaining a height of 60 m found in Himalayas at an altitude of 2800-10000 m.

SYNONYMS

Sanskrit	:	Patrādhyam
Assamese	:	Talish
Bengali	:	Talish Pala, Taleesh Patra
English	:	Himalayan Siver
Gujrati	:	Talish Patra
Hindi	:	Talish Patra
Kannada	:	Tales Patra, Talisapathra, Shukodara
Kashmiri	:	--
Malayalam	:	Talisapatra, Taleesapatri
Marathi	:	Laghu Taleespatra
Oriya	:	Talis
Punjabi	:	--
Tamil	:	Talispatra, Taleesapatri
Telugu	:	Taleesapatri
Urdu	:	Zarnab

DESCRIPTION

a) Macroscopic

Leaves flat, 1 to 5.5 cm long, about 2 mm broad; shining, midrib in the upper surface channelled down the middle but raised beneath; with two faint white lines on either side of the midrib beneath, petiole very short, greyish-brown; odour, terebinthine-like; taste, astringent.

b) Microscopic

Mature leaf shows single layered epidermis on either side covered with thick cuticle; upper epidermis followed by single layered sclerenchymatous hypodermis, lower epidermis shows papillate projections at some places followed by 1 or 2 layers sclerenchymatous hypodermis; palisade 2 layered; spongy parenchyma 4-6 layered; vascular bundle single, situated centrally, consisting of xylem and phloem, enclosed by a single layered endodermis; xylem on upper side and phloem on lower side; cambium inconspicuous; secretory cavities two in numbers, located on either side of vascular bundle, stomata sunken type, present only on the lower surface.

Powder - Greenish-brown; shows sclerenchymatous cells, palisade, spongy parenchyma and a few epidermal cells.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	6	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	14	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	15	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica Gel 'G' using Toluene: Ethylacetate (9:1) shows in visible light five spots at Rf. 0.09, 0.41, 0.59, 0.67 (all green) and 0.92 (light green). Under U.V. (366 nm) eight fluorescent zones visible at Rf. 0.05 (orange), 0.09 (blackish) 0.14 (orange), 0.43 (red), 0.54 (blue), 0.62 (blackish red), 0.67 and 0.92 (both red). On exposure to iodine vapour eleven spots appear at Rf. 0.04, 0.08, 0.12, 0.17, 0.39, 0.50, 0.57, 0.65, 0.73, 0.85 and 0.92 (all yellow). On spraying with Vanillin Sulphuric acid reagent and heating the plate at 105°C for ten minutes eleven spots appear at Rf. 0.04, 0.08, 0.12, 0.17, 0.39, 0.50, 0.57, 0.65, 0.73, 0.85 and 0.92 (all violet).

CONSTITUENTS - Essential Oil & Alkaloid.

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta
Guna	:	Laghu, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Dīpana, Hṛdya, Vātakaphāpham, Ślēṣmapittajit

IMPORTANT FORMULATIONS - Drākṣādi Cūrṇa, Tālīsādi Curṇa, Bhāskara Lavaṇa, Prānaḍa Guṭika, Jātiphālādi Cūrṇa, Puga Khanḍa, Tāl īsādi Mōdaka

THERAPEUTIC USES - Kāśa, Agnimāndya, Hikka, Kṛmi, Kṣaya, Mukharoga, Svāśa, Gulma, Āmadoṣa, Chardi, Aruci

DOSE - 2-3 gm of the drug in powder form.

59. Tila (Sd.)

TILA (Seed)

Tila consists of dried seeds of *Sesamum indicum* Linn. (Fam, Pedaliaceae), a herb extensively cultivated throughout the plains of India upto 1200 m for its seeds.

SYNONYMS

Sanskrit	:	Tila
Assamese	:	Simmasim
Bengali	:	Tilagachh
English	:	Sesame, Gingelly-oil Seeds
Gujrati	:	Tall
Hindi	:	Tila, Teel, Tili
Kannada	:	Accheellu, Ellu
Kashmiri	:	--
Malayalam	:	Ellu
Marathi	:	Tila
Oriya	:	Til
Punjabi	:	Til
Tamil	:	Ellu
Telugu	:	Nuvvulu
Urdu	:	Kunjad

DESCRIPTION

a) Macroscopic

Seed white, brown, grey or black, flattened ovate in shape, smooth or reticulate, 2.5 to 3 mm long and 1.5 mm broad, one side slightly concave with faint marginal lines and an equally faint central line; taste, pleasant and oily.

b) Microscopic

Testa of seed shows single layered palisade-like, thin-walled, yellowish coloured cells, and the rest of the testa composed of collapsed cells; endosperm 3 layered, rarely 2 layered, consisting of cellulosic polygonal cells of parenchyma containing fixed oils and small aleurone grains; cotyledons two, externally covered with thin cuticle; single layered epidermal cell, followed by a single row of palisade- like cells; rest of the tissues consist of polygonal, parenchyma cells containing fixed oil and aleurone grains.

Powder - Blackish coloured; shows palisade-like cells in surface view, parenchyma cells, aleurone grains and oil globules.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	9	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	20	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	4	per cent, Appendix	2.2.7.
Fixed Oil	Not less than	35	per cent, Appendix	2.2.8

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Toluene: Ethylacetate (9 : 1) shows under UV (366 nm) three fluorescent zones at Rf. 0.57, 0.64 (both light blue) and 0.72 (blue). On exposure to Iodine vapour five spots appear at Rf. 0.08, 0.57, 0.64, 0.72 and 0.94 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for ten minutes at 110° C seven spots appear at Rf. 0.08, 0.57, 0.64, 0.72 (all violet), 0.76, 0.84 (both light violet) and 0.94 (violet).

CONSTITUENTS - Fixed Oil

PROPERTIES AND ACTION

Rasa : Madhura, Kaṭu, Tikta, Kaṣāya

Guna : Vyavai, Guru, Snigdha, Sukṣma

Virya : Uṣṇa

Vipaka : Madhura

Karma : Balya, Kēśya, Pittala, Rasayana, Saṅgrāhi, Vātaghna, Varṇya, Viṣaghna, Snēhana, Svarka, Snēhōpaga, Kuṣṭhakara, Vitbardhaka, Mūtrabandhaka, Mēdhavardhala, Agnivardhaka, Avasādakara, Kēśa, Kṛṣṇakara, Kasa Vardhaka, Karṇapālivardhaka, Kaphakōpaka, Mṛdurēcaka, Vrana Samśōdhaka, Vrana Pācaka, Vrana Dāhanāśaka, Bhagna Prasādhaka, Vājikara, Agnibala Vardhaka

IMPORTANT FORMULATIONS - Nārasimha Cūrṇa, Jātiphaladya Curṇa, Samaṅgādi Curna, Haridrādi Lēpa, Vṛṣya, Pupalika Yōga, Nāgarādi Yōga, Tilādi Upanāha, Tilādi Yōga, Priyalādi Yōga, Mustādi Upanāha, Sunthyadi Curṇa, Pathyādi Guṭika, Hingvādi Yōga, Pāniya Kṣāra, Bhallātakādi Modaka

THERAPEUTIC USES - Aśmari, Akṣirōga, Atisāra, Āmaśula, Galaganda, Gulma, Hikka, Kṛmi, Kṣaya, Kasa, Kuṣṭha, Pīnasa, Pradara, Pravāhika, Raktātisāra, Svaśa, Tṛṣa, Visarpa, Udvarta, Yoniśula, Udara,

Ānāha, Śirah Śūla, Pārśva Śula, Raktārśa, Gudabhrāmśa, Vatarakta, Nādi Vraṇa, Svitra, Granthi, Upadamśa, Vidaraka, Alasa, Khālitya, Palitya, Pratiśyāya, Śankhaka, Śākuni Graha, Kumara, Pitṛmēśagraha, Mutrāghata, Dantaroga, Dantaharṣa, Vātika Mukharōga, Atidgdha, Plīharōga, Muśika Daṅśa, Karṇapāli Śōra

DOSE - Powder 5-10 gm/day.

60. Tulasi (Sd.)

TULASI (Seed)

Tulasi consists of seeds of *Ocimum sanctum* Linn. (Fam. Lamiaceae), an erect, branched, annual herb, found throughout the country, and also cultivated

SYNONYMS

Sanskrit	:	Surasa, Surasa, Bahumaniri, Bhūtaghn
Assamese	:	Tulasi
Bengali	:	Tulasi
English	:	Holi Basil, Sacred Basil
Gujrati	:	Tulsi, Tulasi
Hindi	:	Tulasi
Kannada	:	Tulasi, Sri tulasi
Kashmiri	:	Tulasi
Malayalam	:	Tulasi
Marathi	:	Tulasi
Oriya	:	--
Punjabi	:	Tulasi
Tamil	:	Tulasi, Thulasi, Thiruthazhai
Telugu	:	Tulasi, Manchi Tulasi, Nalla Tulasi
Urdu	:	Tulsi

DESCRIPTION

a) Macroscopic

Seeds round to oval, about 0.1 cm long, brown with mucilaginous outer covering, slightly notched at the tip and broadly rounded at the base; no odour; taste, pungent, and slightly mucilaginous.

Powder - Brown; shows groups of polygonal, thick-walled, epidermal cells, 28 to 55 μ in size; oval to polygonal, parenchymatous cells containing oil globules and starch grains simple as well as compound, having 2 to 5 components, single grains measuring 3 to 17 μ in dia.

Swelling Index- Not less than 5, when determinied as follows:

Introduce the accurately weighed seeds into a 25 ml glass stoppered measuring cylinder. The length of the graduated portion of the cylinder should be 125 mm; the internal diameter 16 mm subdivided in 0.2 ml and marked from 0 to 25 ml in up wards direction. Add 25 ml of water, and shake the mixture thoroughly at intervals of every 10 minutes for 1 hour. Allow to stand for 3 hours at room temperature. Measure the volume in ml

occupied by the seeds, including any sticky mucilage. Carry out simultaneously not less than 3 determination and calculate the mean value of the individual determinations, related to 1 g of seeds.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	8	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	2	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Toluene: Ethylacetate (9:1) as mobile phase shows under U.V. (366 nm) three fluorescent zones at Rf. 0.36, 0.56 (both red) and 0.93 (blue). On spraying with Vanillin-Sulphuric acid reagent and heating the plate for about ten minutes at 110°C five spots appear at Rf. 0.04, 0.23, 0.36, 0.70 and 0.93 (all violet).

CONSTITUENTS - Fixed Oil and Mucilage

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta, Kaṣāya
Guna	:	Laghu, Rukṣa, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Dāhakṛta, Vraṇaśōdhaka, Hṛdya, Kṛmighna, Kaphahara, Pittahara, Vātahara, Rucikṛt, Dīpana, Viṣahara

IMPORTANT FORMULATIONS - Muktādi Mahañjanasa

THERAPEUTIC USES - Śōpha, Aruci, Hikka, Kāsa, Kṛmi, Kuṣṭha, Mūtrakṛcchra, Pratiśyāya, Śvāśa, Pārśvaśūla, Pūtigandha, Garaviśa, Rakta Vikāra, Jantuviśa, Bhutarōga

DOSE - 1-2 gm of the seed in powder form.

61. Tumburu (Ft.)

TUMBURU (Fruit)

Tumburu consists of dried fruit of *Zanthoxylum armatum* DC. Syn. *Z. alatum* Roxb. (Farn. Rutaceae), an armed or erect shrub or small tree, found in the valleys of the Himalayas at an altitude of 1000 to 2100 m, in Khasi hills at 600 to 1800 rn, and in the Ghats in peninsular India.

SYNONYMS

Sanskrit	:	Tējōvati, Tējōvali, Tējōhva
Assamese	:	Tējōvati
Bengali	:	Tejovati, Nepali Dhania
English	:	--
Gujrati	:	Tejbal
Hindi	:	Tejbal, Nepali Dhaniya
Kannada	:	Tejapatri, Tumburu, Tejovanti
Kashmiri	:	--
Malayalam	:	Thumboonal, Thumbooni
Marathi	:	Tejbal, Tejobalee
Oriya	:	Tejbal
Punjabi	:	Tirmira
Tamil	:	Thejyovathi
Telugu	:	Tumburl
Urdu	:	Kabab-e-Khanda (Miswak)

DESCRIPTION

a) Macroscopic

Reddish-brown, sub-globose, mostly dehisced, follicles, containing a single seed in each follicle; seeds, globose, glabrous, shiny black; upto 0.5 cm long, and about 0.3 cm wide; taste, pungent; odour, aromatic.

b) Microscopic

Fruit - Pericarp shows large oil cavities and vascular tissues surrounded by parenchymatous cells containing irregular masses of hesperidin and followed by 2 to 5 layered palisade-like cells, hesperidin insoluble in organic solvents but soluble in potassium hydroxide.

Seed - Testa shows wide, very thick-walled, irregular, non-lignified cells having blackish-brown contents and numerous oil globules; tegmen shows 3 or 4 oval to polygonal tangentially elongated thin-walled parenchymatous cells, followed by 8 to 10

layers tangentially elongated tabular cells filled with reddish-brown contents; endosperm consists of thin-walled, polygonal, parenchymatous cells.

Powder - Dark brown to black; shows groups of thin-walled, parenchymatous cells, some filled with oil globules, and a few with hesperidin; polygonal cells of seed coat and separate globules of oil.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	8.5	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	8	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	10	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Toluene: Ethylacetate (9: 1) v/v shows in visible light two spots at Rf. 0.18, 0.35 (both grey). Under U.V. (366 nm) five spots appear at Rf. 0.10, 0.18, (both blue), 0.38 (violet) 0.55 (violet) and 0.93 (violet). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate at 105°C for ten minutes seven spots appear at Rf. 0.18, 0.26, 0.35, 0.48, 0.66, 0.76 and 0.96 (all grey).

CONSTITUENTS - Essential Oil.

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta
Guna	:	Laghu, Rukṣa, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Dīpana, Kaphahara, Pācana, Rucya, Vātahara, Lalaprasēka, Cimcimāyanama, Rasana Samsvēdaka

IMPORTANT FORMULATIONS - Saptavimśati Guggulu, Dadhika Ghṛta, Maha Viṣagarbha Taila, Hingvādi Taila

THERAPEUTIC USES - Agnimāndya, Arśa, Hṛdrōga, Hikka, Kāśa, Kantha Rōga, Svāśa, Ardita, Kaphaja Rōga, Asya Rōga, Danta Rōga

DOSE - 2-4 gm.

62. Utingana (Sd.)

UṬIṄGANA (Seed)

Utiṅgana consists of dried mature seeds of *Blepharis persica* (Burm. f.) O. Kuntze. Syn. *B. edulis* Pers. (Fam. Acanthaceae), a shrub, occurring in Punjab.

SYNONYMS

Sanskrit	:	Uttiṅgana
Assamese	:	--
Bengali	:	Ucchata
English	:	--
Gujrati	:	Utingun, Chopunivel
Hindi	:	Utangan
Kannada	:	Utangana
Kashmiri	:	--
Malayalam	:	Utigana, Utungana
Marathi	:	Utangan
Oriya	:	Utingana
Punjabi	:	Uttangan
Tamil	:	Uttanjana
Telugu	:	Uttangan
Urdu	:	Utangan

DESCRIPTION

a) Macroscopic

Seed occurs as entire or broken, 0.4 to 0.6 cm long, 0.3 to 0.4 cm broad; heart shaped, rough due to network of coarse hairs; cream to light yellow, flat; when soaked in water, hairs swell and produce viscid mucilage; mucilagenous on chewing.

b) Microscopic

Seed shows 4 to 6 layers of tangentially elongated, hyaline, thin-walled, parenchymatous seed coat, multicellular, multiseriate columnar, elongated hairs with twisted tips present towards outer side of the seed coat; embryo having two cotyledons with upper and lower epidermis; upper epidermis followed by 4 to 5 layers of oval to polygonal, thin-walled, parenchymatous cells and 2 or 3 layers more or less radially 2 elongated, thin-walled, parenchymatous cells respectively; beneath this a single layer of palisade-like cells present; lower epidermis covered with thick cuticle and consisting of rounded, isodiametric cells that are larger than those of the upper epidermis.

Powder - Yellowish-brown; shows fragments of hairs with mucilage, palisade-like oval to polygonal, thin-walled, parenchyma cells isolated or in larger or smaller groups.

IDENTITY, PURITY AND STRENGTH

Alcohol-soluble extractive	Not less than	16	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	23	per cent, Appendix	2.2.7.
Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	7	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1.5	per cent, Appendix	2.2.4.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Chloroform : Methanol (80:20) shows in visible light four spots at Rf. 0.17 (grey), 0.25 (light grey), 0.79 (light yellow), 0.87 (yellow). Under U.V. (366 nm) six fluorescent zones are yisible at Rf. 0.09, 0.17 (both black), 0.23 (light black) 0.33, 0.69 (both light blue) and 0.90 (dark blue). On exposure to Iodine vapour seven spots appear at Rf. 0.13, 0.18, 0.26, 0.36, 0.64, 0.75 and 0.90 (all yellow). On spraying with Dragendorff reagent followed by 5% Methanolic-Sulphuric acid one spot appear at Rf. 0.87 (orange). On spraying with 5% methanolic sulphuric acid eight spots appear at Rf. 0.14, 0.22, 0.33 (grey), 0.64 (violet), 0.71 (yellowish), 0.75 (brownish), 0.81 (yellow), and 0.90 (brown).

CONSTITUENTS - Glycosides and Tannin

PROPERTIES AND ACTION

Rasa	:	Madhura, Tikta
Guna	:	Guru, Picchila, Snigdha
Virya	:	Uṣṇa
Vipaka	:	Madhura
Karma	:	Vṛṣya, Mutrāla

IMPORTANT FORMULATIONS - Kumāryasāva

THERAPEUTIC USES - Mutrakṛcchra, Klaibya

DOSE - 3-6 gm of the drug in powder form.

63. Varahi (Rz.)

VĀRĀHI (Rhizome)

Vārāhi consists of dried cut pieces of rhizome of *Dioscorea bulbifera* Linn. (Fam. Dioscoreaceae), a large unarmed climber found throughout India ascending upto 1800 m in the Himalayas.

SYNONYMS

Sanskrit	:	Vārāhikaṇda
Assamese	:	--
Bengali	:	Ratalu
English	:	--
Gujrati	:	Dukkarkanda
Hindi	:	Varahi Kanda, Genthi
Kannada	:	Kunta Genusu, Heggenusu
Kashmiri	:	--
Malayalam	:	Varahi
Marathi	:	Dukarkanda
Oriya	:	--
Punjabi	:	--
Tamil	:	--
Telugu	:	Kaya Pendazam
Urdu	:	--

DESCRIPTION

a) Macroscopic

Drug occurs in cut pieces, 0.5 to 0.7 cm thick, 2 to 3 cm in dia.; a few root and root scars present; outer surface dark brown, inner yellow to light brown; odour, indistinct; taste, bitter.

b) Microscopic

Rhizome shows a cork composed of 10 to 15 layers of thick-walled, tangentially elongated rectangular cells; outer few cells filled with reddish-brown contents; cortex consists of oval to elliptical, thin-walled parenchymatous cells; ground tissue, forming major portion of drug composed of oval to polygonal cells having a few scattered closed vascular bundles; starch grains found both in cortex and ground tissues, but abundant in ground tissue, rounded to oval, three sided with rounded angles or rod-shaped, simple, solitary or in groups, 11 to 28 μ in diameter; hilum present at the narrower extremity.

Powder - Slightly yellowish-brown; shows parenchymatous cells; varying sizes of cone and rod-shaped starch grains measuring 11 to 28 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	6	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	3	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	9	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the alcoholic extract on Silica gel 'G' using n-Butanol : Acetic acid: Water (4: 1 :5) shows three spots at Rf. 0.79 (light yellow), 0.85 (light yellow) and 0.92 (grey) in visible light. Under U.V. (366 nm) six fluorescent zones are visible at Rf. 0.48, 0.59, 0.73 (all light blue), 0.78 (grey), 0.85 (blue) and 0.92 (grey). On exposure to Iodine vapour seven spots appear at Rf. 0.12, 0.34, 0.59, 0.73, 0.78, 0.85 and 0.92 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate for ten minutes at 110°C six spots appear at Rf. 0.34, 0.59, 0.66 (all light grey), 0.73, 0.85 and 0.92 (all grey).

CONSTITUENTS - Saponins-Steroidal, Saponins.

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta
Guna	:	Laghu
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Balya, Pittakara, Rasāyana, Svarya, Vṛśya, Varṇya, Slēṣmaghna, Ayurvardhana, Agnivṛddhikara

IMPORTANT FORMULATIONS - Nārasimha Cūrṇa, Vastyamayantaka Ghṛta, Pancanimba Cūrṇa

THERAPEUTIC USES - Kṛmi, Kandu, Kuṣṭha, Pramēha

DOSE - 3-6 gm.

64. Vrshabhu (Rt.)

VARṢĀBHU (Root)

Varṣābhu consists of dried root of *Trianthema portulacastrum* Linn. Syn. *T. monogyna* Linn., *T. obcordata* Roxb. (Fam. Aizoaceae), a prostrate, glabrous, typically post monsoon annual herb, found almost throughout the country as a weed in cultivated and waste lands.

SYNONYMS

Sanskrit	:	Svēta Mūla, Śōthaghṇi, Vrśōheev
Assamese	:	--
Bengali	:	Sabuni
English	:	Hoase Purslane
Gujrati	:	--
Hindi	:	Saphed Punamava, Bish Kharpra, Pathar
Kannada	:	Muchchugane, Sihi Punarnava
Kashmiri	:	--
Malayalam	:	Thazhuthama, Jamizhama
Marathi	:	Sweta Punarnava
Oriya	:	Sweta Puruni, Gothapurni
Punjabi	:	Sanaya
Tamil	:	Saranai, Mukuruttai
Telugu	:	Galijeru
Urdu	:	Bish Khapra

DESCRIPTION

a) Macroscopic

Root mostly twisted, consisting of tap root, 8 to 21 cm long, about 0.5 cm thick, with several lateral rootlets, external surface light greyish-yellow; fracture, short; no characteristic odour and taste.

b) Microscopic

Mature root shows anamolous secondary growth; cork 5 to 8 layered; secondary cortex narrow zone consisting of round to polygonal, tangentially elongated, thin-walled, parenchymatous cells, a few cells containing groups of prismatic crystals of calcium oxalate; below secondary cortex five concentric bands of vascular tissue; vessels of varying sizes occurring alongwith xylem fibres and phloem; phloem composed of thin walled cells having intercellular spaces a few cells containing prismatic crystals of calcium oxalate; a few rows of polygonal, thin walled, parenchymatous cells occur in rings; medullary rays prominent in middle of the cortical region and in the second or third vascular bundle ring; centre mostly occupied by a single vascular bundle strand with two isolated groups of phloem.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	11	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	2	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	2	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	11	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Acetone: Water: Cone. Ammonia (90 : 78 : 3) shows under U.V. (366 nm) three conspicuous fluorescent zones at Rf. 0.20, 0.33 and 0.91 (all sky blue). On exposure to Iodine vapour one conspicuous spot appears at Rf. 0.11 (yellow). On spraying with Dragendorff reagent one spot appears at Rf. 0.11 (yellow).

CONSTITUENTS - Glycoside

PROPERTIES AND ACTION

Rasa	:	Madhura, Kaṭu, Tikta, Kaṣāya
Guna	:	Laghu, Rukṣa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Bhēdana, Dīpana, Hṛdya, Kaphahara, Rucya, Vatahara, Mutrala

IMPORTANT FORMULATIONS - Suśkamaulaka Taila, Kumaryāsava, Dhanvatara Ghṛta, Sukumāraka Ghṛta, Punarnāvadyariṣṭa

THERAPEUTIC USES - Śōpha, Agnimāndya, Arśa, Gulma, Hṛdrōga, Jvara, Pāṇḍu, Udara Roga, Garaviṣa, Vasti Śula, Urahkṣta, Yakṛta Ēvam Plīha Roga

DOSE - 2-5 gm of the drug in powder form.

65. Vasa (Rt.)

VĀSĀ (Root)

Vāsā consists of dried root of *Adhatoda zeylanica* Medic. Syn. *A. vasica* Nees (Fam. Acanthaceae); a sub-herbaceous bush, found throughout the year in plains and sub-Himalayan tracts of the country ascending upto 1200 m.

SYNONYMS

Sanskrit	:	Vṛśa, Aṭarūśa, Vāsaka, Simhāsya, Vajidana
Assamese	:	Titabahak, Bahak, Vachaka
Bengali	:	Bakas, Basak
English	:	Vasaka, Malabar Nut tree
Gujrati	:	Ardusi, Aradusi, Araduso
Hindi	:	Adoosa, Arusa, Aduss
Kannada	:	Adusoye
Kashmiri	:	--
Malayalam	:	Adalodakam, Adarooshaka
Marathi	:	Adulsa, Vasa
Oriya	:	Vasanga, Basanga
Punjabi	:	Vishuti, Bhekar, Vansa, Arusa
Tamil	:	Adatodai
Telugu	:	Adda, Saramu
Urdu	:	Adusa(Arusa)

DESCRIPTION

a) Macroscopic

Drug occurs in cut pieces of 8 to 13 cm long, 1.5 to 3.0 cm in dia.; hard, woody, almost cylindrical, tap root having lateral branches, rough due to longitudinal cracks or fissures; greyish-brown to dark brown externally; creamish-white internally; fracture, hard; taste, bitter.

b) Microscopic

Shows 6 to 15 layers of rectangular to slightly tangentially elongated, thin-walled cork cells; secondary cortex wide consisting of rectangular to polygonal, thin-walled parenchymatous cells a few containing oil globules, followed by more or less discontinuous, annular band of mostly rectangular groups of stone cells having distinct pits and striations; secondary phloem composed of 15 to 20 layered, rectangular, elongated, thin-walled cells having usual elements; secondary xylem composed of vessels, fibres, parenchyma and rays; vessel simple pitted; xylem rays mostly uniseriate, a few four seriate rays are also present; starch grains simple and compound, with 2 to 3

components, round to oval, 3 to 6 μ in dia., having concentric striations and hilum, present in secondary cortex and secondary phoem.

Powder - Brownish-grey; shows fragments of cork cells; simple pitted vessels; stone cells mostly in groups; starch grains simple and compound having 2 to 3 components, round to oval, 3 to 6 μ in dia. having concentric striations and hilum.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	5	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	10	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' plate using Chloroform: Methanol (80 : 20) shows under U.V. (366 nm) four fluorescent zones at Rf. 0.57, 0.63 (both red), 0.83 (sky blue) and 0.87 (yellow). On exposure to Iodine vapour six spots appear at Rf. 0.07, 0.27, 0.52, 0.72, 0.87 and 0.93 (all yellow). On spraying with Dragendorff reagent two spots appear at Rf. 0.27 and 0.52 (both orange).

CONSTITUENTS - Alkaloids (Vasicine and Vasicinol) and Oil.

PROPERTIES AND ACTION

Rasa	:	Tikta, Kaṣāya
Guna	:	Laghu, Snigdha
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Hṛdya, Kaphahara, Pittahara, Raktaśodhaka, Svara, Vivardhaka, Vātakṛt

IMPORTANT FORMULATIONS - Cyavanaprāśa Avalēha, Kanakāsava, Bṛhata Mañjiṣādi Kvātha Curṇa, Pancatikta Ghṛta

THERAPEUTIC USES - Śvāsa, Chardi, Jvara, Kāsa, Kṛmi, Kṣaya, Kuṣṭha, Mēha, Raktapitta, Tṛṣa, Vāta Roga

DOSE - 3-6 gm.

66. Vishamushti (Sd)

VIṢAMUṢṬHI (Seed)

Viṣamuṣhṭi consists of dried seed of *Strychnos nux-vomica* Linn. (Fam. Fabaceae), a tree, upto a height of 9 to 15 m found throughout tropical parts of the country upto 360 m altitude in the moist deciduous forest. *Seed is poisonous and can produce ill effects.*

SYNONYMS

Sanskrit	:	Kāraskara, Viśatindu, Kākatinḍuka
Assamese	:	Ajraki, Habbul gurab, Kucila
Bengali	:	Kuchila
English	:	Poison-nut tree, Nux vomica
Gujrati	:	Konchala, Jher Kochla, Kuchla, Zer Kochalu
Hindi	:	Kuchala, Kuchila, Bish tendu
Kannada	:	Kanjihemushti, Manjira, Hemmushti, Ittongi, Kasarkayi
Kashmiri	:	--
Malayalam	:	Kajjl, Kanniram
Marathi	:	Kajra, Kuchla
Oriya	:	--
Punjabi	:	Kuchla
Tamil	:	Yettimaram, Kakotee, Ettikottai, Ettikkai
Telugu	:	Mushti, Mushini
Urdu	:	Azaraqi, Kuchla

DESCRIPTION

a) Macroscopic

Seeds greenish-grey to grey, extremely hard, silky to touch with a satiny sheen; disc-shaped, almost flat, umbonate but a few seeds somewhat irregularly bent, 10 to 30 mm in diameter, 4 to 6 mm thick, margin rounded or depressed; when cut open, endosperm found to be horny, having a central cavity in which the embryo is situated with two small, thin, cordate, leafy cotyledons with 5 to 7 veins and a terete radicle; odourless.

b) Microscopic

Seed shows single layered epidermis, each epidermal cell elongated externally to form closely appresed trichomes, lignified, comprising of pitted bulbous base and a thick-walled narrowly elongated, projection; trichome slightly bent beyond the base, with about ten strongly lignified ribs of thickenings; inner testa composed of collapsed parenchymatous cells with yellowish-brown contents; outermost layer of endosperm consists of palisade-like cells while the inner layers have thick-walled, cellulosic polyhedral cells, showing plasmodesmata; endosperm cells also contain oil, and aleurone grams.

Powder - Greenish-grey; shows narrowly elongated and slightly bent thick-walled, lignified trichomes with bulbous base without ramification, thin-walled, parenchymatous cells filled with yellowish-brown content, oil globules and aleurone grains.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	2	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.2	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	12	per cent, Appendix	2.2.7.
Assay	Not less than	1.2	per cent of strychnine	

ASSAY

Weigh accurately about 109 in fine powder, add 100 ml of a 33 per cent v/v mixture of chloroform in solvent ether and set aside for ten minutes. Add 5 ml of dilute ammonia solution and shake continuously for six hours. Transfer to a continuous extraction apparatus with more of the same solvent mixture and extract for two hours. Filter the solvent extract, washing the filter with solvent ether and extract with successive quantities of 20 ml, 20 ml , 10 ml and 10 ml of 1N sulphuric acid, until complete extraction of the alkaloids is effected. Combine the acid extracts and make alkaline with dilute ammonia solution. Extract with successive quantities of 20 ml, 20 ml ml and 10 ml of chloroform until complete extraction of the alkaloids is effected. Evaporate the chloroform, add 5 ml of alcohol and evaporate to dryness. Dissolve the residue in a mixture of 15 ml of a 3 per cent *w/v* solution of sulphuric acid and 2 ml of nitric acid, add a few crystals of sodium nitrite and set aside at 18°C for thirty minutes. Transfer to a separator containing 20 ml of solution of sodium hydroxide, shake for two minutes and then shake with 20 ml of chloroform, separate the chloroform solution, wash it with 5 ml of solution of sodium hydroxide and then with two quantities each of 10 ml of water. Continue the extraction with successive quantities of 10 ml of chloroform, until complete extraction of the alkaloids is effected, washing each chloroform solution separately with the 5 ml of solution of sodium hydroxide and with the two quantities of water, which were used for washing the first chloroform solution. Titrate the second wash with 0.1 N sulphuric acid using solution of methyl orange as indicator if more than 0.1 ml is required, wash the combined chloroform solutions with further quantities, each of 10 ml of water until on titration not more than 0.1 ml of 0.1 N sulphuric acid is required. Remove the chloroform, add 5 ml of alcohol, evaporate, and dry for thirty minutes, at 100°C. Dissolve the residue in 10 ml of 0.1 N sulphuric acid and titrate the excess of acid with 0.1 N sodium hydroxide, using solution of methlyl orange as indicator. Each ml of 0.1 N sulphuric acid is equivalent to 0.03344 g of strychinine, multiply the result by 1.02 to correct for loss of strychinine.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' using Toluene: Ethylacetate: Diethylamine (70:20:10) shows on spraying with Dragendorff reagent followed by 5% Methanolic-Sulphuric acid two orange spots at Rf. 0.44 and 0.65 corresponding to that of brucine and strychnine.

CONSTITUENTS - Alkaloids, Indole Alkaloids, Strychnine & Brucine, Monoterpenoid Glycoside (Loganin), α, β -Colubrine, Vomicine.

PROPERTIES AND ACTION

Rasa	:	Kaṭu, Tikta
Guna	:	Laghu, Rukṣa, Ṭikṣṇa
Virya	:	Uṣṇa
Vipaka	:	Kaṭu
Karma	:	Grāhi, Madakāraka, Vātalam, Kaphanāśaka, Pittanāśaka, Raktadōṣa Nāśaka, Vranaśōdhana, Parama Vēdanahara, Agnirēta, Rujahara, Jantunāśana

IMPORTANT FORMULATIONS - Kṛmimudgara Rasa, Viṣatinduka Taila, Mahaviṣagarbha Taila, Agnitundi Vati, Ēkāngavīra Rasa, Viṣatinduka Vati, Navajīvana Rasa

THERAPEUTIC USES - Agnimāndya, Arśa, Ardita, Kaṇdu, Klaibya, Viśūcika, Vraṇa, Pakṣāghāta, Nādi Daurbalya, Kushha, Gṛdhrasi

DOSE - 60-125 mg powder of the shodhita drug.

67. Vrischikalli (W.P.)

VṚŚCIKĀLI (Whole Plant)

Vṛścikāli consists of dried whole plant of *Tragia involucrata* Linn. (Fam. Euphorbiaceaee), a perennial, evergreen, twiner, more or less hispid with scattered stinging hairs, distributed throughout India from Punjab and Lower Himalayas eastwards to Assam and Meghalaya, ascending upto an altitude of 750 m and southwards to Kerala.

SYNONYMS

Sanskrit	:	--
Assamese	:	--
Bengali	:	Shedha Songi
English	:	Scorpion Tail Plant
Gujrati	:	Vichaati
Hindi	:	Vahanta, Vrishi-Kali
Kannada	:	Haligilu
Kashmiri	:	--
Malayalam	:	Terkkada
Marathi	:	Vrischikali
Oriya	:	--
Punjabi	:	--
Tamil	:	Thai Kodu Kkuppoondu
Telugu	:	--
Urdu	:	--

DESCRIPTION

a) Macroscopic

Root - Occurs in pieces of 2 to 10 cm long and 0.3 to 1.3 cm in dia., woody, hard, cylindrical, ribbed at some places, more or less rough due to presence of secondary roots and root scars; light brown; no characteristic odour and taste.

Stem - Cylindrical, slender, twining 0.2 to 0.6 cm in diameter, elongated, stinging to touch, and having fine ridges and furrows; light grey; moderately hard; internal surface whitish, composed of loosely arranged tissues; fracture, fibrous; no characteristic odour and taste.

Leaf - Simple, petiolate, stipulate, stinging to touch, linear-oblong to broadly ovate, cordate or oblong-lanceolate, acute or acuminate at apex, margin serrate; 1.5 to 5.5 cm long, 1 to 3 cm broad, slightly yellowish-green; no characteristic odour and taste.

b) Microscopic

Root - Root shows nearly circular outline; cork consisting of 3 to 10 layered, tangentially elongated, thin-walled cells; secondary cortex narrow consisting of fairly large, polygonal, thin-walled, parenchymatous cells; rosette crystals of calcium oxalate and some fibres present in the region; secondary phloem appears in form of conical caps, composed of sieve tubes, companion cells, parenchyma, fibres and phloem rays; fibres present in small groups of 2 to 4 cells arranged in tangential rows alternating with phloem elements; rosette crystals of calcium oxalate present in phloem parenchyma; secondary xylem forms major part of root composed of vessels, tracheids, parenchyma, fibres and xylem rays; vessels solitary or 2 or 3 to a group, having simple pits; fibres and tracheids having thick-walled and blunt ends; medullary rays 1 or 2 cells wide, rectangular to radially elongated and thick-walled; some cells contain starch grains and rosettes of calcium oxalate present in those towards periphery; starch grains rounded to oval in shape, measuring 4 to 9 μ in diameter.

Stem - Mature stem shows cork composed of 3 to 8 layered, thin-walled cells; at a few places epidermis shows the presence of glandular and stinging hairs; secondary cortex a wide zone, consisting of tangentially elongated, thin-walled, parenchymatous cells; some cells contain rosette crystals of calcium oxalate; some laticifers present scattered in this region; secondary cortex followed by zone of pericycle fibres with highly thickened walls, arranged in groups; secondary phloem composed of sieve elements, phloem fibres and phloem parenchyma; phloem fibres thick-walled, some phloem parenchyma cells contain rosette crystals of calcium oxalate; laticifers scattered in the secondary phloem similar to those found in secondary cortex; cambium narrow consisting of thin-walled, tangentially elongated cells; secondary xylem in form of continuous cylinder traversed by narrow xylem rays; xylem consists of vessels, tracheids, xylem fibres and xylem parenchyma; vessels numerous distributed uniformly in groups or singles; in macerated material vessels vary in shape and size, with transverse to oblique perforation, lignified with pitted walls; xylem parenchyma usually rectangular having simple pits, xylem rays uni to triseriate, uniseriate being more common and usually 2 to 15 cells high, having pitted walls; pits consists of large, thin-walled parenchymatous cells, some cells with rosette crystals of calcium oxalate.

Leaf-

Petiole - shows irregular outline due to fine ridges and furrows; epidermis single layered having some unicellular glandular and stinging hairs; collenchyma 4 to 7 layered, followed by polygonal, thin-walled parenchymatous cells containing rosette crystals of calcium oxalate; vascular bundles collateral, five in number corresponding to ridges; centre occupied by oval to angular, thin-walled parenchymatous cells containing rosette crystals of calcium oxalate.

Midrib - nearly biconvex in outline; epidermis consists of single layered, oval, parenchymatous cells covered externally by a thin cuticle; some unicellular glandular

and stinging hairs present on both surfaces; epidermis followed by 3 or 4 layers of collenchymatous cells; stele composed of single, collateral vascular bundle; ground tissue composed of 3 or 4 layers of thin-walled, polygonal, parenchymatous cells; rosette crystals of calcium oxalate present in parenchyma and phloem parenchyma.

Lamina - shows dorsiventral structure; epidermis on either side; upper epidermal cells radially elongated and larger in size; lower ones oval-shaped, tangentially elongated both covered externally by thick cuticle; glandular and stinging hairs present on both surfaces similar to those present in midrib; palisade 1 or 2 layered; spongy parenchyma 5 to 7 layered of loosely arranged cells, some contain rosette crystals of calcium oxalate; small veins found traversing spongy tissue at certain places.

Powder -Light greenish-yellow; shows groups of fibres, vessels with simple pits and spiral thickening, rosette crystals of calcium oxalate, simple rounded starch grains, fragments of lamina showing palisade and groups of spongy parenchyma, unicellular stinging hairs

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	14	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	3	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	4	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	11	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel G plate using Chloroform : Ethyl acetate: Formic acid (5:4:1) shows under visible light two spots at Rf. 0.92 (light grey) and 0.95 (yellowish green). Under U.V. (366 nm) two fluorescent zones are visible at Rf. 0.92 (blue) and 0.95 (pink). On exposure to Iodine vapur six spots appear at Rf. 0.08, 0.27, 0.40, 0.50, 0.92 and 0.95 (all yellow). On spraying with 5% Ferric chloride solution and heating the plate for ten minutes a 110^{o} C two spots appear a Rf. 0.92 and 0.95 (both bluish grey).

PROPERTIES AND ACTION

Rasa : Kaṭu
Guna : Uṣṇa
Virya : Uṣṇa
Vipaka : Kaṭu
Karma : Balya, Vātakara, Śuddikṛt, Hṛtśuddhikṛt

IMPORTANT FORMULATIONS - Vidāryadi Kvātha Curṇa, Vidāryādi Ghṛta

THERAPEUTIC USES - Arōcaka, Raktapitta, Vibandha

DOSE - 3-6 gm.

68. Yava (W.P.)

YAVA (Whole Plant)

Yava consists of dried whole plant of *Hordeum vulgare* Linn. Syn. *H. sativum* Pers. (Fam. Poaceae), an annual, erect, herb, 50 to 100 cm high, cultivated chiefly in North India, for its de husked fruits known as Barley in trade.

SYNONYMS

Sanskrit	:	Divya
Assamese	:	--
Bengali	:	Jab, Jau, Yava
English	:	Barley
Gujrati	:	Jau, Java, Jau
Hindi	:	Yay, Jav, Jau
Kannada	:	Jave godi, Barli Akki
Kashmiri	:	--
Malayalam	:	Yavam, Baarli, Barley
Marathi	:	Jav
Oriya	:	Jav, Javadhana, Yava, Bansa
Punjabi	:	Jav, Jau
Tamil	:	Barliarisi, Yavam
Telugu	:	Yavalu, Barlibiyam, Tella Tumma, Barley
Urdu	:	Jau

DESCRIPTION

a) Macroscopic

Root - Fibrous, 0.5 to 1 cm thick; cylindrical, glabrous, greyish-brown.

Stem - Cylindrical, 0.4 to 0.6 cm thick; hollow, slightly flattened, smooth; internode long, shining yellow; node short, bearing sheath; fracture, fibrous.

Leaf - Linear-Ianceolate, 15 to 25 cm long, upper one dose to the spike; sheath smooth, striate; yellowish-grey.

Inflorescence - Spike, terminal, linear-oblong, compressed spikelet sessile, 6 to 8 cm long, 6-rowed type; dark cream.

Fruit - A caryopsis, elliptic, oblong, ovoid and tapering at both ends; smooth, about 1 cm long and 0.2 to 0.3 cm wide; dorsally compressed and flattened on the sides with a shallow longitudinal furrow; 3 to 5 ridged having shallow depression between them;

grains tightly enclosed and adhering to the lemma and palea; a long awn present on the palea; pale greenish-yellow; taste, sweetish acrid.

b) Microscopic

Root - Shows single layered epidermis, covered by striated cuticle; cortex composed of about 4 to 6 layers of round to polygonal, thin-walled, parenchymatous cells having intercellular spaces; vascular bundles arranged in discontinuous ring, each having usual elements; pith very wide composed of round to polygonal thin-walled, parenchymatous cells having intercellular spaces.

Stem - Shows single layered epidermis, covered by thick cuticle; hypodermis composed of 5 to 6 layered, round to polygonal, lignified, sclerenchymatous cells; ground tissue consisting of 5 to 7 layered, round to polygonal, thin-walled, parenchymatous cells having intercellular spaces; vascular bundles containing of usual elements found scattered in ground tissues.

Leaf - Shows single layered epidermis covered by thick cuticle on either surface; a few big or bulliform cells are present in upper and lower epidermis, mesophyll not differentiated into palisade and spongy parenchyma; vascular bundles conjoint, collateral, closed, each covered by bundle sheath; stomata paracytic, present on both surfaces; stomatal number 9 to 17 per sq. mm on lower surface. 5 to 8 per sq. mm on upper surface; stomatal index 15 to 23 on lower surface, 9 to 15 upper surface.

Fruit -shows single layered epidermis consisting of crescent-shaped, round to oval wavy walled cells, followed by 2 or 3 layers of thick-walled, sclerenchymatous fibres; below the sclerenchyma are present irregular, square or quadrilateral, spongy parenchymatous cells, a few cell walls having silica bodies through which run the fibro-vascular bundles of the ribs, followed by more or less, polygonal inner epidermal cells, a few inner epidermal cells having unicellular claw-shaped hair and stomata; pericarp composed of cells with more or less compressed parenchymatous cells; seed coat appears as a colourless line; perisperm composed of cells with more or less wavy walls having narrow lumens; endosperm divided into two zones, 2 to 4 cells deep aleurone layers, and the rest starch layers; starch grains simple, round to oval, measuring 3 to 30 μ in dia.

Powder - Light creamish-yellow; shows fragments of epidermal cells, parenchyma, groups of tubular, elongated lignified cells, polygonal, thin-walled parenchymatous epidermal cells of palea with intercellular spaces, in surface view, thin-walled, conical trichomes with large lumen, measuring 30 to 180 μ in length and upto 20 μ in width and stomata, selerenchymatous fibres, scalariform vessels, abundant round to oval, simple starch grains having concentric striations, measuring 3 to 30 μ in dia.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	1	per cent, Appendix	2.2.2.
Total Ash	Not more than	8.5	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	4	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	7	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	8	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of alcoholic extract on Silica gel 'G' using n-Butanol : Acetic acid : Water (4:1:5) shows under U.V. (366nm) nine fluorescent zones at Rf. 0.15, 0.28, 0.42, 0.52, 0.59, 0.67, 0.85, 0.93 and 0.96 (all blue). On exposure to Iodine vapour nine spots appear at Rf. 0.10, 0.15, 0.39, 0.48, 0.56, 0.67, 0.85, 0.93 and 0.96 (all yellow). On spraying with 5% Phosphomolybdic acid reagent and heating the plate for fifteen minutes at 105°C nine spots appear at Rf. 0.10, 0.24. 0.39, 0.48, 0.56, 0.67, 0.85, 0.93 and 0.96 (all blue).

CONSTITUENTS - Proteins, Carbohydrate, free Amino-acids, Vitamins, Tannins and Flavonoid glycosides-Luteolin and Orientin.

PROPERTIES AND ACTION

Rasa	:	Madhura
Guna	:	Rukṣa, Mṛdu, Aguru
Virya	:	Śīta
Vipaka	:	Kaṭu
Karma	:	Kaphapittahara, Lēkhana, Mēdōhara, Mēdhyavardhaka, Svara Vardhaka, Vātahara, Vṛṣya, Vrṇa Vardhaka

IMPORTANT FORMULATIONS - (No Formulations)

THERAPEUTIC USES - Kāsa, Pīnasa, Svāśa, Urusthambha

DOSE - 10-20 gm.