THE SIDDHA PHARMACOPOEIA OF INDIA

PART – I
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GOVERNMENT OF INDIA
MINISTRY OF HEALTH AND FAMILY WELFARE
DEPARTMENT OF AYURVEDA, YOGA & NATUROPATHY, UNANI, SIDDHA AND HOMOEOPATHY (AYUSH)

AMUKKARĀ (Root) - அமுக்கரா

Amukkarā is the dried root of *Withania somnifera* (L.) Dunal Syn. *Physalis somnifera* L., *P. flexuosa* L., *P. arborescense* DC. (Fam. Solanaceae), a perennial shrub, found in waste land, cultivated fields and open grounds throughout India. It is also cultivated in certain areas of Madhya Pradesh and Rajasthan. Roots are collected in winter, washed and cut into small pieces.The dried root is subjected to purification process before use. It grows in Mullai and Marutham thiṇai.

SYNONYMS

Tamil	:	Acuvakanthi (அசுவகந்தி), Amukkarā Kiẕaṅku (அமுக்கரா கிழங்கு)
Assamese	:	Ashvagandha
Bengali	:	Ashvagandha
Gujrati	:	Asgandha
Hindi	:	Asgandh
Kannada	:	Angarberu, Hiremaddina- gida
Kashmiri	:	Asagandh
Malayalam	:	Amukkuram
Marathi	:	Asagandha, Askagandha
Oriya	:	Aswagandha
Punjabi	:	Asgandh
Sanskrit	:	Asvagandha, Hayagandha, Vajigandha
Telugu	:	Pennerugadda
Urdu	:	Asgand

DESCRIPTION

a) Macroscopic

Roots straight, unbranched, thickness varying with age, roots bear fibre-like secondary roots, outer surface buff to grey-yellow with longitudinal wrinkles; crown consists of remains of variously thickened stem bases; fracture short and uneven; odour characteristic; taste bitter and acrid.

b) Microscopic

Transverse section of root shows cork exfoliated or crushed; when present rectangular, radially flattened and non-lignified; cork cambium 2 to 4 diffused rows of cells; secondary cortex about twenty layers of compact parenchymatous cells mostly filled with starch grains; phloem consists of sieve tubes, companion cells, phloem parenchyma; cambium 4 or 5 rows of tangentially

elongated cells; xylem hard forming a closed vascular ring separated by multiseriate medullary rays.

Powder:

Yellowish grey; shows cork cells, parenchyma cells, tracheids, vessels, fibres and starch grains.

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	15	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	27	per cent, Appendix	2.2.7.

ASSAY

HPLC conditions for the separation of withaferin A in Alcohol extract.

Mobile phase	:	n- Hexane: Isopropanol (9:1)
Flow rate	:	0.2 ml/min.
Column	:	Porasil A coiled column (1.2ft. x 1/8 inch)
Detector	:	UV at 225 nm

T.L.C.

T.L.C. of Petroleum ether soluble fraction of Alcohol extract on an aluminium plate precoated with silica gel 60 F_{254} (E.Merck) 0.2 mm. thickness using Petroleum ether (80 -100° C): Chloroform (1:1) spraying with 10% Methanolic Sulphuric acid reagent and heating the plate for ten minutes at 105ºC shows two spots at Rf. 0.17 (violet) and 0.92 (greyish brown).

CONSTITUENTS

Withanolides- withaferin A, withanone, withanolides I, II, III, III A, C, D, E, F, G, H, I, J, K, L, M, WS-I, P and S, withasomidienone, cuscohygrine, anahygrine, tropine, pseudotropine, anaferine, isopellatierine, 3- tropyltigloate.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Āṇmaiperukki (ஆண்மைபெருக்கி), Ciṟunīrperukki (சிறுநீர்பெருக்கி), Kāyakaṟpamākki (காயகற்பமாக்கி), Uṟakkamuṇḍākki (உறக்கமுண்டாக்கி), Uramākki (உரமாக்கி), Uḍalveppakaṟṟi (உடல்வெப்பகற்றி), Uḍaṟtēṟṟi (உடற்தேற்றி), Vīkkamurukki (வீக்கமுருக்கி)

IMPORTANT FORMULATIONS

Amukkarāc Cūraṇam (அமுக்கராச் சூரணம்), Iracakanthi Mez̲uku (இரசகந்தி மெழுகு), Iḍivallāthi Mez̲uku (இடிவல்லாதி மெழுகு), Kantaka Iracāyaṉam (கந்தக இரசாயனம்), Makā Ēlāthi Kuḷikai (மகா ஏலாதி குளிகை), Makāvallāti Iḷakam (மகாவல்லாதி இளகம்), Nanthi Mez̲uku (நந்தி மெழுகு), Nārathtai Iḷakam (நாரத்தை இளகம்), Paṟaṅkippaḍḍai Iracāyaṉam (பறங்கிப்பட்டை இரசாயனம்)

THERAPEUTIC USES

Cūlai (சூலை), Curam/Kāyccal (சுரம்/காய்ச்சல்), Karappāṉ (கரப்பான்), Kayam (கயம்), Tōḍam (தோடம்), Uḍal Vaṉmaikkuṟaivu (உடல் வன்மைக்குறைவு), Vaḷi Nōykaḷ (வளி நோய்கள்), Veḷuppu Nōy/Pāṇḍu (வெளுப்பு நோய்/பாண்டு), Vīkkam (வீக்கம்), Vintukkuṟaivu (விந்துக்குறைவு)

DOSE - Powder 3 - 6 g

ĀR̲R̲UTHUMMAṬṬI (Unripe fruit) - ஆற்றுதும்மட்டி

Ār̲r̲uthummaṭṭi is the unripe fruit of ***Citrullus colocynthis*** (L.) Schrad. Syn. ***Colocynthis vulgaris*** Schrad.(Fam. Cucurbitaceae), an annual or perennial prostrate creeper growing wild in the warm, arid and sandy tracts of North West, Central and Southern parts of the country. Fruits are harvested when mature but unripe, peeled and cut into pieces. The fruit is subjected to purification process (cutti) before use. It grows in Marutham thiṇai.

SYNONYMS

Tamil : Kaliṅkam (கலிங்கம்), Kumaṭṭikkāy (குமட்டிக்காய்), Pēykumaṭṭi (பேய் குமட்டி), Piccikkāy (பிச்சிக்காய்), Thumaṭṭi (துமட்டி), Variththumaṭṭi (வரித்துமட்டி)

Assamese	:	Gavadani
Bengali	:	Rakhal
English	:	Colocynth
Gujrati	:	Indrayan
Hindi	:	Indrayan
Kannada	:	Havumekke
Malayalam	:	Valiya Pekkummatti
Marathi	:	Endrayana
Oriya	:	Gothakakudi, Indrayanalata, Garukhiya
Punjabi	:	Indrayana
Sanskrit	:	Indravaruni, Gavaksi, Indravalli, Aendri
Telugu	:	Chedupuchcha, Peikummatti
Urdu	:	Hanjal

DESCRIPTION

a) Macroscopic

Peeled and cut pieces of fruit about 6 cm. long and 2 cm. thick; white or pale yellowish-white, externally convex with ridges and flattened areas marked by peeling with a knife; internally irregularly concave and showing numerous ovoid depressions about 10 mm. long, left by fallen seeds; pulp bitter; seeds flattened, ovoid, yellowish-white to dark brown, about 7 mm. long, 5 mm. broad and 2 mm. thick; odourless; taste intensely bitter.

b) Microscopic

Epicarp, where present, with epidermis of radially elongated cells having thick outer walls and thin inner walls and partially thickened anticlinal walls with occasional stomata of the anomocytic type; the adjacent parenchymatous layer about 15 layers of cells thick, and an inner layer of sclereids; outer sclereids very thick, smaller, about 15 to 30 mm in diameter, isodiametric and the inner sclereids layer upto about 60 mm, radially elongated, with thinner walls. Pulp consists of large, thin-walled, pitted parenchyma of rounded cells showing oval, flat, pitted areas where they are in contact with many slender bicollateral vascular strands having spiral vessels and occasional associated latex vessels; testa of seed with outer epidermis of thick-walled unlignified palisade cells having vertical strips of thickening on the anticlinal walls, with inner layers of very thick-walled, striated, pitted, lignified sclereids, and an innermost layer of sclereids with reticulately thickened walls; endosperm and cotyledons parenchymatous with fixed oil and aleurone grains.

Powder:

Yellowish-brown; shows groups of pitted parenchyma cells; annular and spiral vessels, sclereids; oil globules and aleurone grains.

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	7	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	20.5	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	16.5	per cent, Appendix	2.2.7.

Light Petroleum soluble-matter: On continuous extraction with light Petroleum (b.p. 40 to 60 C) and drying at 100 C, not more than 3.0 percent.

ASSAY

HPTLC densitometric estimation of 2-O-β-D-glucopyranosyl- cucurbitacin I.

TLC plates

Aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm thickness.

Solvent system

Chloroform: Methanol (95:10).

Spray reagent

Vanillin-Phosphoric acid reagent.

Test solution

3 g of the powdered drug is extracted in a Soxhlet apparatus with 150 ml of ethanol (8 to 9 hr). The solvent is filtered and removed under vacuum. 20 mg of the residue is dissolved in 1 ml of methanol.

Standard solution

1 mg of 2-O-β-D-glucopyranosyl-cucurbitacin I is dissolved in 1 ml of methanol.

Calibration curve

2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0 and 16.0 µl of the standard solution is applied on a TLC plate. The plate is developed in the solvent system to a distance of 8 cm. and derivatized with Vanillin-Phosphoric acid reagent. The plate is heated at 100-105ºC until the colour develops. The plate is scanned immediately at 560 nm. The peak areas are recorded and plotted to get the calibration curve.

Estimation of 2-O-β-D-glucopyranosyl-cucurbitacin I in the drug

10 µl of the test solution is applied on a TLC plate. The plate is developed in the solvent system and the chromatogram is recorded .The amount of 2-O-β-D-glucopyranosyl-cucurbitacin I present in the sample is calculated from the calibration curve.

The percentage of 2-O-β-D-glucopyranosyl-cucurbitacin I ranges from 1.46 to 1.72 in the samples analyzed.

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) two fluorescent zones at Rf. 0.88 (light blue) and 0.98 (yellow). On exposure to iodine vapours two spots appear at Rf. 0.88 and 0.98 (both yellow). On spraying with 5% Methanolic- Phosphomolybdic acid reagent and heating the plate at 105°C until the colour develops, the plate shows four spots at Rf. 0.65 (blue), 0.84 (blue), 0.96 (blue) and 0.98 (dark blue).

CONSTITUENTS

2- O- β- D- Glucopyranosyl- cucurbitacin L, 2- O - β- D- glucopyranosyl- (22- 27) -hexanorcucurbitacin I, coloside A (α- elaterin -2- D- glucopyranoside); cucurbitacin E (elaterin), cucurbitacin I (elatericin B), cucurbitacin L (dihydroelatericin B), cucurbitacin J, cucurbitacin T, isovitexin, iso- orientin, iso- orientin 3′- methyl ether, colocynthin, colocynthitin, citrullol, α- spinasterol, hentriacontane, lipids and essential oil constituents.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை), Va̲ṛaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai :

In small Dose 25 - 50 mg:

Kōz̲aiyaka̲r̲r̲i (கோழையகற்றி), Uḍa̲ṛtē̲r̲r̲i (உடற்தேற்றி),

In medium Dose 50 - 100 mg :

Ci̲run̄irperukki (சிறுநீர்பெருக்கி), Malamn̄irākki (மலம்நீராக்கி),

In standard Dose 125 - 500 mg:

Kuḍa̲rpuraḍḍi (குடற்புரட்டி), Namaiccaluṇḍākki (நமைச்சலுண்டாக்கி), Vāntiyuṇḍākki (வாந்தியுண்டாக்கி)

IMPORTANT FORMULATIONS

Kummaḍḍik Ku̲zampu (கும்மட்டிக் குழம்பு), Nava Uppu Me̲zuku (நவ உப்பு மெழுகு)

THERAPEUTIC USES

Cūtakataḍai (சூதகதடை), Cūtakavali (சூதகவலி), Vaḷi Nōykaḷ (வளி நோய்கள்)

DOSE - Powder 0.125 - 0.5g

Contraindicated in pregnancy.

ĀṬĀTHŌṬAI ILAI (Leaf) - ஆடாதோடை இலை

Āṭāthōṭai Ilai is the dried, mature leaves of *Justicia adhatoda* L. Syn. *Adhatoda zeylanica* Medic., *A. vasica* (L.) Nees (Fam. Acanthaceae), an evergreen shrub, flowering during February-March and also at the end of rainy seasons, distributed throughout India upto an altitude of 1300 m.; cultivated also as hedges; leaves stripped off from older stems and dried in drying sheds. It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Vācai (வாசை)
Assamese	:	Bahak, Titabahak, Vachaka
Bengali	:	Bakas, Basak
English	:	Vasaka, Malabar nut
Gujrati	:	Ardusi, Aradusi, Araduso
Hindi	:	Adoosa, Arusa, Aduss
Kannada	:	Adusoye
Kashmiri	:	Vasa
Malayalam	:	Adalodakam, Adarooshaka
Marathi	:	Adulsa, Vasa
Oriya	:	Vasanga, Basanga
Punjabi	:	Vishuti, Bhekar, Vansa, Arusa
Sanskrit	:	Vasa, Vrsa, Atarusa, Vasaka, Simhasya, Vajidnta
Telugu	:	Addasaramu
Urdu	:	Adusa (Arusa)

DESCRIPTION

a) Macroscopic

Leaves dull brown above, light greyish brown below;10 to 30 cm. long and 3 to 10 cm. broad, lanceolate to ovate-lanceolate, slightly acuminate, base tapering, petiolate; petioles 2 to 8 cm. long, exstipulate, glabrescent, 8 to 10 pairs of lateral vein bearing a few hairs; odour characteristic; taste bitter.

b) Microscopic

Transverse section of leaf shows a dorsiventral type with 2 layers of palisade cells; in surface view, epidermal cell walls sinuous with diacytic stomata on both surface, more numerous

on the lower; covering trichomes a few, 1 to 3, rarely upto 5, celled, thin-walled, uniseriate, upto 500 µm; glandular trichomes with unicellular stalk and 4 celled head measuring, 25 to 36 µm in diameter in surface view; cystoliths in mesophyll layers elongated and cigar shaped; acicular and prismatic forms of calcium oxalate crystals present in mesophyll; palisade ratio 5 to 9; stomatal index 10 to 18 for lower surface; vein- islet number 6 to 8 per square mm.

Powder:

Green; shows fragments of wavy epidermal cells with diacytic stomata; cystoliths, acicular and prismatic crystals of calcium oxalate; spiral and reticulate vessels and debris of trichomes.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	21	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	22	per cent, Appendix	2.2.7.

ASSAY

HPLC analysis of vasicine, the major bioactive constituent.

Mobile phase	:	Methanol: Water (2:3)
Flow rate	:	0.7 ml/min.
Column	:	Resolve C18 spherical 5µ (15cm. x 3.9 mm.)
Detector	:	UV at 298 nm

Standard preparation:

A solution of known concentration (conc. range: 50-80 µg/ml) of vasicine in methanol is prepared.

Sample preparation:

1g of dried leaves are refluxed with Methanol for 2 hr., filtered and the marc is subjected for another two cycles of (1 hr.each) reflux with Methanol. The combined filtrates are concentrated to about 1ml, and diluted with water to 20ml, acidified with dilute HCl (3 ml), partition with Chloroform (2x 10 ml), and the Chloroform fractions are rejected. The aqueous phase is basified with dilute Ammonia solution and extracted with Chloroform (5 x10ml). The pooled Chloroform fractions are concentrated under vacuum to dryness, and dissolved in Methanol (10 ml). 1 ml of this solution is diluted to 100 ml with Methanol. If necessary further dilutions are prepared.

Procedure:

Known volumes of standard and sample preparations are subjected to HPLC and the respective peak area for vasicine in triplicate is recorded and accordingly its percentage in the sample is calculated.

The above method may also be used for the estimation of vasicine in polyherbal formulations with suitable modifications in the sample preparation.

T.L.C.

T.L.C. of Alcoholic extract on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using 1, 4 - Dioxone: Ammonia (9:1) v/v, and spraying with Dragendorff reagent, shows one spot at Rf.0.79 (orange).

CONSTITUENTS

Vasicine, vasicinone, vasicol, vasicinol, vasicoline, adhatonine, vasicinolone, vasicolinone, anisotine, adhavasinone, 1, 2, 3, 9 - tetrahydro - 5 - methoxy pyrrolo (2, 1 -b) quinazoline - 3-ol, deoxy vasicinone, deoxy vasicine, anisoline, desmethoxy aniflorine, 7-methoxy vasicinone.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Icivakaṟṟi (இசிவகற்றி), Kōzaiyakaṟṟi (கோழையகற்றி), Puzukkolli (புழுக்கொல்லி)

IMPORTANT FORMULATIONS

Āḍātōḍai Kuḍinīr (ஆடாதோடை குடிநீர்), Āḍātōḍai Maṇappāku (ஆடாதோடை மணப்பாகு), Āḍātōḍai Ney (ஆடாதோடை நெய்), Kakkuvāṉ Iḷakam (கக்குவான் இளகம்), Kapacurak Kuḍinīr (கபசுரக் குடிநீர்)

THERAPEUTIC USES

Curam/Kāyccal (சுரம்/காய்ச்சல்), Irumal (இருமல்), Kuruti Azal (குருதி அழல்)

DOSE - Powder 3 -5 g

Juice 5 -10 ml

Decoction 30 - 50 ml twice daily. 15 - 30 g coarse powder in 200 ml of water for preparing decoction.

ĀṬĀTHŌṬAI VĒR (Root) - ஆடாதோடை வேர்

Āṭāthōṭai Vēr is the dried root of ***Justicia adhatoda*** L. Syn. ***Adhatoda zeylanica*** Medic. ***A. vasica*** (L.) Nees (Fam. Acanthaceae), an evergreen shrub, flowering during February - March and also at the end of rainy seasons, distributed throughout India upto an altitude of 1300 m.; cultivated also as hedges.

SYNONYMS

Tamil	:	Vācai (வாசை)
Assamese	:	Bahak, Titabahak, Vachaka
Bengali	:	Bakas, Basak
English	:	Malabar nut, Vasaka
Gujrati	:	Aradusi, Ardusi, Araduso
Hindi	:	Adoosa, Aduss, Arusa
Kannada	:	Adusoye
Kashmiri	:	Vasa
Malayalam	:	Adalodakam, Adarooshaka
Marathi	:	Adulsa, Vasa
Oriya	:	Basanga, Vasanga
Punjabi	:	Arusa, Bhekar, Vansa, Vishuti
Sanskrit	:	Atarusa, Simhasya, Vajidnta, Vasa, Vasaka, Vrsa
Telugu	:	Addasaramu
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 µm in dia., having concentric striations and hilum, present in secondary cortex and secondary phloem.

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 µm 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.

ASSAY

T.L.C.

T.L.C. of the Alcoholic extract on silica gel 'G' plate using Chloroform: Methanol (4:1) shows under UV (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 vapours 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

Vasicine, vasicinol, vasicinolene, tritriacontane and essential oil.

PROPERTIES AND ACTIONS

Cuvai : Kārppu (கார்ப்பு)

Guṇam : Ilaku (இலகு), Noymai (நொய்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Cirunīrperukki (சிறுநீர்பெருக்கி), Icivakarri (இசிவகற்றி), Īral Tērri (ஈரல் தேற்றி), Kōzaiyakarri (கோழையகற்றி)

IMPORTANT FORMULATIONS

Tūtuvēḷai Ney (தூதுவேளை நெய்)

THERAPEUTIC USES

Iraippu (இரைப்பு), Irumal (இருமல்), Aiyacuram (ஐயசுரம்)

DOSE - : Powder 3 - 6 g

Decoction 30- 50 ml twice daily.

15 - 30 g coarse powder in 200 ml of water for preparing decoction.

ATHIMATHURAM (Stolon and Root) - அதிமதுரம்

Athimathuram is the dried, unpeeled, stolon and root of *Glycyrrhiza glabra* L. (Fam. Fabaceae), a tall perennial herb or under shrub upto 2 m. high found wild and cultivated in Europe, Persia, Afghanistan and to a small extent in some parts of India. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Athiṅkam (அதிங்கம்), Mathūkam (மதூகம்)
Assamese	:	Jesthimadhu, Yeshtmadhu
Bengali	:	Yashtimadhu
English	:	Liquorice root
Gujrati	:	Jethimadha, Jethimard, Jethimadh
Hindi	:	Mulethi, Mulathi, Muleti, Jethimadhu, Jethimadh
Kannada	:	Jestamadu, Madhuka, Jyeshtamadhu, Atimadhura
Kashmiri	:	Multhi
Malayalam	:	Irattimadhuram
Marathi	:	Jesthamadh
Oriya	:	Jatimadhu, Jastimadhu
Punjabi	:	Jethimadh, Mulathi
Sanskrit	:	Yasti, Yastimadhuka, Yastika, Madhuka, Madhuyasti, Yastyahva
Telugu	:	Atimadhuramu
Urdu	:	Mulethi, Asl-us-sus

DESCRIPTION

a) Macroscopic

Stolon consists of yellowish brown or dark brown outer layer, externally longitudinally wrinkled, with occasional small buds and encircling scale leaves; transversely cut and smoothed surface shows a cambium ring at about one-third distance from periphery and a small central pith; root similar without a pith; fracture coarsely fibrous in bark and splintery in wood; odour faint and characteristic; taste sweetish.

b) Microscopic

Stolon - Transverse section of stolon shows cork of 10 to 20 or more layers of tabular cells, outer layers with reddish-brown amorphous contents, inner 3 or 4 rows having thicker, colourless walls;

secondary cortex usually of 1 to 3 layers of radially arranged parenchymatous cells containing isolated prisms of calcium oxalate; secondary phloem a broad band, cells of inner part cellulosic and outer lignified, radially arranged groups of about 10 to 50 fibres, surrounded by a sheath of parenchyma cells, each usually containing a prism of calcium oxalate about 10 to 35 µm in size; cambium of 3 or more layers of cells; secondary xylem distinctly radiate with medullary rays, 3 to 5 cells wide, vessels with thick, yellow, pitted, reticulate walls; groups of lignified fibres with crystal sheaths similar to those of phloem; xylem parenchyma of two kinds, those between the vessels having thick pitted walls without intercellular spaces, the remaining with thin walls; pith of parenchymatous cells in longitudinal rows with intercellular spaces.

Root - Transverse section of root shows structure closely resembling that of stolon except that no medulla is present; xylem tetrarch; usually four principal medullary rays at right angles to each other; all parenchymatous tissues containing abundant, simple, oval or rounded starch grains, 2 to 20 µm in length.

Powder:

Yellowish-cream; shows parenchyma cells containing a small prism of calcium oxalate; vessels with spiral thickening, fragments of fibres; starch grains simple, oval or rounded with wide lumen having 2 to 4 or more components, measuring 2 to 20 µm in diameter.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Nil, Appendix	2.2.2.
Total Ash	Not more than 10 per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than 2.5 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 20 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Chloroform extract of the drug on silica gel 'G' plate shows under UV light (254 nm) 2 spots at Rf. 0.41 (glycyrrhetic acid marker) and 0.45. After spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate at 105º C until the colour develops , the plate shows 6 spots at 0.27 (violet), 0.41 (dark violet, glycyrrrhetic acid, marker), 0.45 (dark yellow) 0.49 (dark yellow), 0.70 (violet) and a dark blue spot running along with the solvent front.

CONSTITUENTS

Glycyrrhizin, glycyrrhetinic acid, glycyrrhetic acid, 24 - hydroxy glycyrrhetic acid, mixture of potassium and calcium salts of glycyrrhizinic (glycyrrhizic) acid, glabranin A & B, glycyrrhetol, glabrolide, isoglabrolide, formononetin, glabrone, neoliquiritin, hispaglabridin A & B; herniarin, umbelliferone; licoagrodin, glabrol, onocerin, ß- amyrin, stigmasterol, ß- sitosterol, glabroisoflavanone A and B, glabrocoumarin, glychionide Aand B and flavonoids.

PROPERTIES AND ACTIONS

Cuvai : I̲nippu (இனிப்பு)

Guṇam : Noymai (நொய்மை), Tiṇmai (திண்மை)

Vīrium : Taḍpam (தட்பம்)

Pirivu : Iṉippu (இனிப்பு)

Ceykai : Kōzaiyakaṟṟi (கோழையகற்றி), Malamiḷakki (மலமிளக்கி), Uḷḷazalāṟṟi (உள்ளழலாற்றி), Uramākki (உரமாக்கி), Vaṟaḍciyakaṟṟi (வறட்சியகற்றி)

IMPORTANT FORMULATIONS

Arakku Tailam (அரக்கு தைலம்), Āḍātōḍai Kuḍinīr (ஆடாதோடை குடிநீர்), Makā Ēlāthi Kuḷikai (மகா ஏலாதி குளிகை), Pīṉicat Tailam (பீனிசத் தைலம்), Tāḷicāthi Cūraṇam (தாளிசாதி சூரணம்), Vacanta Kucumākaram (வசந்த குசுமாகரம்), Veṇpūcaṇi Iḷakam (வெண்பூசணி இளகம்)

THERAPEUTIC USES

Ciṟunīr Ericcal (சிறுநீர் எரிச்சல்), Elumpu Nōykaḷ (எலும்பு நோய்கள்), Irumal (இருமல்), Kāmālai (காமாலை), Kaṇ Nōykaḷ (கண் நோய்கள்), Nīrvēḍkai (நீர்வேட்கை), Vayiṟṟuppuṇ (வயிற்றுப்புண்), Veṇ Kuḍḍam (வெண் குட்டம்), Veppu Nōy (வெப்பு நோய்)

DOSE - Powder 2 - 4 g

ATHIVIḌAYAM (Root) - அதிவிடயம்

Athiviḍayam is the dried, tuberous root of ***Aconitum heterophyllum*** Wall. ex. Royle (Fam. Ranunculaceae), an annual herb, native of western Himalayas and found in Garhwal, Kumaon and Kashmir at an altitude between 2,500 to 4,000 m. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Atthiraṇam (அத்திரணம்), Māthiri (மாதிரி), Paṅkurai (பங்குரை)
Assamese	:	Aatich
Bengali	:	Ataicha
English	:	Atis root
Gujrati	:	Ativishni Kali, Ativikhani Kali
Hindi	:	Atis
Kannada	:	Ativisha, Athihage
Malayalam	:	Atividayam, Ativitayam
Marathi	:	Atvisha
Oriya	:	Atushi
Punjabi	:	Atisa, Atees
Sanskrit	:	Ativisa, Aruna, Ghunapriya, Visa
Telugu	:	Ativasa
Urdu	:	Atees

DESCRIPTION

a) Macroscopic

Roots conical, fusiform or cylindrical, about 2.0 to 7.5 cm. long and 0.4 to 1.6 cm. or more thick at its upper extremity, gradually decreasing in thickness towards tapering end, externally yellowish to greyish white, external surface wrinkled marked with scars of fallen rootlet and with a rosette of scaly rudimentary leaves on top; fracture short, starchy, white, fractured surface marked towards center by 4 to 7 concentrically arranged yellowish-brown dots, corresponding to end of fibrovascular bundles; taste bitter with no tingling sensation; odourless.

b) Microscopic

Transverse section of mature root shows a single layered epidermis consisting of light-brown tabular cells rupturing on formation of cork; cork consists of 5 to 10 rows of tangentially elongated, thin-walled cells; cork cambium single layered consisting of tangentially elongated, thin-walled cells; cortex much wider consisting of tangentially elongated or rounded, thin-walled

parenchymatous cells with intercellular spaces, cells fully packed with both simple as well as compound starch grains, compound starch grains composed of 2 to 4 components, spherical; endodermis distinct composed of barrel-shaped cells; elements of vascular bundles poorly developed, vascular bundles arranged in a ring; inter-fascicular cambium present in the form of a ring composed of a few layered thin-walled cells; central core consisting of thin-walled parenchymatous cells, possessing starch grains similar to those found in cortical cells.

Powder:

Ash coloured to light brown; shows abundant simple and compound starch grains; fragments of reticulate xylem vessels and parenchyma cells.

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	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	24	per cent, Appendix	2.2.7.

ASSAY

HPTLC densitometric estimation of Atisine.

TLC plates

Aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness.

Solvent system

Toluene: Ethyl acetate: Diethylamine (7:2:1).

Test solution

5 g of powdered drug is accurately weighed and extracted in a Soxhlet apparatus with 50 ml Methanol for 4 hr., filtered and the volume was made up to 50 ml with Methanol. 3 ml is pipetted out and diluted to 10 ml with Methanol.

Standard solution

1.0 mg/ml stock solution of Atisine is prepared in Methanol. Aliquots of 0.5 to 3 ml is pipetted out in increments of 1 ml into 10 ml in volumetric flasks and made up to the volume in each flask with Methanol.

Calibration curve

10 µl of each concentration of standard solution is applied in triplicate on a TLC plate. The plate was developed in the solvent system to a distance of 8 cm. and dried in a current of hot air and scanned at 232 nm. The peak areas for Atisine are recorded and the calibration curve is constructed.

Estimation of atisine in the drug

10 µl of the test solution is applied in triplicate on a TLC plate. The plate was developed with the solvent system to a distance of 8 cm. and the chromatogram is recorded. The amount of Atisine is determined in the test sample from the calibration curve.

The percentage of Atisine ranges from 0.36 to 0.44 in the samples analyzed.

T.L.C.

T.L.C. of Alcoholic extract on silica gel 'G' plate using 1,4 -Dioxone: Ammonia (9:1) v/v, and on spraying with Dragendorff reagent, four spots appear at Rf.0.31, 0.49, 0.73 and 0.95 (all orange).

CONSTITUENTS

Atisine, F- dihydroatisine, hetisine, heteratisine, heterophyllisine, heterophylline, heterophyllidine, hetidine, hetisinone and atisenol.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Vaṟaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Āṇmaiperukki (ஆண்மைபெருக்கி), Kaẓiccalaḍakki (கழிச்சலடக்கி), Muṟaiveppakaṟṟi (முறைவெப்பகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Tuvarppi (துவர்ப்பி), Uramākki (உரமாக்கி), Veppakaṟṟi (வெப்பகற்றி)

IMPORTANT FORMULATIONS

Kapāḍa Mātthirai (கபாட மாத்திரை), Nanthi Meẓuku (நந்தி மெழுகு), Nārathtai Iḷakam (நாரத்தை இளகம்), Pūra Mātthirai (பூர மாத்திரை)

THERAPEUTIC USES

Kōẓai (கோழை), Mūlam (மூலம்), Muṟaicuram (முறைசுரம்), Peruṅkaẓiccal (பெருங்கழிச்சல்), Puṇ (புண்), Vānti (வாந்தி)

DOSE - Powder 600 mg - 2 g

ATTHIPPAḌṬAI (Bark) - அத்திப்பட்டை

Atthippaḍṭai is the dried bark of ***Ficus racemosa*** L. Syn. ***Ficus glomerata*** Roxb. (Fam. Moraceae), a deciduous tree distributed all over India in moist localities and banks of streams to the elevation of 1800 m.; often cultivated in villages for its shade and edible fruits. It grows in Kuṟiñci and Marutham thiṇai.

SYNONYMS

Tamil	:	Aḍam (அடம்), Atavu (அதவு), Kōḷi (கோளி), Utumparam (உதும்பரம்)
Assamese	:	Jangedumuru, Yagyadimru
Bengali	:	Jagnadumur, Yagnadumur
English	:	Cluster fig, Country fig
Gujrati	:	Umbro, Umerdo, Umardo, Umarado
Hindi	:	Gulara, Gular
Kannada	:	Attihannianmara, Oudumbara, Athimara, Attigida
Kashmiri	:	Rumbal
Malayalam	:	Athi
Marathi	:	Atti, Gular, Umber
Oriya	:	Jajnadimbri, Dimbiri
Punjabi	:	Kath Gular, Gular
Sanskrit	:	Udambara, Sadaphala
Telugu	:	Atti, Medi
Urdu	:	Gular

DESCRIPTION

a) Macroscopic

Bark greyish-green, surface soft and uneven, 0.5 to 1.8 cm. thick; on rubbing white papery flakes come out of outer surface, inner surface light brown; fracture fibrous; taste mucilaginous without any odour.

b) Microscopic

Transverse section of bark shows cork, 3 to 6 layers of thin-walled cells filled with brownish contents; cork cambium single layered; secondary cortex 6 to 12 layered, composed of thin-walled, rectangular cells arranged regularly, a number of secondary cortex cells contain starch grains and some contain rhomboidal crystals of calcium oxalate; most of the cells filled with chloroplast; cortex a fairly wide zone composed of circular to oblong, thin-walled cells containing

orange-brown contents; most of the cells filled with simple and compound starch grains, a number of cells also contain cubical and rhomboidal crystals of calcium oxalate, some cortical cells are lignified with pitted walls, scattered singly or in large groups throughout; secondary phloem a very wide zone composed of parenchyma with patches of sieve tubes, companion cells and traversed by medullary rays; phloem parenchyma circular to oval and thin-walled; phloem fibres much elongated, lignified, very heavily thickened and possess a very narrow lumen; medullary rays uni to pentaseriate, widen towards peripheral region; a number of ray cells also get lignified and show pitted wall as described above; laticiferous cells found in phloem parenchyma cells filled with small granular masses; starch grains and rhomboidal crystals of calcium oxalate also found in most of phloem parenchyma and ray cells; cambium, when present, 2 to 3 layered of tangentially elongated thin-walled cells.

Powder:

Brown; shows cork cells, single or in groups; elongated, lignified, phloem fibres with thick walls and narrow lumen; laticiferous cells; cortical cells with cubical and rhomboidal crystals of calcium oxalate; simple and compound starch grains.

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	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	9 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Dichloromethane extractive of alcohol extract on silica gel 'G' plate using Petroleum Ether:Chloroform (1:1) v/v, shows under UV (366 nm) one fluorescent spot at Rf.0.30 (blue). On spraying with Anisaldehyde - Sulphuric acid reagent and heating the plate for five minutes at 105ºC four spots appear at Rf. 0.21, 0.36, 0.89 and 0.97 (all violet).

CONSTITUENTS

Leucocyanidin-3-O-β-D-glucopyranoside, leucopelargodinin, 3-O-α-L- rhamnopyranoside, cerylbehanate, lupeol and its acetate, α-amyrin acetate and tannins.

PROPERTIES AND ACTIONS

Cuvai	:	Tuvarppu (துவர்ப்பு)
Guṇam	:	Tiṇmai (திண்மை), Vaṟaḍci (வறட்சி)
Vīrium	:	Taḍpam (தட்பம்)
Pirivu	:	Iṉippu (இனிப்பு)
Ceykai	:	Tuvarppi (துவர்ப்பி)

IMPORTANT FORMULATIONS

Karicālai Iḷakam (கரிசாலை இளகம்)

THERAPEUTIC USES

Cīitakkaẕiccal (சீதக்கழிச்சல்), Kurutippōkku (குருதிப்போக்கு), Mūlam (மூலம்), Veḷḷai (வெள்ளை)

DOSE - Powder 3 - 6g

Decoction 30- 50 ml twice daily.

20 - 30 g coarse powder in 200 ml of water for preparing decoction.

AVURI (Whole Plant) - அவுரி

Avuri is the dried whole plant of *Indigofera tinctoria* L. (Fam. Fabaceae), an under shrub, upto 2m. high, found throughout India and widely cultivated in many parts of the country. It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Aviri (அவிரி), Nīli (நீலி)
Assamese	:	Nilbam
Bengali	:	Nil
English	:	Indigo, Indian indigo
Gujrati	:	Gali, Gari, Nil
Hindi	:	Nili
Kannada	:	Karunili, Neeligida
Malayalam	:	Nilam, Amari
Marathi	:	Neel
Oriya	:	Nili, Nila
Punjabi	:	Neel
Sanskrit	:	Nili, Nilika, Nilini, Rangapatri
Telugu	:	Nili Chettu, Nili, Aviri
Urdu	:	Neel

DESCRIPTION

a) Macroscopic

Root - Tap root having lateral roots, pale yellow to light yellowish-brown, hard, woody, cylindrical, nearly smooth except for a few having scattered lenticels; odour not distinct; taste slightly bitter.

Stem - Pieces woody, hard, slender, cylindrical, 0.1 to 1.5 cm. in dia., suRf.ace, smooth, lenticels present; yellowish-green to greyish-brown in colour; no characteristic odour and taste.

Leaf - Compound, imparipinnate; leaflets, 1 to 5 cm. long and 0.3 to 1.2 cm. wide, oblong or oblanceolate with a short mucronate tip; pale green to greenish-black; no characteristic odour and taste.

Flower - Numerous in nearly sessile spicate racemes, 10.0 cm. long; calyx 1.2 to 1.5 mm. long, hairy outside, teeth triangular, acute, as long as tube; corolla pink, papilionaceous, about 4 mm.

long, back of standard petal pubescent, stamen 10, diadelphous; ovary sessile, linear, downy; stigma capitate.

Fruit - Pod nearly cylindrical, straight or slightly curved, apiculate, 2 to 3.2 cm. long and 0.15 to 0.2 cm. in dia., having 8 to 12 seeds; smooth, brown to dark brown.

Seed - Somewhat quadrangular with truncate ends, about 0.2 cm. long and 0.1 cm. wide, smooth, yellowish-brown to greenish-brown in colour.

b) Microscopic

Root - Shows a narrow zone of cork, consisting of 4 to 10 layers of tangentially elongated, rectangular, thin-walled cells, with lenticels; secondary cortex a narrow zone, consisting of rectangular to polygonal thin-walled cells containing rhomboidal to hexagonal crystals of calcium oxalate and groups of fibres; secondary phloem composed of usual elements; secondary xylem consisting of xylem parenchyma, vessels, fibres and rays; fibres long, aseptate with pointed end; vessels solitary or 2 to 4 in groups having simple pits; medullary ray 1 to 4 cells wide; prismatic crystals of calcium oxalate present in secondary cortex, phloem, xylem parenchyma and rays; oil globules present in cortex and phloem parenchyma; starch grains simple, round to oval, measuring upto 11 µm in dia., present in cortex, phloem, xylem parenchyma and rays.

Stem - Young stem furrowed and ridged in outline; epidermis single layered, 5 to 10 layers of collenchymatous cells present in ridges; mature stem shows 5 to 15 layers of tangentially elongated, rectangular, thin-walled cork cells, broken by lenticels, a few upper rectangular cells filled with reddish-brown contents; secondary cortex consists of 5 to 7 layers of oval to elliptical, thin-walled, parenchymatous cells, pericycle a discontinuous ring of fibres; secondary phloem and secondary xylem composed of usual elements; xylem traversed by rays; vessels solitary or 2 to 7 in radial rows, isolated vessels show spiral thickening and simple pits; fibres having narrow lumen and pointed ends; tracheids pitted; crystal fibres upto 12 chambered, each containing 1 or 2 prismatic crystals of calcium oxalate; pith occupied by isodiametric, thin-walled, parenchymatous cells; a few cells of secondary cortex, phloem and pith contain brown coloured substances; prismatic crystals of calcium oxalate and simple starch grains measuring 3 to 6 µm in dia. found in secondary cortex, phloem and xylem parenchyma, pith and rays.

Leaf

Petiole - Appears nearly circular in outline having two lateral wings; epidermis single layered, covered externally with thin cuticle and followed internally by a single layered collenchymatous hypodermis; unicellular hairs scanty to moderate with blunt tip; cortex 4 to 6 layered, consisting of oval to polygonal, elongated, thin-walled chlorenchymatous cells; pericycle scanty, present in the form of continuous or discontinuous ring; vascular bundle collateral and three in number, large one present in center and two smaller in lateral wings; pith composed of rounded to oval, thin-walled parenchymatous cells; a few prismatic crystals of calcium oxalate present in phloem and pith region.

Midrib - Shows a similar structure of epidermis, cuticle and hairs as in petioles; lower and upper epidermis followed by single and 2 or 3 layers of collenchymatous hypodermis respectively; parenchyma 2 or 3 layered, present on both sides; vascular bundle single, collateral, crescent-shaped, present centrally.

Lamina - Shows a dorsiventral structure; epidermis, cuticle and hairs as in petiole and midrib; palisade 2-layered; spongy parenchyma 2 to 4 layered; a few patches of veins scattered between palisade and spongy parenchyma; a few prismatic crystals of calcium oxalate present in mesophyll

cells; stomata paracytic; unicellular hairs present on both surface but abundant on lower surface; palisade ratio not more than 4; stomatal index 18 to 40 on lower surface and 10 to 16 on upper surface; vein -islet number 15 to 18 per square mm.

Fruit - Shows single layered epicarp; mesocarp 7 or 8 layered, more or less elliptical, tangentially elongated, thin-walled parenchymatous cells, a few upper cells contain reddish brown content; vascular bundle present in the mesocarp region sheathed by sclerenchyma cells; endocarp present in the form of 3 to 5 layers of sclerenchymatous cells.

Seed - Shows a single layered, radially elongated, thin-walled, palisade-like cells, covered externally by a thin cuticle and internally followed by a single layer of bearer cells; beneath bearer cells 2 to 4 tangentially elongated elliptical, thin-walled parenchymatous cells present; cotyledons consists of oval to angular, elongated, thin-walled parenchymatous cells.

Powder:

Yellowish grey; shows aseptate fibres; vessels with spiral thickening and simple pits; groups of mesophyll cells; unicellular hairs; pieces of hexagonal, straight walled, epidermal cells in surface view; prismatic crystals of calcium oxalate; rarely oil globules; simple, rounded to oval, starch grains measuring 3 to 11 µm in diameter.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2 per cent, Appendix	2.2.2.
Total Ash	Not more than	5.2 per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	1.0 per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	2.5 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	7.5 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Alcoholic extract on silica gel 'G' plate using n-Butanol: glacial Acetic acid: Water (5:1:4) in visible light shows three spots at Rf. 0.38, 0.75 and 0.88 (all grey). On exposure to iodine vapours seven spots appear at Rf. 0.15, 0.38, 0.50, 0.59, 0.67, 0.75 and 0.88 (all yellow). On spraying with 5% Methanolic - Sulphuric acid reagent and heating the plate at 105° C until the colour develops, the plate shows nine spots at Rf.0.15, 0.25, 0.38, 0.50, 0.59, 0.67, 0.75, 0.84 and 0.88 (all grey).

CONSTITUENTS

Indigotin, indirubin, indoxyl, indican, kaempferol, luteolin, apigenin, ercetin, tephrosin, degalin, dehydrodegalin, sumatrol, kaempferol -4-7-dirhamnoside, trans-tetracos-15-enoic acid, semiglabrin and pseudo semiglabrin.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Acaivu (அசைவு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Mu̲raiveppaka̲r̲r̲i (முறைவெப்பகற்றி), Nu̲ṇpu̲zukkolli (நுண்புழுக்கொல்லி), Veppamu̲ṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Nanthi Me̲zuku (நந்தி மெழுகு)

THERAPEUTIC USES

Ku̲nmam (குன்மம்), Nañcu Nīkkum (நஞ்சு நீக்கும்), Ve̲ḷḷai (வெள்ளை)

DOSE - Decoction 25- 50 ml twice daily. 10 - 20 g coarse powder in 200 ml of water for preparing decoction.

AVURI VĒR (Root) - அவுரி வேர்

Avuri Vēr is the dried root of *Indigofera tinctoria* L. (Fam. Fabaceae), an under shrub up to 2 m. high, found throughout India and widely cultivated in many parts of the country. It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Aviri (அவிரி), Nīli (நீலி)
Assamese	:	Nilbam
Bengali	:	Nil
English	:	Indian indigo, Indigo
Gujrati	:	Gali, Gari, Nil
Hindi	:	Nili
Kannada	:	Karunili, Neeligida
Malayalam	:	Nilam, Amari, Neela Amari
Marathi	:	Neel
Oriya	:	Nila, Nili
Punjabi	:	Neel
Sanskrit	:	Nili, Nilika, Nilini, Rangapatri
Telugu	:	Aviri, Nili, Nili chettu
Urdu	:	Neel

DESCRIPTION

a) Macroscopic

Root mostly availabe in pieces, hard, woody, cylindrical, 0.1 to1.5 cm. thick, surface nearly smooth except for a few scattered lenticels; pale-yellow to light yellowish-brown; odour not distinct; taste slightly bitter.

b) Microscopic

Root - Shows a narrow zone of cork consisting of 4 to 10 layers of tangentially elongated, rectangular, thin-walled cells, with lenticels; secondary cortex a narrow zone, consisting of rectangular to polygonal, thin-walled cells; group of fibres thick-walled and lignified with wide lumen; secondary phloem composed of usual elements; wood occupies bulk part of the root, consisting of usual elements; vessels solitary or 2 to 4 in groups having simple pits; fibres present in the form of alternating bands of parenchyma; parenchyma cells rectangular to polygonal in shape and present on both external and internal sides of vessels; medullary rays 1 to 4 cells wide; prismatic crystals of calcium oxalate present in secondary cortex, phloem and xylem parenchyma

and rays; oil globules present in cortex and phloem parenchyma; starch grains simple, round to oval, measuring upto 12 mm in dia., present in cortex, phloem, xylem parenchyma and rays.

Powder:

Creamish- brown; shows aseptate fibres; pitted vessels; simple and compound starch grains, measuring 3 to 11 mm in dia.; occasionally oil globules and prismatic 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	6 per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.7 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 of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Chloroform: Ethylacetate (3:2) shows under UV light (366 nm) ten fluorescent zones at Rf. 0.14 (blue), 0.30 (bluish green), 0.40 (blue), 0.47 (blue), 0.58 (blue), 0.63(bluish green), 0.75 (blue), 0.81 (blue), 0.86 (green) and 0.91 (blue). On exposure to iodine vapours thirteen spots appear at Rf. 0.06, 0.10, 0.14, 0.27, 0.33, 0.40, 0.50, 0.58, 0.63, 0.75, 0.80, 0.86 and 0.91 (all yellow). On spraying with 5 % Methanolic Sulphuric acid reagent and heating the plate at 105°C until the colour develops, the plate shows fourteen spots at Rf. 0.06, 0.10, 0.14, 0.21, 0.27, 0.33, 0.40, 0.50, 0.58, 0.63, 0.75, 0.81, 0.86, and 0.91 (all grey).

CONSTITUENTS

Indican.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Acaivu (அசைவு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Muṟaiveppakaṯṟi (முறைவெப்பகற்றி), Nuṇpuzukkolli (நுண்புழுக்கெல்லி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Karicālai Iḷakam (கரிசாலை இளகம்)

THERAPEUTIC USES

Kuṉmam (குன்மம்), Nañcu Nīkkum (நஞ்சு நீக்கும்), Veḷḷai (வெள்ளை), Mūrccai (மூர்ச்சை)

DOSE - Decoction 30- 50 ml twice daily.30- 60 g powder in 200 ml of water for preparing decoction.

CARAKKONRAI PULI (Fruit Pulp) - சரக்கொன்றை புளி

Carakkonrai Puḷi is the pulp of fruit (devoid of seeds, septa and pieces of pericarp) of *Cassia fistula* L. (Fam. Fabaceae), a moderate sized deciduous tree, common throughout India as wild or cultivated plant; fruits collected when pods are ripe and black, and pulp separated and dried. It grows in Kuṟiñci, Mullai and Marutham thiṇai.

SYNONYMS

Tamil	:	Itaẓi (இதழி), Koṇṇai (கொண்ணை), Kirutāmalam (கிருதாமலம்)
Assamese	:	Sonaroo
Bengali	:	Sondala
English	:	Indian laburnum, Purging cassia
Gujrati	:	Garamala, Garmalo
Hindi	:	Amaltas
Kannada	:	Aragvadha, Kakke, Kakke-gida, Kakkemara, Kakkedai, Rajataru
Kashmiri	:	Kriyangal Phali
Malayalam	:	Konna, Kritamlam
Marathi	:	Bahava, Garamala, Amaltas
Oriya	:	Sunari
Punjabi	:	Amaltas
Sanskrit	:	Aragvadha, Krtamala, Vyadhigata, Samopaka, Nrpadruma
Telugu	:	Rela
Urdu	:	Khiyar Shambar

DESCRIPTION

a) Macroscopic

Pulp dark brown; sticky, sweet and mucilaginous; odour characteristic, somewhat disagreeable.

b) Microscopic

Pulp shows oval to polygonal thin walled parenchyma cells and lignified stone 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	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	15	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	46	per cent, Appendix	2.2.7.

ASSAY

TLC densitometric estimation of rhein

TLC plates

Aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness

Solvent system

Petroleum ether (40-60º): Ethyl acetate: Formic acid (7.5: 2.5: 0.1).

Test solution

1 g of powdered drug is extracted with 0.01N Methanolic potassium hydroxide (3 x 25 ml) under reflux on a water bath. Filtered, pooled the filtrates and concentrated the extract and made up the volume to 25 ml with methanol.

Standard solution

5 mg of rhein is dissolved in 5 ml of 0.01 N Methanolic potassium hydroxide in a volumetric flask. Further dilution is made by pipetting 2.5 ml into a 25 ml volumetric flask and making up the final volume to 25 ml with Methanol. From this stock solution standard solutions of 10 to 35 µg/ml are prepared by transferring aliquots (1 to 3.5 ml) of stock solution to 10 ml volumetric flasks and adjusting the volume to 10 ml with Methanol.

Calibration curve

10 µl of the standard solutions (100 to 350 ng per spot) are applied on a TLC plate. The plate is developed with the solvent system in twin trough chamber to a distance of 8 cm. and scanned densitometrically at 434 nm. The peak areas are recorded and the calibration curve is obtained by plotting peak area vs concentration of rhein applied.

Estimation of rhein in the drug

10 µl of the test solution is applied in triplicate on a TLC plate. The plate is developed in the solvent system and the peak area is recorded as described above for the calibration curve. The amount of rhein present in the sample is calculated from the calibration curve of rhein.

The percentage of rhein ranges from 0.07 to 0.14 in the samples analyzed.

T.L.C.

1 gm. of the powdered drug is extracted with 25 ml of 0.01N Potassium hydroxide for 1 hr. on a boiling water bath. The solution is filtered, cooled, acidified with dilute hydrochloric acid and then extracted with diethyl ether (3 x 25 ml). The combined ether layer is evaporated to dryness and

dissolved in 25 ml of Methanol. T.L.C. of the solution on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Toluene: Ethyl acetate : Formic acid : Methanol (3:3: 0.8:0.2) shows under UV light (254 nm) seven spots at Rf. 0.11, 0.24, 0.38, 0.55, 0.62, 0.69 and 0.76 (rhein marker). Under UV light, (366 nm) shows seven spots at Rf. 0.17 (blue), 0.25 (green), 0.37 (light blue), 0.48 (light blue), 0.58 (fluorescent blue), 0.76 (greenish yellow, rhein marker) and 0.86 (green). On spraying with 5 percent ethanolic potassium hydroxide shows six spots at Rf. 0.10, 0.21, 0.25, 0.51, 0.67 (all light brown) and 0.76 (purple, rhein marker).

CONSTITUENTS

Fistulic acid, rhein, 3- formyl-1- hydroxy-8- methoxy- anthraquinone, 3ß- hydroxy-17- norpimer- 8 (9) -en-15-one, (+) catechin, epicatechin and its derivatives, argenine, leucine, methionine, phenylalanine, tryptophan, aspartic acid, glutamic acid, glucose, sucrose, fructose, galactomannan, procyanidin-B-2.

PROPERTIES AND ACTIONS

Cuvai	:	Puḷippu (புளிப்பு)
Guṇam	:	Tiṇmai (திண்மை)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)
Ceykai	:	Nīrmalampōkki (நீர்மலம்போக்கி), Puz̲uvakar̲r̲i (புழுவகற்றி)

IMPORTANT FORMULATIONS

Karuṇai Iḷakam (கருணை இளகம்), Neruñcik Kuḍinīr (நெருஞ்சிக் குடிநீர்), Nīrmuḷḷik Kuḍinīr (நீர்முள்ளிக் குடிநீர்)

THERAPEUTIC USES

Kuḍal Vali (குடல் வலி), Malakkaḍḍu (மலக்கட்டு), Veḷḷai (வெள்ளை)

DOSE - Powder 4 - 8 g

CAḌĀMĀÑCIL (Rhizome) - சடாமாஞ்சில்

Caḍāmāñcil is the dried rhizome of *Nardostachys grandiflora* DC. Syn. *N. jatamansi grandiflora* DC.(Fam. Valerianaceae), an erect perennial herb, 10 to 60 cm. high, found in the sub-alpine Himalayas from Punjab to Sikkim and Bhutan at altitudes of 3000 to 5000 m .It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Caḍāmāñci (சடாமாஞ்சி), Caḍilai (சடிலை), Paicāci (பைசாசி), Pūtakēciṉi (பூதகேசினி)
Assamese	:	Jatamansi, Jatamangshi
Bengali	:	Jatamamsi
English	:	Nardus root
Gujrati	:	Baalchad, Kalichad
Hindi	:	Balchara
Kannada	:	Bhootajata, Ganagila maste
Kashmiri	:	Bhutijata
Malayalam	:	Manchi, Jatamanchi
Marathi	:	Jatamansi
Oriya	:	Jatamansi
Punjabi	:	Billilotan, Balchhar, Chharguddi
Sanskrit	:	Jatamansi, Mamsi, Jata jatila
Telugu	:	Jatamamsi
Urdu	:	Sumbul-ut-teeb

DESCRIPTION

a) Macroscopic

Dried rhizome dark brown, 2.5 to 7.5 cm. long, cylindrical, covered with reddish-brown fibres forming a net work, which are skeletons of sheathing leaf bases; fracture brittle; internal colour reddish-brown; odour strongly aromatic; taste acrid, slightly bitter.

b) Microscopic

Transverse section of rhizome shows cork consisting of 2 to 5 layers of cells filled with oil globules; cortex characterized by the presence of schizogenous canals; phloem in form of patches

of small cells; cambium ring distinct and continuous; xylem consists of vessels, scattered individually or in rows of two or three vessels with scalariform thickening; older rhizomes show one or more stellate shaped rings of interxylary and medullary cork, completely or incompletely separating the rhizome into four to nine vascular strands by joining outer cork; each separated strand encircled by a few layers of cork cell consisting of an outer cortex zone followed by two or more functional vascular bundles, tissues in between the strands usually non-functional except for the cork cells which act as storage organ for oil globule.

Powder:

Dark brown; shows cork cells; parenchyma and oleo- resin cells with resinous matter and oil globules; fragments of vessels with scalariform thickening, tracheids and a few linear fibres.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than 5 per cent, Appendix	2.2.2.
Total Ash	Not more than 9 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 2 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than 5 per cent, Appendix	2.2.7.
Volatile oil	Not less than 0.1 per cent, v/wAppendix	2.2.10.

ASSAY

GC profile of volatile oil (yield upto 1.9%) with valeranone as marker

Column	:	OV-1 Chrom W (80 -100), SS- 2m. x 3.2mm.
Oven temperature	:	Programmed from 180 -220ºC at a rate of 10ºC/min.
Injector temperature	:	240ºC.
Detector (FID) temperature	:	240ºC.
Carrier gas (N_2)	:	(3.8 kg/cm^2)

T.L.C.

TLC of Petroleum Ether (40-60°C) extract of the drug on silica gel 'G' precoated plate using Toluene: Ethyl acetate (7:3), on exposure to iodine vapours shows six spots appear at Rf.. 0.48, 0.58, 0.69, 0.77, 0.82 and 0.95 (all yellow). On spraying with Anisaldehyde -Sulphuric acid reagent and heating the plate for five minutes at 105°C six spots appear at Rf. 0.48 (grey), 0.58 (blue), 0.69(indigo blue), 0.77 (orange), 0.82 (light violet) and 0.95 (violet).

CONSTITUENTS

Jatamansin, jatamansone, jatmansinol, nardol, oroselol, angelicin, β- endesrol, elemol, nardostachone, α- β- pinene, 3- carene, jatamanshic acid, seychellen, seychelane, norseychelanone, patchouli alcohol, nardostachysin, α & β - patchoulenes, narostachone, actinidine, virolin, spirojatamol, jatamol A and B.

PROPERTIES AND ACTIONS

Cuvai : I̲ippu (இனிப்பு) , Kārppu (dried) (கார்ப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ci̲runīrperukki (சிறுநீர்பெருக்கி), Icivaka̲r̲ri (இசிவகற்றி), Kō̲zaiyaka̲r̲ri (கோழையகற்றி), U̲rakkamuṇḍākki (உறக்கமுண்டாக்கி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Cirōpāra Nivāraṇat Tailam (சிரோபார நிவாரணத் தைலம்), Ilaku Canta̲nāthi Tailam (இலகு சந்தனாதி தைலம்), Iñci Cūraṇam (இஞ்சி சூரணம்), Makā Ēlāthi Kuḷikai (மகா ஏலாதி குளிகை), Maya̲nat Tailam (மயனத் தைலம்), Nanthi Me̲zuku (நந்தி மெழுகு), Noccit Tailam (நொச்சித் தைலம்), Tāḷicāthi Cūraṇam (தாளிசாதி சூரணம்)

THERAPEUTIC USES

Kuḍḍam (குட்டம்), Purāṇa Curam (புராண சுரம்), Tūkkami̲nmai (தூக்கமின்மை), Uḍal Cūḍu (உடல் சூடு)

DOSE - Powder 500 mg - 1 g

Decoction 30- 50 ml twice daily.

5 - 10 g coarse powder in 200 ml of water for preparing decoction.

CĀTHIKKĀY (Kernel) - சாதிக்காய்

Cāthikkāy is the dried endosperm (kernel) of the seed of *Myristica fragrans* Houtt. (Fam. Myristicaceae), dioecious or occasionally monoecious aromatic tree, about 10-20 m high, native of Moluccas, now found under cultivation in India. It is mainly grown in Tamil Nadu, Kerala, Andhra Pradesh and Assam. The seed is cracked to remove shell, and the kernel is collected for the market. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Jāthikkāy (ஜாதிக்காய்), Kulakkāy (குலக்காய்)
Assamese	:	Jaiphal, Kanivish
Bengali	:	Jaiphala, Jaitri
English	:	Nutmeg
Gujrati	:	Jaiphala, Jayfar
Hindi	:	Jaiphal
Kannada	:	Jadikai, Jaykai, Jaidikai
Kashmiri	:	Jafal
Malayalam	:	Jatika
Marathi	:	Jaiphal
Oriya	:	Jaiphal
Punjabi	:	Jaiphal
Sanskrit	:	Jatiphala, Jatisasya
Telugu	:	Jajikaya
Urdu	:	Jauzbuwa, Jaiphal

DESCRIPTION

a) Macroscopic

Kernel ellipsoid, 20 to 30 mm. long and about 20 mm. broad; externally greenish-brown sometimes marked with small irregular dark brown patches or minute dark points and lines slightly furrowed reticulately; a small light-coloured area at one end indicated the position of the radicle; a groove runs along the line of raphe to the darker chalaza at the opposite end; a thin layer of perisperm with infoldings appearing as dark ruminations surrounding the abundant greyish-brown endosperm; embryo, in an irregular cavity, small with two widely spreading crumpled cotyledons and a small radicle; odour strong and aromatic; taste pungent and aromatic.

b) Microscopic

Transverse section of endosperm shows peripheral perisperm of several layers of strongly flattened, polyhedral cells with brown contents, or containing prismatic crystals; inner layer of perisperm of thin-walled parenchyma about 40 µm thick, infolding into the tissue of the endosperm to form the ruminations containing numerous, very large oil cells with brown cell walls; vascular strands in the peripheral region with numerous small spiral vessels; large celled, endosperm, parenchymatous with occasional tannin idioblasts, with thin brown walls, containing numerous simple, rounded and compound starch grains, with upto about 10 components usually 2 to 8, individual grains, upto 20 µm in diameter present; most of the cells with crystalline fat and often a large aleurone grain in each cell, containing a rhombic protein crystal upto 12 µm and small aleurone grains with less regular crystalloids; embryo, of shrivelled and collapsed parenchyma.

Powder:

Brown, oily; shows fragments of endosperm cells containing prismatic crystals and starch grains; a few cells of endosperm containing brown contents; starch grains numerous, oval to rounded, measuring upto 20 µm in diameter having 2 to10 components; a few cells containing oil globules and a few aleurone grains.

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	11	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	7	per cent, Appendix	2.2.7.
Ether -soluble extractive	Not less than	25	per cent v/w Appendix	2.2.8
Volatile oil	Not less than	5	per cent v/w Appendix	2.2.10

T.L.C.

T.L.C. of the Alcoholic extract on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Toluene: Ethyl acetate (9:1) in visible light shows five spots at Rf. 0.12, 0.18 (both light yellow), 0.44, 0.48 and 0.50 (all yellow). On exposure to iodine vapours eleven spots appear at Rf. 0.12, 0.18, 0.22, 0.26, 0.31 0.34, 0.44, 0.57, 0.74, 0.84 and 0.95 (all yellow). On spraying with Anisaldehyde - Sulphuric acid reagent and heating the plate for five minutes at 105ºC seventeen spots appear at Rf. 0.12, 0.14(both pinkish brown), 0.18 (grey), 0.26, 0.31(both pinkish brown), 0.34 (violet), 0.39, 0.44 (both pink), 0.51 (pinkish brown), 0.57 (pinkish red), 0.62, 0.74 (both brown), 0.78 (violet), 0.84 (pinkish violet), 0.86 (brown), 0.89 and 0.95 (both greyish violet).

CONSTITUENTS

Dimeric phenylpropanoids I-VI, myricetin, essential oil and fixed oil.

PROPERTIES AND ACTIONS

Cuvai : Kārppu (கார்ப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Kāmamperukki (காமம்பெருக்கி), Maṇamūṭṭi (மணமூட்டி), Mūrccaiyuṇṭākki (மூர்ச்சையுண்டாக்கி), Uramākki (உரமாக்கி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Aśḍapayiravak Kuḷikai (அஷ்டபயிரவக் குளிகை), Cāmpirāṇippū Pataṅkam (சாம்பிராணிப்பூ பதங்கம்), Carapuṅka Vilvāti Iḷakam (சரபுங்க வில்வாதி இளகம்), Ilaku Cantaṉāthi Tailam (இலகு சந்தனாதி தைலம்), Kapāḍa Mātthirai (கபாட மாத்திரை)

THERAPEUTIC USES

Pacittīkkuṟaivu (பசித்தீக்குறைவு), Iraippu (இரைப்பு), Irumal (இருமல்), Nāḷpaḍḍa Kaẕiccal (நாள்பட்ட கழிச்சல்), Peruṅkaẕiccal (பெருங்கழிச்சல்), Vintukkuṟaivu (விந்துக்குறைவு)

DOSE - Powder 500 mg - 1g

CĪNTHIL THAṆḌU (Stem) - சீந்தில் தண்டு

Cīnthil Thaṇḍu is the dried, matured pieces of stem of ***Tinospora cordifolia*** (Willd.) Miers. (Fam. Menispermaceae), a perennial climber found throughout tropical India; drug is collected during summer preferably in the month of May; drug is used in fresh form also. It grows in Kuṟiñci, Mullai, Marutham and Neythal thiṇai.

SYNONYMS

Tamil	:	Amirtavalli (அமிர்தவல்லி), Amutavalli (அமுதவல்லி), Cañcīvi (சஞ்சீவி), Cīnthil Koḍi (சீந்தில் கொடி), Cōmavalli (சோமவல்லி), Kuṇḍali (குண்டலி)
Assamese	:	Siddhilata, Amariat
Bengali	:	Gulancha
Gujrati	:	Galac, Garo
Hindi	:	Giloe, Gurcha
Kannada	:	Amrutaballi
Kashmiri	:	Amrita, Gilo
Malayalam	:	Chittamrutu
Marathi	:	Gulvel
Oriya	:	Guluchi
Punjabi	:	Gilo
Sanskrit	:	Guduci, Amrtavalli, Amrta, Madhuparni, Guducika, Chinnodbhava
Telugu	:	Thippateega
Urdu	:	Gilo

DESCRIPTION

a) Macroscopic

Drug occurs in pieces of varying thickness ranging from 0.6 to 5 cm. in diameter; young stems green with smooth surfaces and swelling at nodes, older ones show a light brown surface marked with warty protuberances due to circular lenticels; transversely smoothened surface shows a radial structure with conspicuous medullary rays traversing porous tissues; taste bitter.

b) Microscopic

Transverse section of stem shows outermost layer of cork, differentiating into outer zone of thick-walled brownish and compressed cells, inner zone of thin walled colourless, tangentially

arranged 3 to 4 rows of cells; cork broken at some places due to opening of lenticels, followed by 5 or more rows of secondary cortex of which the cells of outer rows smaller than the inner one; just within the opening of lenticels, groups of sclereids consisting of 2 to 10 cells found in secondary cortex region, outer zone of cortex consists of 3 to 5 rows of irregularly arranged, tangentially elongated chlorenchymatous cells; cortical cells situated towards inner side, polygonal in shape and filled with plenty of starch grains, simple, ovoid, or irregularly ovoid-elliptical, occasionally compound of 2 to 4 components; several secretory cells found scattered in the cortex; pericyclic fibres lignified with wide lumen and pointed ends, associated with a large number of crystal fibres containing a single prism in each chamber; vascular zone composed of 10 to 12 or more wedge-shaped strips of xylem, externally surrounded by semi-circular strips of phloem, alternating with wide medullary rays; phloem consists of sieve tubes, companion cells and phloem parenchyma of polygonal or tangentially elongated cells, some of them contain crystals of calcium oxalate; cambium composed of one or two layers of tangentially elongated cells in each vascular bundle; xylem consists of vessels, tracheids, parenchyma and fibres; in primary xylem, vessels comparatively narrow devoid of tyloses; secondary xylem elements thick-walled, lignified, vessels cylindrical in shape bearing bordered pits on their walls, some large vessels possess several tyloses and often contain transverse septa; medullary rays 15 to 20 or more cells wide containing rounded, hemispherical, oblong, ovoid, with faintly marked concentric striations and central hilum appearing like a point, starch grains of 6 to 13 µm in diameter and 6 to 11µm in length, variously shaped; pith composed of large, thin-walled cells mostly containing starch grains.

Powder:

Yellowish-cream; shows cork cells, parenchyma cells; fragments of vessels with bordered pits, fibres, crystal fibres containing prisms of calcium oxalate; starch grains simple, oval to rounded with faintly marked concentric striations and central hilum, measuring 6 to 13 µm in diameter.

IDENTITY, PURITY AND STRENGTH

For dry drug:

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 3 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.
For fresh drug:	- -	
Foreign matter	Nil, Appendix 2.2.2	
Moisture content	75 percent, Appendix	2.2.9

T.L.C.

T.L.C. of Chloroform soluble part of the Alcoholic extract on silica gel 'G' plate using Chloroform : Methanol (9:1). On spraying with Anisaldehyde - Sulphuric acid reagent and heating

for five minutes at 105°C shows eight spots at Rf. 0.19 (violet), 0.26 (violet), 0.58 (violet), 0.65 (violet), 0.84 (violet), 0.88, 0.93 and 0.97 (all pinkish violet).

CONSTITUENTS

Diterpenoid furanolactone, 3- (α 4 - dihydroxy-3-methoxy benzyl) 4-(4-hydroxy-3-medoxybenzy1) tetra-hydrofuran, tinosporaside. tinosporide, magnoflorium, giloin, gilosterol, gilenin, columbin, chasmanthin, palmaria, tinosporin, tinosporic acid,tinosporal and amritoside A,B,C and D.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Kāyakaṟpamākki (காயகற்பமாக்கி), Kāmamperukki (காமம்பெருக்கி), Muṟaiveppakaṟṟi (முறைவெப்பகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Uḷḷaẕalāṟṟi (உள்ளழலாற்றி), Uramākki (உரமாக்கி), Uḍaṟtēṟṟi (உடற்தேற்றி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Cīnthil Cūraṇam (சீந்தில் சூரணம்), Cīnthil Ney (சீந்தில் நெய்), Kapacurak Kuḍinīr (கபசுரக் குடிநீர்)

THERAPEUTIC USES

Coṟi (சொறி), Curam/Kāyccal (சுரம்/காய்ச்சல்), Kayanōy (கயநோய்), Kuruti Aẕal (குருதி அழல்), Kuḍḍam (குட்டம்), Mēkam (மேகம்), Pīṉicam (பீனிசம்)

DOSE - Powder 3 - 5 g

Decoction 30- 50 ml twice daily.

20 - 30 g coarse powder in 200 ml of water for preparing decoction

CĪRAKAM (Fruit) - சீரகம்

Cīrakam is the ripe fruit of ***Cuminum cyminum*** L. (Fam. Apiaceae), a small slender, glabrous, annual herb, 30 to 90 cm. high; flowers very small, white, about 38 mm. long stalk in compound umbels, mostly cultivated in plains; plants pulled out, dried and threshed for collecting mature fruits.It grows in Mullai, Marutham and Neythal thiṇai.

SYNONYMS

Tamil : Acai (அசை), Naṟcīrakam (நற்சீரகம்), Pitthanāciṉi (பித்தநாசினி), Pōcaṉakuḍōri (போசனகுடோரி)

Assamese : Jira

Bengali : Jira, Sadajira

English : Cumin seed, Cumin

Gujrati : Jirautmi, Jiru, Jiraugi, Jeeru, Jirun

Hindi : Jira, Safed jira

Kannada : Jirage, Bilejirege

Kashmiri : Safed Zoor

Malayalam : Jeerakam

Marathi : Pandhare jire

Oriya : Dhalajeera, Dalajira, Jira

Punjabi : Safed jira, Chitta jira

Sanskrit : Sveta jiraka, Ajaji, Jiraka, Ajajika

Telugu : Jilakarra, Tella jilakarra

Urdu : Zirah, Zirasafed

DESCRIPTION

a) Macroscopic

Fruit, a cremocarp, often separated into mericarps, brown with light coloured ridges, ellipsoidal, elongated, about 4 to 6 mm. long, 2 mm. wide, tapering at ends and slightly compressed laterally; mericarps with 5 longitudinal hairy primary ridges from base to apex, alternating with 4 secondary ridges which are flatter and bear conspicuous emergences; seeds orthospermous; odour umbelliferous, characteristic; taste richly spicy.

b) Microscopic

Transverse section of fruit shows epidermis consisting of short polygonal, tabular cells densely covered with short, bristle hairs that are multicellular and multiseriate on ridges; mesocarp with a few layers of parenchyma and five vascular bundles under five primary ridges; six vittae under secondary ridges, four on dorsal and two on commissural surface; endocarp consists of polygonal cells containing fixed oil and aleurone grains; carpophore consists of slender fibres.

Powder:

Brownish-yellow; shows fragments of vittae; sclerenchymatous cells of the mesocarp; endosperm cells containing oil globules, aleurone grains, small rosette crystals of calcium oxalate; fragments of multiserial hairs.

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	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 Dichloromethane extractive of the Alcohol extract on silica gel 'G' plate using Dichloromethane, on exposure to iodine vapours shows six spots at Rf. 0.05, 0.09, 0.15, 0.26, 0.55 and 0.94 (all yellow). On spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate for five minutes at 105°C six spots appear at Rf. 0.15, 0.26 (both violet), 0.31 (pink), 0.55(grey), 0.73 (violet) and 0.94 (violet).

CONSTITUENTS

Cuminaldehyde, cuminin,1,3 - þ - menthadien -7-al, 1,4 - þ - menthadien -7-al,þ-cymene, ϒ-terpinene, β-pinene, 7-1(O-β-D-galalacturonide) -4-(1-O-β-D- glucopyranosyl)-3,5- dihydroxy flavone, glycosides of luteolin and apigenin.

PROPERTIES AND ACTIONS

Cuvai : I**n̲**ippu (இனிப்பு), Kārppu (கார்ப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை), Va**r̲**aḍci (வறட்சி)

Vīrium : Taḍpam (தட்பம்)

Pirivu : I**n̲**ippu (இனிப்பு)

Ceykai : Akaḍḍuvāyvaka**r̲r̲**i (அகட்டுவாய்வகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Tuvarppi (துவர்ப்பி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Aśḍāthic Cūraṇam (அஷ்டாதிச் சூரணம்), Cīrakac Cūraṇam (சீரகச் சூரணம்), Cīrakat Tailam (சீரகத் தைலம்), Kēcari Iḷakam (கேசரி இளகம்), Mayiliṟakāthi Cūraṇam (மயிலிறகாதி சூரணம்), Pañcatīpākkiṉi Cūraṇam (பஞ்சதீபாக்கினி சூரணம்), Pittacurak Kuḍinīr (பித்தசுரக் குடிநீர்)

THERAPEUTIC USES

Aẕal Nōykaḷ (அழல் நோய்கள்), Cītakkaẕiccal (சீதக்கழிச்சல்), Īral Nōy (ஈரல் நோய்), Kallaḍaippu (கல்லடைப்பு), Kāmālai (காமாலை), Kuṉmam (குன்மம்)

DOSE - Powder 1 - 5 g

CIṞUKUṞIÑCĀṈ VĒR (Root) - சிறுகுறிஞ்சான் வேர்

Ciṟukuṟiñcāṉ is the root of ***Gymnema sylvestre*** R. Br. (Fam. Asclepiadaceae), a large woody, climber, much branched, with pubescent young parts, found throughout India in dry forests upto 600 m.; occasionally cultivated. It grows in Kuṟiñci, Mullai , Marutham and Neythal thiṇai.

SYNONYMS

Tamil	:	Cakkaraikkolli (சக்கரைக்கொல்லி)
Bengali	:	Medhasingi
English	:	Periploca of the woods
Gujrati	:	Kaavalee, Medhasinge
Hindi	:	Gudmaar, Medhaasingee
Kannada	:	Kadhasige
Malayalam	:	Cakkarakkolli, Madhunaashini
Marathi	:	Kaavalee, Medhaashingi
Sanskrit	:	Mesasrngi, Madhunasini, Ajasrngi
Telugu	:	Podapatri

DESCRIPTION

a) Macroscopic

Tap root branched, rough, longitudinally fissured, corky, soft and nodulose pieces, 2 to 7 cm. long and 0.2 to 1.0 cm. in thickness; external surface dark brown and cut surface showing a core cream in colour; fracture splintery; odour unpleasant; taste bitter and acrid.

b) Microscopic

Root - Shows 5 to 20 rows of tangentially elongated and radially arranged cork cells; secondary cortex a wide zone consisting of oval to polygonal cells somewhat irregular in shape and moderately thick walled, filled with rosette crystals of calcium oxalate and a few simple or compound starch grains; secondary phloem composed of sieve tubes, companion cells and phloem parenchyma, with mostly large and a few small rosette crystals and starch grains; medullary rays prominent, uni or multi seriate, generally tetra seriate, extending from primary xylem to secondary phloem; groups of oval to elongated, thick walled, lignified sclereids with clear striations and narrow lumen present in cortex and phloem region; secondary xylem consists of usual lignified elements; vessels simple pitted, single or 2 to 7 in radial groups and dispersed throughout the xylem region; fibres long with tapering ends and wide lumen; primary xylem diarch.

Powder:

Light yellow; shows thick walled cork cells; polygonal, thin walled parenchymatous cells; simple pitted fibres, vessels; groups of sclereids; large and a few small rosette crystals of calcium oxalate; simple and compound starch grains, measuring 5 to 11 µm in diameter.

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	5 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	14 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Alcoholic extract on silica gel 'G' plate using Toluene: Ethylacetate: Methanol (5:5:2) as mobile phase shows on spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate at 105ºC until the colour develops, eight spots at Rf. 0.17 (brown), 0.25 (violet), 0.48 (grey), 0.57 (pink), 0.068, 0.80, 0.87 (violet) and 0.95 (pink).

PROPERTIES AND ACTIONS

Cuvai	:	Kaippu (கைப்பு)
Guṇam	:	Ilaku (இலகு), Va̲ṛaḍci (வறட்சி)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)
Ceykai	:	Kōz̲aiyaka̲ṛṛi (கோழையகற்றி), Vāntiyuṇḍākki (வாந்தியுண்டாக்கி)

IMPORTANT FORMULATIONS

Maṇḍūrāti Aḍaikkuḍinīr (மண்டூராதி அடைக்குடிநீர்)

THERAPEUTIC USES

Iraippu (இரைப்பு), Irumal (இருமல்), Nañcukaḷ (நஞ்சுகள்), Vaḷiccuram (வளிச்சுரம்), Nīriz̲ivu (நீரிழிவு)

DOSE - Powder 1 - 2 g

Decoction 30- 50 ml twice daily.

30 -50 g powder in 200 ml of water for preparing decoction.

CĪṟUPĪḶAI CAMŪLAM (Whole Plant) - சீறுபீளை சமூலம்

Cīṟupīḷai Camūlam is the whole plant of *Aerva lanata* (L.) Juss. ex Schult. (Fam. Amaranthaceae), an erect or prostrate branched herb, 30 to 60 cm. in height, found throughout India as a common weed in fields and in waste lands. It grows in Marutham and Neythal thiṇai.

SYNONYMS

Tamil : Ciṟukaṇpīḷai (சிறுகண்பீளை), Kaṇpīḷai (கண்பீளை), Kaṟpēti (கற்பேதி), Pāśāṇapēti (பாஷாணபேதி)

Bengali : Chaya

Gujrati : Gorakhganjo

Hindi : Gorakhaganja

Kannada : Bilihindisoppu

Malayalam : Cherupila

Marathi : Kapurphutee, Kumrapindee

Punjabi : Bhuikallan

Sanskrit : Pattura, Goraksaganja, Bhadra

Telugu : Pindichettu, Kanda Pindi

DESCRIPTION

a) Macroscopic

Root - Tap-root, laterally branched, cylindrical, up to 0.8 cm. in thickness and about 25 cm. long pieces, externally light brown and rough but cut surface white and smooth; fracture fibrous and hard.

Stem - Nearly cylindrical, branching alternate, external surface shows slight ridges and furrows, hairy and light brown in colour; cut surface white; fracture granular.

Leaf - Simple, opposite, alternate, shortly petiolate, lamina 2.0 to 2.5 cm. long and 1.0 to 1.6 cm. broad, elliptic-orbicular or ovate, acute, reticulate veined, margin entire, densely pubescent on both surfaces.

Flower - Minute cluster as axillary spike; greenish-white; perianth 5, bracteolate; actinomorphic, bisexual; stamen 5, opposite to perianth, anthers 2 lobed; stigma bifid, superior ovary, unilocular with campylotropous ovule.

Fruit - A greenish, roundish, compressed membranous, utricle or circumscissile capsule with a coriaceous upper part or lid and containing a single seed.

Seed - Seed minute, 0.5 to 0.7 cm. in dia., black, polished, lenticular; taste pungent.

b) Microscopic

Root - Shows 5 to 7 layers of cork cells, upper 2 or 3 layers filled with brownish content; secondary cortex a wide zone consisting of circular to oval, elongated, thin walled parenchymatous cells, most of the cells containing rosette crystals of calcium oxalate; endodermis not distinct; pericycle present in the form of interrupted ring of pericyclic fibres; anomalous secondary growth present; secondary xylem and phloem tissues in form of 3 or 4 alternating rings; medullary bundles present; phloem consisting of sieve tubes, companion cells and phloem parenchyma; xylem consists of vessels, tracheids, fibres and xylem parenchyma; vessels circular to oval having simple pits; pith cells circular in shape containing rosette crystals of calcium oxalate.

Stem - Shows slightly wavy outline, corresponding to ridges and furrows; epidermis single layered covered with thick cuticle; trichomes multicellular, end cells pointed or vesicular, warty and thick walled; cortex 6 or 7 layers with 3 or 4 layers below ridges being collenchymatous and 3 or 4 layers below furrows chlorenchymatous; rest of the cells oval to elongated, elliptical, thin walled and parenchymatous, with a few cells containing rosette crystals of calcium oxalate; endodermis single layered; pericycle present in the form of a ring, single or groups of 2 to 4 fibres; anomalous secondary growth present; vascular bundles arranged in 2 or 3 rings showing included phloem alternating with parenchymatous tissue; phloem consists of sieve tubes, companion cells and phloem parenchyma; xylem composed of vessels, tracheids, wood fibres and xylem parenchyma; vessels round to oval having simple pits; pith wide consisting of circular to polygonal having intercellular spaces, rosette crystals of calcium oxalate present in this region.

Leaf

Petiole - Shows single layered epidermis covered with cuticle; trichomes multicellular present on both surfaces; cortex consisting of 2 or 3 layers, upper collenchymatous and lower parenchymatous; vascular bundle collateral and 3 in number; rosette crystals of calcium oxalate present in cortical cells.

Midrib - Epidermis, cuticle and trichomes, similar to those in petiole; cortex 5 to 7 layers, upper 3 collenchymatous and lower 3 or 4 circular, thin walled and parenchymatous; vascular bundles 3 in number, 2 accessory and one middle; xylem towards the upper and phloem towards lower epidermis; rosette crystals of calcium oxalate present in cortical region.

Lamina - Epidermis, cuticle and trichomes similar as in petiole and midrib; palisade 1 or 2 layers; spongy parenchyma 3 to 5 layers composed of thin walled parenchymatous cells with intercellular spaces, a few rosette crystals of calcium oxalate present in spongy parenchyma; anomocytic stomata present on both surfaces; palisade ratio 2 or 3; stomatal index on upper surface 12 to 15 and on lower surface 16 to 18; vein -islet number 4 or 5 per square mm.

Powder:

Yellowish-green; shows straight walled epidermal cells, multicellular trichomes and anomocytic stomata in surface view; simple pitted vessels, cork cells, tracheids, fibres and rosette 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 17 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 the Alcoholic extract on silica 'G' plate using Toluene: Ethyl acetate: Methanol (5:5:2) as mobile phase shows under UV (366 nm) ten fluorescent zones at Rf.0.11 (sky blue), 0.27 (red), 0.47 (red), 0.51 (sky blue), 0.73 (sky blue), 0.82 (pink), 0.87 (sky blue), 0.91 (red), 0.94 (red) and 0.97 (dark red). On spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate at 105ºC until the colour develops, the plate shows ten spots at Rf.0.11, 0.23, 0.37, 0.51, 0.61, 0.73, 0.85, 0.92 and 0.94 (all violet) and 0.97 (dark violet).

CONSTITUENTS

β-sitosterol, β-sitosterol palmitate, campesterol, stigmasterol, stigmasterol acetate, daucosterol, ergosterol, α-amyrin, β-amyrin, lupeol, betulin, olean-12-en-28-oic acid-3, 16-dioxymethyl ester, hentriacontane, chrysin, 3-glu (6"-coumaroyl) flavone, 4'-methoxy, 3-glu (6"p,-coumaroyl) flavone, 3-glu (4", 6" di-p-coumaroyl) flavone, 3-glu (4", 6" di-p-coumaroyl) flavone, 3'-methoxy flavone, kaempferol, kaempferol-3-galactoside,kaempferol-3-rhamno galactoside, aervine, methylaervine, aervoside, aervolonine, free sugars-fructose, galactose, rhamnose and sucrose.

PROPERTIES AND ACTIONS

Cuvai	:	Kaippu (கைப்பு)
Guṇam	:	Ilaku (இலகு), Kūrmai (கூர்மை)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)
Ceykai	:	Ciṟunīrperukki (சிறுநீர்பெருக்கி), Kaṟkaraicci (கற்கரைச்சி)

IMPORTANT FORMULATIONS

Kalluḍaikkuḍōri (கல்லுடைக்குடோரி), Naṇḍukkal Paṟpam (நண்டுக்கல் பற்பம்)

THERAPEUTIC USES

Cataiyaḍaippu (சதையடைப்பு), Kaẓiccal (கழிச்சல்), Kallaḍaippu (கல்லடைப்பு), Kuruti Vānti (குருதி வாந்தி), Nīrcurukku (நீர்சுருக்கு), Perumpāḍu (பெரும்பாடு), Vīkkam (வீக்கம்)

DOSE - Powder 5 -10 g

Decoction 15- 30 ml twice daily.

15 - 30 g coarse powder in 200 ml of water for preparing decoction.

CŌMPU (Fruit) - சோம்பு

Cōmpu is the dried ripe fruit of ***Foeniculum vulgare*** Mill. Syn. ***F. capillaceum*** Gilib., ***F.officinale*** All., ***Anethum foeniculum*** L. (Fam. Apiaceae), an erect, glabrous, aromatic herb, 1 or 2 m. high, native of southern Europe and Asia cultivated extensively throughout India upto 1830 m. and also sometimes found wild; fruits ripen in September; when dry, fruits are beaten out in a cloth in sun, cleaned by winnowing and collected. It grows in Kuṟiñci, Mullai, Marutham and Neythal thiṇai.

SYNONYMS

Tamil	:	Acai (அசை), Acuvakanthi (அசுவகந்தி)
Assamese	:	Guvamuri
Bengali	:	Marui, Panmauri
English	:	Fennel fruit
Gujrati	:	Variyali
Hindi	:	Saunf
Kannada	:	Badisompu, Doddasompu
Kashmiri	:	Sanuf, Badnai
Malayalam	:	Kattusatakuppa, Parinjaeragum
Marathi	:	Badishop
Oriya	:	Panamadhuri
Punjabi	:	Saunf
Sanskrit	:	Misreya, Misi, Madhurika
Telugu	:	Sopu
Urdu	:	Saunf

DESCRIPTION

a) Macroscopic

Fruits, usually entire with pedicel attached; mericarps, upto about 10 mm. long and 4 mm. broad, five sided with a wider commissural surface, tapering slightly towards base and apex, crowned with a conical stylopod, glabrous, greenish or yellowish-brown with five paler prominent primary ridges; endosperm, orthospermous.

b) Microscopic

Transverse section of fruit shows pericarp with outer epidermis of quadrangular to polygonal cells with smooth cuticle and a few stomata; trichomes, absent; vittae, 4 dorsal and 2 commissural extending with length of each mericarp, intercostal, with an epithelium of brown cells and volatile oil in cavity; mesocarp, with much reticulate lignified parenchyma; costae 5 in each mericarp, each with 1 vascular strand having 1 inner xylem strand and 2 lateral phloem strands separated by a bundle of fibres; inner epidermis of very narrow, thin-walled cells arranged parallel to one another in groups of 5 to 7, many of these groups with longer axis of their cells at an angle with those of adjacent groups (parquetry arrangement); endosperm consists of thick-walled, cellulosic parenchyma containing much fixed oil, micro-rosette crystals of calcium oxalate and numerous aleurone grains upto 5 µm in diameter; carpophore with very thick-walled sclerenchyma in two strands, often unsplit with two strands very close to each other.

Powder:

Greenish yellow; with characteristic aroma; shows lignified and reticulate parenchyma; thick walled endosperm cells containing aleurone grains; minute rosettes of calcium oxalate and oil globules; endocarp cells showing a parquetry arrangement and fragments of yellowish brown vittae.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	12	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	15	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	1	per cent, Appendix	2.2.7.
Volatile oil	Not less than	1.4	per cent, Appendix	2.2.10

T.L.C.

T.L.C. of the Alcoholic extract on silica gel 'G' plate using Toluene: Ethyl acetate (9:1) v/v shows five spots (UV light 366 nm) at Rf. 0.04 (blue), 0.27 (red), 0.34 (red), 0.41 (sky blue) and 0.51(sky blue). On exposure to iodine vapours six spots appear at Rf. 0.20, 0.27, 0.31, 0.58 and 0.93 (all yellow). On spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate, for five minutes at 105°C six spots appear at Rf. 0.12, 0.20, 0.27, 0.31,0.37 and 0.93 (all violet).

CONSTITUENTS

E- anethole, fenchone, methyl chavicol, limonene, α- pinene, imperatorin, bergapten, xanthotoxol, miyabenol C, cis - miyabenol C and its glycosides, foeniculosides VI, VII, VIII, IX, zizybeoside I, icaviside A, syringin, synapyl alcohol, 1, 3'- di- O- β-D-glucopyranoside, adenosine, threo- anethole glycol and erythro- anethole glycol.

PROPERTIES AND ACTIONS

Cuvai : I̲nippu (இனிப்பு), Kārppu (கார்ப்பு)

Guṇam	:	Ilaku (இலகு), Va̱ṛaḍci (வறட்சி)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)
Ceykai	:	Akaḍḍuvāyvaka̱ṛṛi (அகட்டுவாய்வகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி)

IMPORTANT FORMULATIONS

Cōmput Tīnīr (சோம்புத் தீநீர்), Nākkuppūcci(Kolli) Kuḍinīr (நாக்குப்பூச்சி(கொல்லி) குடிநீர்), Neruñcik Kuḍinīr (நெருஞ்சிக் குடிநீர்), Tamarakak Kuḍinīr (தமரகக் குடிநீர்)

THERAPEUTIC USES

Ceriyāmai (செரியாமை), Iraippu (இரைப்பு), Īral Nōy (ஈரல் நோய்), Irumal (இருமல்), Kural Kammal (குரல் கம்மல்), Pīṉicam (பீனிசம்), Vali Nōy (வலி நோய்)

DOSE - Powder 1 - 3 g

CUKKU (Dried Rhizome) - சுக்கு

Cukku is the dried rhizome of *Zingiber officinale* Rosc. (Fam. Zingiberaceae), widely cultivated in India; rhizomes dug in January - February, buds and roots removed, soaked overnight in water, decorticated and some times treated with lime and dried. It grows in Kuṟiñci and Marutham thiṇai.

SYNONYMS

Tamil	:	Cuṇḍi (சுண்டி), Ularnta Iñci (உலர்ந்த இஞ்சி), Vērkkompu (வேர்க்கொம்பு), Viḍamūḍiya Amirtam (விடமூடிய அமிர்தம்)
Assamese	:	Adasuth, Aadar shuth
Bengali	:	Suntha, Sunthi
English	:	Ginger root, Ginger
Gujrati	:	Sunth, Sundh, Suntha
Hindi	:	Sonth
Kannada	:	Shunthi
Kashmiri	:	Shonth
Malayalam	:	Chukku
Marathi	:	Sunth
Oriya	:	Sunthi
Punjabi	:	Sund
Sanskrit	:	Ardraka, Ausadha, Mahausadha, Visvabhesaja, Srngavera, Visva, Visvausadha
Telugu	:	Sonthi, Sunti
Urdu	:	Sonth, Zanjabeel

DESCRIPTION

a) Macroscopic

Rhizome, laterally compressed bearing short, flattish, ovate, oblique, branches on upper side each having at its apex a depressed scar, pieces about 5 to15 cm. long, 1.5 to 6.5 cm. wide usually 3 to 4 cm. and 1 to 1.5 cm. thick; externally buff coloured showing longitudinal striations and occasional loose fibres; fracture short, smooth, transverse surface exhibiting narrow cortex, (about one-third of radius) a well-marked endodermis, a wide stele showing numerous scattered fibro-

vascular bundles and yellow secreting cells when examined under 10x lens; odour agreeable and aromatic; taste agreeable and pungent.

b) Microscopic

Transverse section of rhizome shows cortex of isodiametric thin-walled parenchyma with scattered vascular strands and numerous isodiametric idioblasts, about 40 to 80 µm in diameter containing a yellowish to reddish-brown oleo-resin; endodermis slightly thick walled, free from starch; immediately inside endodermis a row of nearly continuous collateral bundles usually without fibres, stele of thin-walled, parenchyma cells, arranged radially around numerous scattered, collateral vascular bundles, each consisting of a few unlignified, reticulate or spiral vessels upto about 70 µm in diameter; a group of phloem cells, unlignified, thin-walled; septate fibres upto about 30 µm wide and 600 µm long with small oblique slit like pits present; numerous scattered idioblasts, similar those of cortex, and associated with vascular bundles, also present; idioblasts about 8 to 20 µm wide and upto 130 µm long with dark reddish-brown contents; in single or in axial rows, adjacent to vessels, present; parenchyma of cortex and stele packed with flattened, rectangular, ovate starch grains upto 60 µm long about 25 µm wide and 7µm thick, marked by fine concentric striations.

Powder:

Cream; shows groups of polygonal thin walled parenchyma cells; yellowish to reddish brown oleo-resin cells; unlignified fibres, vessels with annular, reticulate or spiral thickening; numerous round to oval starch grains upto 60 µm long, about 25 µm wide and 7 ìm thick marked by fine concentric striations.

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.
Water soluble ash	Not more than 1.5 per cent, Appendix	2.2.5.
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-Hexane: Diethyl ether (4:6) v/v shows two spots under (UV light 366 nm) at Rf. 0.55 and 0.60 (both sky blue). On exposure to iodine vapours seven spots appear at Rf. 0.23, 0.27, 0.43, 0.50, 0.55,0.81 and 0.94(all yellow). On spraying with Vanillin- Sulphuric acid reagent and heating the plate, for five minutes at 105°C eight spots appear at Rf. 0.23 (blackish brown), 0.27 (blackish brown), 0.37 (violet), 0.50 (violet), 0.60 (brown), 0.67 (brown), 0.81 (violet) and 0.94 (violet).

CONSTITUENTS

Gingerols, shogaols, dihydrogingerol, gingerdione, hexahydrocurcumin and desmethyl hexahydrocurcumin, α -zingiberene, ß-sesquiphellandrene, ar-curcumene, lipids, proteins, fats, waxes, and starch.

PROPERTIES AND ACTIONS

Cuvai : Kārppu (கார்ப்பு)

Guṇam : Ilaku (இலகு), Noymai (நொய்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Cukku Tailam (சுக்கு தைலம்), Ēlātic Cūraṇaṃ (ஏலாதிச் சூரணம்), Nilavākaic Cūraṇam (நிலவாகைச் சூரணம்), Pañcatīpākkiṉi Cūraṇam (பஞ்சதீபாக்கினி சூரணம்), Pāvaṉakkaḍukkāy (பாவனக்கடுக்காய்), Tayircuṇḍiccūraṇam (தயிர்சுண்டிச்சூரணம்), Tirikaḍukuc Cūraṇam (திரிகடுகுச் சூரணம்)

THERAPEUTIC USES

Ceriyāmai (செரியாமை), Irumal (இருமல்), Kuṉmam (குன்மம்), Neñcerippu (நெஞ்செரிப்பு), Talaivali (தலைவலி), Vāta Kuṉmam (வாத குன்மம்), Paciyiṉmai (பசியின்மை), Ēppam (ஏப்பம்)

DOSE - Powder 500 mg - 1g

ILAVAṄKAM (Flower Bud) - இலவங்கம்

Ilavaṅkam is the dried flower bud of ***Syzygium aromaticum*** (L.) Merr. & L.M. Perry Syn. ***Eugenia aromatica*** Kuntze, ***Eugenia caryophyllata*** Thunb. (Fam. Myrtaceae), a tree, cultivated in many parts of the world and also to a considerable extent in South India; flower buds collected twice a year, in the months of October and February when they change colour from green to crimson, dried carefully and separated from their peduncles. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil : Añcukam (அஞ்சுகம்), Cōcam (சோசம்), Kirāmpu (கிராம்பு), Tirāḷi (திராளி), Varāṅkam (வராங்கம்)

Assamese : Lavang, Lan, Long

Bengali : Lavang

English : Clove

Gujrati : Lavang, Laving

Hindi : Lavanga, Laung

Kannada : Lavanga

Kashmiri : Rung

Malayalam : Karampu, Karayampoovu, Grampu

Marathi : Lavang

Oriya : Labanga

Punjabi : Laung, Long

Sanskrit : Lavanga, Devapuspa

Telugu : Lavangalu

Urdu : Qarnful, Laung

DESCRIPTION

a) Macroscopic

Flower bud measuring 10 to 17.5 mm. in length, dark brown to black, consisting of a sub-cylindrical, slightly flattened, four sided hypanthium readily exuding oil when pressed; hypanthium contains in its upper portion a two celled inferior ovary with numerous ovules attached to a axile placenta, surmounted by four thick, divergent sepals and covered by unopened corolla consisting of four membranous imbricate petals, frequently detached, enclosing numerous incurved stamens and

one erect-style; odour strongly aromatic; taste pungent, aromatic followed by slight tingling of the tongue.

b) Microscopic

Transverse section of hypanthium shows epidermis and calyx teeth composed of straight walled cells, with thick cuticle having large anomocytic stomata, hypanthium tissue spongy, clusters of calcium oxalate crystals varying in size from 6 to 20 µm in diameter, small number of stone cells and prismatic crystals of calcium oxalate present in stalk; stamens, each with an oil gland in the apex of the connective, triangularly centricular pollen grains, 15 to 20 µm in diameter; anther walls showing a typical fibrous layer, schizolysigenous glands found in all parts; occasional isolated pericyclic fibre present.

Powder:

Dark brown; fragments of parenchyma showing large, oval, schizolysigenous oil cavities; spiral tracheids and a few rather thick-walled, spindle shaped fibres; calcium oxalate crystals in rosette aggregates, 10 to 15 µm in diameter; fragments of anther walls with characteristic reticulated cells; pollen grains numerous, tetrahedral, 15 to 20 µm in diameter.

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	9	per cent, Appendix	2.2.7.
Volatile oil	Not less than	15	per cent, Appendix	2.2.10

ASSAY

GC Profile

GC analysis of volatile oil (yield 16.7%)

GC Conditions:

Column	:	Fused silica capillary column (0.25 mm. x 20 m.) with 0.25mm. coating of free fatty acid phase (FFAP)
Oven Temperature	:	Programmed from 90 to 210ºC at 7ºC/min.
Injector temperature	:	230ºC
Detector temperature	:	240ºC
Carrier gas	:	Helium
Flow rate	:	1.5 ml/min.
Injection volume	:	0.1µl.

T.L.C.

T.L.C. of the Petroleum ether extract on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm thickness using Toluene: Ethyl acetate (8:2), with Anisaldehyde - Sulphuric acid reagent and heating the plate, for five minutes at 105ºC shows eleven spots appear at Rf. 0.18 (light pink), 0.29 (pink), 0.35 (violet), 0.41 (violet), 0.47 (pinkish violet), 0.56 (pink), 0.62 (pinkish violet), 0.76 (reddish brown), 0.82 (red), 0.93 (red) and 0.96.

CONSTITUENTS

Caryophyllene oxide, caryophylla -3 (12), 6-dien-4-ol , caryophylla - 3 (12), 7 (13) -dien -6 α-al, eugenol (77.1 % of volatile oil), acetophenone, 2-hydroxy, 4, 6,di-methoxy-5- methyl acetophenone, β-caryophyllene, eugenol acetate, derivatives of β-caryophyllene, α-humulene and its expoxide, benzyl salicylate, α-cardinol, γ-decalacetate, fenchone, hexanal, 2-hexanone, methyl palmitate, α-murolene, palustrol, propyl benzoate, α-thujene, β- selinene and eugenine.

PROPERTIES AND ACTIONS

Cuvai : Kārppu (கார்ப்பு), Viṟuviṟuppu (விறுவிறுப்பு)

Guṇam : Ilaku (இலகு), Noymai (நொய்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Icivakaṟṟi (இசிவகற்றி), Pacittīt ūṇḍi (பசித்தீதூண்டி)

IMPORTANT FORMULATIONS

Amirtātik Kuḷikai (அமிர்தாதிக் குளிகை), Amukkarāc Cūraṇam (அமுக்கராச் சூரணம்), Ilavaṅkāti Māttirai (இலவங்காதி மாத்திரை), Kuṅkumappū Māttirai (குங்குமப்பூ மாத்திரை), Paṟakkirāmpu Pakkuva Veṇṇey (பழக்கிராம்பு பக்குவ வெண்ணெய்), Vāṟaippu Vaḍakam (வாழைப்பு வடகம்)

THERAPEUTIC USES

Kaṟiccal (கழிச்சல்), Paciyiṉmai (பசியின்மை), Pal Vali (பல் வலி), Vānti (வாந்தி), Pittamayakkam (பித்தமயக்கம்)

DOSE - Powder 200 - 500 mg

ILAVAṄKAP PAḌṬAI (Bark) - இலவங்கப் பட்டை

Ilavaṅkappaḍṭai is the dried inner stem bark of coppiced tree of ***Cinnamomum verum*** J.S.Presl Syn. ***C.zeylanicum*** Blume (Fam. Lauraceae), a moderate sized evergreen tree usually attaining a height of 6 to 7.5 m.; cultivated in the Western Ghats and adjoining hills; bark collected during April -July and October -December. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Karuvāppaḍḍai (கருவாப்பட்டை), Lavaṅkappaḍḍai (லவங்கப்பட்டை)
Assamese	:	Dalcheni, Dalchini
Bengali	:	Daruchini, Darchini
English	:	Cinnamon bark
Gujrati	:	Dalchini
Hindi	:	Dalchini
Kannada	:	Dalchini Chakke
Kashmiri	:	Dalchini, Dalchin
Malayalam	:	Karuvapatta, Ilavarngathely
Marathi	:	Dalchini
Oriya	:	Dalechini, Guda twak
Punjabi	:	Dalchini, Darchini
Sanskrit	:	Tvak, Darusita
Telugu	:	Lavangapatta, Dalchini chekka
Urdu	:	Darchini

DESCRIPTION

a) Macroscopic

Bark pieces about 0.5 mm. thick, brittle, occurs as single or double, closely packed compound quills, upto a metre or more in length and upto about 1 cm. in diameter; outer surface, dull yellowish-brown, marked with pale wavy longitudinal lines with occasional small scars or holes; inner surface darker in colour, striated with longitudinally elongated reticulations; fracture splintery; odour fragrant; taste sweet, aromatic with sensation of warmth.

b) Microscopic

Transverse section of bark (devoid of cork and cortex) shows except at certain places pericyclic sclerenchyma, 3 or 4 rows of isodiametric cells, sometimes tangentially elongated, inner and radial walls often being thicker than the outer, some containing starch grains; small groups of pericyclic fibres embedded at intervals in the sclerenchyma; phloem of tangential bands of sieve tissue alternating with parenchyma, and containing axially elongated secreting cells containing volatile oil or mucilage; phloem fibres with very thick walls, upto 30 µm in diameter, isolated or in short tangential rows; sieve tubes narrow with transverse sieve plates, collapsed in outer periphery; medullary rays of isodiametric cells, mostly 2 cells wide; cortical parenchyma and medullary rays containing small starch grains mostly below 10 µm in diameter; minute acicular crystals of calcium oxalate present.

Powder:

Dark brown; shows fragments of parenchyma as well as sclerenchyma cells with thicker inner and radial walls; a few pieces of tracheids, fibres; oil globules; numerous small, simple, rounded starch grains measuring 2 to10 µm in diameter; minute acicular 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 3 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 3 per cent, Appendix	2.2.7.
Volatile oil	Not less than 1 per cent, v/w Appendix	2.2.10

T.L.C.

T.L.C. of Alcoholic extract on silica gel 'G' plate using Toluene: Ethyl acetate (9:1) under UV light (366 nm) shows four fluorescent zones visible at Rf.0.41(sky blue), 0.63 (sky blue), 0.70 (sky blue) and 0.93 (famthy sky blue). On spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate for five minutes at 105ºC four spots appear at Rf. 0.14, 0.28,0.66 and 0.93 (all violet).

CONSTITUENTS

Cinnacassiol A, B and C, trans-cinnamic acid, protocatechuic acid, cinnamaldehyde and eugenol.

PROPERTIES AND ACTIONS

Cuvai	:	I**ṉ**ippu (இனிப்பு), Kārppu (கார்ப்பு)
Guṇam	:	Ilaku (இலகு), Kūrmai (கூர்மை), Va**ṟ**a**ṭ**ci (வறட்சி)
Vīrium	:	Ta**ṭ**pam (தட்பம்)
Pirivu	:	I**ṉ**ippu (இனிப்பு)

Ceykai : Āṇmaiperukki (ஆண்மைபெருக்கி), Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Kakkuvāṉ Iḷakam (கக்குவான் இளகம்), Tāḷicāti Vaḍakam (தாளிசாதி வடகம்), Tamarakak Kuḍiṉīr (தமரகக் குடிநீர்), Vilvāti Iḷakam (வில்வாதி இளகம்)

THERAPEUTIC USES

Carvaviḍam (சர்வவிடம்), Iraippu (இரைப்பு), Irattakkaḍuppu (இரத்தக்கடுப்பு), Kuṉmam (குன்மம்), Porumal (பொருமல்), Vayiṟṟukkaḍuppu (வயிற்றுக்கடுப்பு)

DOSE - Powder 65 - 260 mg

ILAVAṄKAP PATHTHIRI (Leaf) - இலவங்கப் பத்திரி

Ilavaṅkappaththiri is the dried mature leaves of *Cinnamomum tamala* (Buch.-Ham.) Nees & Eberm. (Fam. Lauraceae), a small evergreen tree upto 7.5 m. high and occurs in tropical, sub-tropical Himalayas between 900 to 2300 m.; often raised from seeds sown in nursery; leaves collected in dry weather from about ten year old plants during October to March.It grows in Kuṟiñci and Marutham thiṇai.

SYNONYMS

Tamil	:	Lavaṅkappattiri (லவங்கப்பத்திரி)
Assamese	:	Tejpat, Mahpat
Bengali	:	Tejpatra, Tejpata
English	:	Indian cinnamon
Gujrati	:	Tamala patra, Develee
Hindi	:	Tejpatra
Kannada	:	Tamalapatra, Dalchini ele
Kashmiri	:	Dalchini pan, Tajpatra
Malayalam	:	Karuvapatta patram
Marathi	:	Tamalpatra
Oriya	:	Tejapatra
Punjabi	:	Tajpater
Sanskrit	:	Tvaka patra, Varanga, Coca
Telugu	:	Akupatri
Urdu	:	Tezpat

DESCRIPTION

a) Macroscopic

Leaves - 12.5 to 20 cm. long, 5 to 7.5 cm. wide at the center, 3 converging nerves from base to apex, young leaves pink; petiole 7.5 to 13 mm. long; margin entire, apex acute or acuminate, both surfaces smooth; stomata paracytic; odour aromatic; taste slightly sweet, mucilaginous and aromatic.

b) Microscopic

Petiole and midrib - Transverse sections of petiole and midrib show epidermis externally covered with cuticle, uniseriate, multicellular trichomes present with 1 to 3 cells; oil cells present as single

or groups; isolated large stone cells, much lignified and showing striations, are found scattered; most of the parenchymatous cells of cortex show reddish-brown contents; pericycle represented by a few layers of sclerenchymatous cells; stele more or less planoconvex as in the midrib of leaf; xylem on upper and phloem on lower side consisting of usual elements, present.

Lamina - Transverse section of lamina shows dorsiventral structure, represented by palisade tissue on upper and spongy parenchyma on lower side; in surface view the anticlinal walls of both the epidermii are straight with striated cuticle containing paracytic stomata on the lower side;below upper epidermis single row of closely packed palisade layer followed by multilayered, irregular, thin-walled cells of spongy parenchyma without intercellular spaces; idioblasts containing oil globules present in mesophyll and also in palisade; lower epidermis covered externally with cuticle; lamina intervened by several small veinlets; vascular bundles covered with thick-walled fibres on both side; palisade ratio 2 to 3; stomatal index 14 to 15 for lower surface; vein-islet number 7 to 11 per square mm.

Powder:

Light green; shows fragments of unicellular, multicellular trichomes, parenchyma cells, epidermal cells with wavy walls and paracytic stomata; oil globules, oil cells and pitted spiral or scalariform vessels.

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	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	9	per cent, Appendix	2.2.7.
Volatile oil	Not less than	1	per cent v/w Appendix	2.2.10.

T.L.C.

T.L.C. of Toluene extractive of Alcoholic extract on silica gel 'G' plate using Toluene : Ethyl acetate (9:1) v/v, under UV (366 nm) shows five fluorescent zones visible at Rf. 0.27, 0.31, 0.38, 0.50 and 0.60 (all red).

CONSTITUENTS

β - Caryophyllene, linalool, caryophyllene oxide, d -β- phellandrene, eugenol, α and β - pinene, p- cymene, 3, 4', 5, 7 -tetrahydroxy flavone, 3, 3', 4', 5,7 - O- pentahydroxy flavone, kaempferol - 3-O-glucopyranoside, kaempferol - 3-O-sophoroside, quercetin 3-O-rutinoside.

PROPERTIES AND ACTIONS

Cuvai : Kārppu (கார்ப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை), Maṅkal (மங்கல்)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Veppamuṇḍākki (வெப்பமுண்டாக்கி), Viyarvaiyuṇḍākki (வியர்வையுண்டாக்கி)

IMPORTANT FORMULATIONS

Arakku Tailam (அரக்கு தைலம்), Kaṇattailam (கணத்தைலம்), Makāvallāti Iḷakam (மகாவல்லாதி இளகம்), Tāḷicāti Vaḍakam (தாளிசாதி வடகம்), Tippili Irācāyaṉam (திப்பிலி இராசாயனம்)

THERAPEUTIC USES

Cuvācam/Cuvācakācam (சுவாசம்/சுவாசகாசம்), Irumal (இருமல்), Mēkacuram (மேகசுரம்), Mēkakkaḍḍi (மேகக்கட்டி), Nīrvēḍkai (நீர்வேட்கை), Porumal (பொருமல்), Vānti (வாந்தி), Veḍḍai (வெட்டை)

DOSE - Powder 1- 3 g

IÑCI (Fresh Rhizome) - இஞ்சி

Iñci is the fresh rhizome of ***Zingiber officinale*** Rosc. (Fam. Zingiberaceae), a herbaceous rhizomatous perennial, reaching up to 90 cm. in height, extensively cultivated in India. Rhizomes are dug in January to February, buds and roots are removed and washed well. It grows in Kuṟiñci and Marutham thiṇai.

SYNONYMS

Tamil	:	Ārttarakam (ஆர்த்தரகம்), Allam (அல்லம்), Narumaruppu Matil (நருமருப்பு மதில்)
Bengali	:	Ada
English	:	Ginger
Gujrati	:	Adu
Hindi	:	Adarakha
Kannada	:	Alla, Hasishunti
Malayalam	:	Inchi
Marathi	:	Ardrak, Ale
Punjabi	:	Adi, Adrak
Sanskrit	:	Ardraka, Katubhadra, Srngavera
Telugu	:	Allamu, Allam
Urdu	:	Adrak

DESCRIPTION

a) Macroscopic

Drug occurs as entire rhizome or in pieces, rhizome laterally compressed bearing flattish ovate, oblique branches on upper side, each having a depressed scar at its apex, pieces 5 to 15 cm. long, 1.5 to 6.5 cm. wide (usually 3 to 4 cm.) and 1 to 1.5 cm. thick, fracture short with projecting fibres, transversely cut surface shows a wide central stele having numerous greyish cut ends of fibres and yellow secreting cells; odour characteristic; taste pungent.

b) Microscopic

Rhizome - Shows a few layered, irregularly arranged, tangentially elongated, brown cells of outer cork and 6 to 12 rows of thin-walled, colourless, radially arranged cells of inner cork; secondary cortex consisting of hexagonal to polygonal, isodiametric, thin-walled, parenchymatous cells containing numerous circular to oval starch grains with characteristic striations and hilum at one end measuring 5 to 25 mm in dia., idioblasts containing large yellowish to brownish globules of oleo-resin; walls of oil cells suberised; numerous closed, conjoint, collateral, cortical fibro-vascular

bundles scattered throughout cortical zone, greater number occurring in inner cortical region, larger bundles consists of 2 to 7 vessels, small cells of sieve tube, polygonal cells of parenchyma and group of fibres; vessels showing reticulate, scalariform and spiral thickening; fibres septate with a few oblique pores on their walls; endodermis single layered, free from starch; pericycle single layered enclosing central stele; stele consisting of thin-walled polygonal, isodiametric cells of parenchyma, filled with abundant starch grains, oleo-resin cells similar to those present in cortex; fibrovascular bundles of two types, those arranged along pericycle in a definite ring are smaller in size and devoid of fibres, vessels 2 to 5 in number, larger bundles found scattered throughout stele, composed of xylem, phloem, parenchyma and sheath of sclerenchyma.

Powder:

Light yellow; shows thin-walled parenchyma cells; septate fibres with oblique, elongated pits on their walls, reticulate and spiral vessels; oleo-resin cells abundant; single starch grains of varying shapes with eccentric hilum, measuring 5 to 25 mm in diameter.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	0.5	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	5	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	2	per cent, Appendix	2.2.7.
Moisture content	Not more than	90	percent, Appendix	2.2.9.

T.L.C.

T.L.C. of Alcoholic extract of drug on silica gel 'G' plate using Benzene: Ethyl acetate (9:1) shows in visible light four spots are seen at Rf. 0.16, 0.35, 0.63 & 0.69 (all light yellow). Under UV (366 nm), three fluorescent zones appear at Rf. 0.16(blue), 0.63(grey) & 0.69 (grey). On exposure to iodine vapours eleven spots appear at Rf. 0.03, 0.08, 0.13, 0.16, 0.35, 0.47, 0.63, 0.69, 0.76, 0.83 & 0.92 (all yellow). On spraying with Vanillin- Sulphuric acid reagent & heating the plate at 105ºC until the colour develops, the plate shows eight spots at Rf. 0.08(violet), 0.16 (brownish violet), 0.35 (light violet), 0.47 (light violet). 0.63 (light violet), 0.69 (light violet), 0.76 (violet) and 0.92 (violet).

CONSTITUENTS

Volatile oil containing cineole, zingiberol, zingiberene, bisabolene and phellandrene, gingerdione, dihydrogingerol, dexahydrocurcumin and desmethyl - hexahydrocurcumin, dehydrogingerdione.

PROPERTIES AND ACTIONS

Cuvai : Kārppu (கார்ப்பு)

Guṇam : Kūrmai (கூர்மை), Tiṇmai (திண்மை), Va̲ṛaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Ceripuṇḍākki (செரிப்புண்டாக்கி), Kāyakaṟpamākki (காயகற்பமாக்கி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Umiẕnīrperukki (உமிழ்நீர்பெருக்கி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Iñci Cūraṇam (இஞ்சி சூரணம்), Iñci Iracāyaṉam (இஞ்சி இரசாயனம்), Iñci Vaḍakam (இஞ்சி வடகம்), Kantaka Paṟpam (கந்தக பற்பம்), Kanti Meẕuku (கந்தி மெழுகு), Kummaḍḍik Kuẕampu (கும்மட்டிக் குழம்பு), Nārathtai Iḷakam (நாரத்தை இளகம்), Pāvaṉakkaḍukkāy (பாவனக்கடுக்காய்), Pirammāṉanta Pairavam (பிரம்மானந்த பைரவம்), Vacanta Kucumākaram (வசந்த குசுமாகரம்)

THERAPEUTIC USES

Caṉṉi (சன்னி), Ceriyākkaẕiccal (செரியாக்கழிச்சல்), Ceriyāmai (செரியாமை), Irumal (இருமல்), Mukkuṟṟanōy (முக்குற்றநோய்), Vali Nōy (வலி நோய்), Aẕal Nōy (அழல் நோய்)

DOSE - 2 - 3 ml of juice with honey.

KACAKACĀ (Seed) - கசகசா

Kacakacā is the seed of ***Papaver somniferum*** L. (Fam. Papaveraceae), a glaucous, erect, annual herb, 60 to 120 cm. high, cultivated under State control in certain areas of Rajasthan, Madhya Pradesh and Uttar Pradesh. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Apiṉi (அபினி), Pōsttakkāy (போஸ்த்தக்காய்)
Bengali	:	Aaphim postadaanaa, Postabeej
English	:	Opium, Poppy seeds
Gujrati	:	Khaskhas
Hindi	:	Apheem, Postadaanaa, Khaskhas, Khasabija
Kannada	:	Gasgase, Aapheen, Aphini
Malayalam	:	Avil, Karappu, Kashkash, Aalan
Marathi	:	Khaskhas
Oriya	:	Aapu
Sanskrit	:	Ajasrngi, Madhunasini, Khaskhasa
Telugu	:	Gasgashaalu, Nallamandu
Urdu	:	Apheem

DESCRIPTION

a) Macroscopic

Seeds are small, about 1.0 to 1.15 mm. long, round to reniform or kidney shaped, generally dirty white, occasionally found mingled with a few brownish or greyish coloured seeds; surface coarsely reticulated, larger network enclosing within, numerous irregular smaller reticulations; hilum and micropyle are situated in the notch on the lateral side near the smaller end; seeds are odourless and oily in taste.

b) Microscopic

Testa is composed of 5 distinct cell layers, outermost layer of epidermal cells corresponding to the surface reticulations; the next layer consists of polygonal or elongated cells containing minute microsphenoidal crystals of calcium oxalate and below this is a single layer of thick walled unlignified elongated cells; this layer is followed by a single layer of thin walled cells; testa is limited internally by a single layer or elongated palisade like cells with reticulately thickened walls; central portion of the seed is occupied by polygonal parenchymatous cells of endosperm containing abundant oil drops and aleurone grains; embryo is slightly curved, radicle rod like, bearing 2, or

rarely 3, cotyledonary leaves, embedded in the oily endosperm; contents of the cotyledon are similar to those of endosperm.

Powder:

Light brown; coarse, not free flowing, clot or ball forming; shows large fatty oil droplets, characteristic penta to hexagonal testa cells; endosperm and reticulate layer cells; cells containing characteristic crystal and fibres.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than 1 per cent, Appendix	2.2.2.
Total Ash	Not more than 8 per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than 1.5 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 13 per cent, Appendix	2.2.7.
Fixed oil	Not less than 19 per cent, Appendix	2.2.8.

T.L.C.

T.L.C. of Hexane extract on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm thickness using Toluene: Acetone (93:07) shows five spots at Rf. 0.25, 0.39, 0.50, 0.76 and 0.83, on spraying with Vanillin -Sulphuric acid reagent and heating the plate for five minutes at 105ºC.

CONSTITUENTS

Morphine, codeine, thebaine, narcotine, narceine, papaverine; 6-Acetonyl dihydrosanguinarine, cryptopine, allocryptopine, ß-allocryptopine, berberine, canadine, codamine, codeine, codeine-N-oxide, codeinone, captisine, coreximine, corytuberine, dihydroprotopine, dihydrosanguinarine, glaudine, gnoscopine, hydrocotamine, 10-hydroxycodeine, lanthopine, laudanine, laudanidine, laudanosine, magnoflorine, 6-methylcodeine, N-methyl-14-O-demethylepiporphyroxine, morphine-N-oxide, narceine imide, narcotoline, neopine, normorphine, nornarceine, norsanguinarine, orientaline, oripavine, 13-oxocryptopine, oxysanguinarine, palaudine, papaveraldine, papaveramine, papaverrubines C and D, protopine, pseudomorphine, reticuline, salutaridine, sanguinarine, scoulerine, stepholidine, thebaine-N-oxide, tetrahydropapaverine, narcotine-methohydroxide, choline, oxydimorphine, pacodine,1-pentanol, 1-hexanal,1- hexanol, 2-pentyl furan, fatty acids, amino acids, albumin, pectin and sugars.

PROPERTIES AND ACTIONS

Cuvai	:	I**ṉ**ippu (இனிப்பு)
Guṇam	:	Tiṉmai (திண்மை)
Vī**rium**	:	Veppam (வெப்பம்)
Pirivu	:	I**ṉ**ippu (இனிப்பு)

Ceykai : Amaitiyūṭṭi (அமைதியூட்டி), Tuvarppi (துவர்ப்பி), Uḷḷaẕalāṟṟi (உள்ளழலாற்றி), Uḍaluramākki (உடலுரமாக்கி)

IMPORTANT FORMULATIONS

Mēkaviraṇak Kaḷimpu (மேகவிரணக் களிம்பு), Nanthi Meẕuku (நந்தி மெழுகு)

THERAPEUTIC USES

Āṇmaikkuṟaivu (ஆண்மைக்குறைவு), Cītakkaẕiccal (சீதக்கழிச்சல்), Kurutikkaẕiccal (குருதிக்கழிச்சல்), Kuḍaṟpuẕu (குடற்புழு), Talaikkaṇam (தலைக்கனம்), Tiṇavu (தினவு), Tūkkamiṇmai (தூக்கமின்மை), Uḍal Nalivu (உடல் நலிவு)

DOSE - Powder 3 - 5 g

10 ml kacakaca milk.

15 g seeds ground with 15 ml of water for preparing kacakaca milk.

KĀKKAṆA VĒR (Root) - காக்கண வேர்

Kākkaṇavēr is the dried root of *Clitoria ternatea* L. (Fam. Fabaceae), a perennial climber with slender downy stem, found commonly throughout India, being cultivated in gardens every where and often also found growing over hedges and thickets. It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Caṅku Puṣpam (சங்கு புஷ்பம்), Kākkaḍḍāṉ (காக்கட்டான்)
Assamese	:	Aparajita
Bengali	:	Aparajita
English	:	Clitoria, Conch flower
Gujrati	:	Gokarni
Hindi	:	Aparajita
Kannada	:	Girikarnika Balli, Girikarnika
Malayalam	:	Shankhapushapam
Marathi	:	Gokarna, Aparajita
Oriya	:	Aparajita
Punjabi	:	Koyal
Sanskrit	:	Aparajita, Girikarnika, Visnukranta
Telugu	:	Dintena

DESCRIPTION

a) Macroscopic

Drug consisting of a stout tap root with a few tortuous branches, cylindrical, 1 to 5 m. in thickness, a few places show cracks due to presence of lenticels, colour light-brown; fracture fibrous; taste bitter.

b) Microscopic

Root - Shows 10 to 20 or more layers of rectangular, thin-walled, tangentially elongated exfoliating cork cells; secondary cortex consists of 10 to 12 rows of large, polygonal, thin-walled cells filled with starch grains; a few cells contain prismatic crystals of calcium oxalate in this region; single or groups of 2 to 10 lignified cortical fibres, distributed in the lower half of the cortex; secondary phloem consists of usual elements; phloem fibres 2 to 8 in groups, a few solitary fibres also present, very long, thin-walled with narrow lumen and pointed tips; secondary xylem consists of usual elements; vessels mostly occur 2 or 3 in groups, with oblong bordered pits and have short conical tail at one end, xylem fibres similar to those of phloem fibres, a few showing slit-like pits; medullary rays 1 to 5 cells wide, oblong and pitted; xylem parenchyma irregular in shape with

pitted walls; starch grains simple as well as compound having 2 to 6 components, single grains measuring upto 13 mm in dia., found in secondary cortex, phloem and xylem parenchyma.

Powder:

Yellowish-brown; shows simple and compound starch grains, measuring 3 to 13 mm in dia., tailed vessels with oblong bordered pits and fragments of fibres.

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 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 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 Chloroform: Ethyl acetate: Formic Acid (5:4:1) v/v shows one spot at Rf. 0.79 (dull yellow) in visible light. Under UV (366 nm) a spot is seen at Rf. 0.79(blue). On exposure to iodine vapours two spots appear at Rf. 0.54 and 0.79 (both yellow). On spraying with 10 % aqueous solution of Ferric chloride, the plate shows one spot at Rf. 0.79 (grey).

CONSTITUENTS

Kaempferol, cyanins- ternatins A1, A2, B1, B2, D1 and D2, taraxerol.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை), Va̲ṛaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ci̲ṛunīrperukki (சிறுநீர்பெருக்கி), Peruṅka̲ziccaluṇḍākki (பெருங்கழிச்சலுண்டாக்கி), U̲ḷḷa̲zalā̲ṛṛi (உள்ளழலாற்றி)

IMPORTANT FORMULATIONS

Kākkaṇa Māttirai (காக்கண மாத்திரை)

THERAPEUTIC USES

Curam/Kāyccal (சுரம்/காய்ச்சல்), Kaṇ Nōy (கண் நோய்), Kuḍa̲rpuz̲u (குடற்புழு), Māntam (மாந்தம்), Veḷḷai (வெள்ளை)

DOSE - Powder 250 - 500 mg for children

750 mg - 1.5 g for adults.

KAÑCĀ (Leaf) - கஞ்சா

Kañcā is the dried leaf of ***Cannabis sativa*** L. (Fam. Cannabinaceae), an annual, erect, dioecious herb, upto 2 m. high, found wild almost throughout the year, in the Sub-Himalayan tracts in India and abundantly found in waste lands from Punjab eastwards to Bengal and extending Southwards. The leaves are subjected to purification process (cutti) before use. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil : Aṉanta Mūli (அனந்த மூலி), Civa Mūli (சிவ மூலி), Kōrakai (கோரகை), Kōrakkar Mūli (கோரக்கர் மூலி), Paṅki (பங்கி)

Assamese : Bhan, Bhang

Bengali : Bhang, Sidhi

English : Indian hemp

Gujrati : Bhang

Hindi : Bhaang, Bhanga

Kannada : Bhangigida, Ganjagida

Kashmiri : Pang, Bangi

Malayalam : Kanchavu

Marathi : Bhang, Ganja

Oriya : Bhanga, Ganjei

Punjabi : Bhang

Sanskrit : Vijaya, Bhanga, Madani

Telugu : Ganjayi

Urdu : Qinaab, Bhang

DESCRIPTION

a) Macroscopic

Leaves palmately compound, leaflets linear, lanceolate with serrate margins, 5 to 20 cm. long, pointed, narrow at base, upper surface dark green and rough, lower pale, downy; leaves of female plants longer than the male; odour strong and characteristic; taste slightly acrid.

b) Microscopic

Transverse section of leaves and bracts shows dorsiventral surface; upper epidermis with unicellular, pointed, curved, conical trichomes with enlarged bases containing cystoliths of calcium

carbonate; mesophyll contains cluster crystals of calcium oxalate in many cells consisting of usually one layer of palisade cell and spongy tissue; trichomes on lower epidermis conical, longer, 340 to 500 µm but without cystoliths; numerous glandular trichomes, sessile or with a multicellular stalk and a head of about eight radiating, club-shaped cells secreting oleo-resin, present in the lower epidermis especially on mid-rib; bracteoles with undifferentiated mesophyll and on lower surface bear numerous glandular trichomes; in surface view the upper epidermis devoid of stomata and lower epidermis shows sinuous walls with anomocytic stomata: palisade ratio 9 to 14; stomatal index 13 to 20 for lower surface; vein-islet number 22 to 28 per square mm.

Powder:

Green; shows fragments of epidermal cells with anomocytic stomata, numerous multicellular trichomes with or without cystolith; palisade cells, parenchyma cells with cluster crystals of calcium oxalate and fragments of vessels with spiral thickenings.

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	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	13	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Toluene soluble fraction of methanol extract on silical gel 'G' plate using n-Hexane: Diethyl ether (8:2) v/v, shows under UV (366 nm) one blue fluorescent spot at Rf. 0.14. On spraying with fast blue salt 'B' followed by 5% Alcoholic Potassium hydroxide five spots appear at Rf. 0.21, 0.31, 0.38, 0.43 and 0.51 (all red).

CONSTITUENTS

Cannabinol, tetrahydrocannabinol, cannabidiol, cannabichrome, cannabicitran, cannabicyclol, cannabigerol, cannabiglendol, cannabiallsvin, cannabitatrol, cannabinodiol, cannabicumaronone, flavocannobicide, flavosativaside, orientin, vitexin, quercetin, kaempferol. Essential oil-á pinene, myrcene, trans-ß-ocimene á-terpinolene, trans caryophyllene and á-humulene.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Icivakaṟṟi (இசிவகற்றி), Kāyakaṟpamākki (காயகற்பமாக்கி), Kāmamperukki (காமம்பெருக்கி), Mūrccaiyuṇṭākki

(மூர்ச்சையுண்டாக்கி), Peruvaliyuṇḍākki (பெருவலியுண்டாக்கி), Tuyaraḍakki (துயரடக்கி), Uṟakkameẕuppi (உறக்கமெழுப்பி), Uṟakkamuṇḍākki (உறக்கமுண்டாக்கி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Kapāḍa Mātthirai (கபாட மாத்திரை), Ūẕi Māttirai (ஊழி மாத்திரை), Vāẕaippu Vaḍakam (வாழைப்பு வடகம்)

THERAPEUTIC USES

Kakkirumal/Kakkuvāṉ Irumal (கக்கிருமல்/கக்குவான் இருமல்), Mikupaci (மிகுபசி), Narampu Vali (நரம்பு வலி), Oṟṟaittalaivali (ஒற்றைத்தலைவலி), Perumpāḍu (பெரும்பாடு), Vānti Pēti (வாந்தி பேதி)

DOSE - It cannot be administered as a single drug It should be used in combination.

KAṆḌAṄKATHTHIRI CAMŪLAM (Whole Plant) - கண்டங்கத்திரி சமூலம்

Kaṇḍaṅkaththiri Camūlam is the mature, dried whole plant of ***Solanum surattense*** Burm.f., Syn. ***Solanum xanthocarpum*** Schrad. & Wendl. S. ***virginianum*** L. (Fam. Solanaceae), a perennial, very prickly diffused herb of waste lands; found throughout India. It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Kaṇḍaṅkattiri (கண்டங்கத்திரி)
Assamese	:	Kantakar, Katvaedana
Bengali	:	Kantakari
English	:	Febrifuge plant
Gujrati	:	Bharingani
Hindi	:	Bhatakataiya, Chhotikateri, Katai, Katali, Ringani
Kannada	:	Kiragulla, Nelagulla
Malayalam	:	Kantakari chunda
Marathi	:	Bhauringani, Kataringani
Oriya	:	Ankarati, Bhejibaugna, Chakada Bhoji
Punjabi	:	Kandiari
Sanskrit	:	Dhavani, Kantakari, Kantakarika, Ksudra, Nidigdhika, Vyaghri, Nidigdha, Dusparsa
Telugu	:	Chinnamulaka, Mulaka, Nelamulaka, Pinnamulaka, Vakudu

DESCRIPTION

a) Macroscopic

Root - 10 to 45 cm. long, few mm. to two cm. in diameter, almost cylindrical and tapering, bearing a number of fine longitudinal and few transverse wrinkles with occasional scars or a few lenticels and small rootlets, transversely smoothened surface shows a thin bark and wide compact cylinder of wood; fracture short; taste bitter.

Stem - Herbaceous, prickly with prominent nodes and internodes, green when fresh, young branches covered with numerous hairs, mature ones glabrous, furrows more prominent in young stem appearing almost circular towards basal region, stem pieces 8 to 10 mm. thick of variable length; external surface light green, when dry, surface yellowish green and smooth; transversely smoothened surface shows a very thin bark and a prominent wood; center shows a large and distinct pith; mature and dry stem often with a hollow pith; fracture short to slightly fibrous.

Leaf - Petiolate, exstipulate, ovate-oblong or elliptic, sinuate or sub-pinnatifid, sub-acute hairy; 4 to 12.5 cm. long and 2 to 7.5 cm. wide; green; veins and midrib full with sharp prickles; odour and taste not distinct.

Flower - Ebracteate, pedicellate, bisexual, pentamerous, regular, complete, bright blue or bluish purple; calyx-persistent, gamosepalous, tube short, globose, linear-lanceolate, acute, hairy, 0.5 to 1.3 cm. long and densely prickly; corolla-gamopetalous, lobes deltoid, acute, hairy; 1 to 2 cm. long and purple in colour; stamens 5, epipetalous, basifixed, filament short 1 to 1.5 mm. long; anther, oblong lanceolate, 0.7 to 0.8 cm. long; ovary superior, ovoid, glabrous, bilocular with axile placentation having numerous ovules.

Fruit - Berry, globular, measuring 0.8 to 1 cm. in diameter, surrounded by persistent calyx at base; unripe fruits variegated with green and white strips; ripe fruit shows yellow and white shades.

Seeds - Circular, flat, numerous, embedded in a fleshy mesocarp, about 0.2 cm. in diameter, glabrous; taste bitter and acrid.

b) Microscopic

Root - Transverse section of mature root shows cork composing of 3 to 6 layers of thin-walled, rectangular and tangentially elongated cells; cork cambium single layered followed by 6 to 15 layers of thin-walled, tangentially elongated to oval or circular parenchymatous cells; stone cells either single or in groups of 2 to 20 or even more present in this region; secondary phloem composed of sieve elements and phloem parenchyma traversed by medullary rays; stone cells present in singles or in groups of 2 to 20 or more in outer, and middle phloem regions; phloem rays 1 to 4 cells wide and 2 to 22 cells high; cambium 3 to 5 layers of thin-walled rectangular cells; xylem composed of vessels, tracheids, fibre tracheids, parenchyma and traversed by medullary rays, all elements being lignified; vessels and tracheids with bordered pits; fibres with a few simple pits; xylem parenchyma rectangular or slightly elongated with simple pits and rarely with reticulate thickening; xylem rays 1 to 3 cells wide and 1 to 20 cells high; microsphenoidal crystals of calcium oxalate as sandy masses and simple starch grains present in secondary cortex, phloem and medullary rays.

Stem - Transverse section of mature stem, 1.5 to 2 cm. thick consists of 6 to 12 layers of cork of thin-walled somewhat rectangular cells; secondary cortex consists of 7 to 11 layers of parenchymatous cells, some cells thickened and lignified forming stone cells; primary cortex remains intact even in quite mature stage but later gets crushed; pericyclic fibre, occur singly or in small groups of 2 or 3; secondary phloem consists of sieve elements, parenchyma, a few fibres, stone cells and traversed by phloem rays; fibres found scattered in singles or in small groups in outer and middle phloem region; inner phloem devoid of fibres; stone cells present in singles or in small groups of 2 to 4; phloem rays, 1 or 2 or rarely 3 cells wide, cambium composed of 2 or 3 layers; xylem consists of vessels, tracheids, parenchyma, fibres and traversed by xylem rays; vessels vary greatly in shape and size and show bordered pits; tracheids elongated with irregular walls and bordered pits; fibres much elongated, thick-walled and lignified with tapering and pointed ends, some having truncated ends or bifurcated at one or both ends with a few simple pits; tracheids fibres smaller than fibres, with both ends tapering and have reticulate thickening; xylem parenchyma cubical to rectangular with simple or bordered pits or reticulate thickening; xylem rays conspicuous by their pitted thickenings, longer size and radial elongation of cells, 1 or 2 or rarely 3 cells wide and 2 to 25 cells high; internal phloem composed of sieve elements and parenchyma, forming more or less continuous band and embedded in perimedullary zone; a few phloem fibres similar to those of outer phloem region also present; central region occupied by a large pith;

microsphenoidal crystals of calcium oxalate as sandy masses and simple starch grains present in cortex, secondary cortex, phloem, medullary rays and pith cells.

Leaf

Petiole - Transverse section of petiole shows circular to wavy outlines; epidermis single layered, covered externally by a thick cuticle; hypodermis consists of 3 or 4 layers of collenchymatous cells; one largecresent-shaped, bicollateral, central vascular bundle and two small lateral bundles present; rest of tissue of petiole composed of polygonal, angular, thin-walled, parenchymatous cells; epidermis shows mostly stellate and rarely uni to tricellular hairs.

Midrib - Transverse section of midrib shows a biconvex structure; epidermis on either side covered externally by a thick cuticle; below epidermis 3 or 4 layers of collenchyma present; stele composed of crescent-shaped, bicollateral, central vascular bundle and two small lateral vascular bundles; rest of tissue composed of thin-walled, parenchyma, some stellate hair present on epidermis.

Lamina - Transverse section shows dorsiventral structure; epidermis on either side, wavy in outline, covered externally by a thick cuticle; palisade single layered; 4 to 6 layers of loosely arranged spongy parenchyma present; some stellate hairs (4 to 8 armed) present on both sides of epidermis; anisocytic stomata present on both surfaces; palisade ratio 2 to 4; stomatal index 20 to 25 on lower epidermis, 14 to 24 on upper epidermis; vein-islet number 50 to 80 per square mm.

Fruit - Transverse section of mature fruit shows single layered epidermis, covered externally by a thin cuticle; 1 or 2 layers of collenchyma present below epidermis; mesocarp composed of thin-walled, oval to polygonal cells; some fibro vascular bundles present, scattered; seed consists of thick-walled radially elongated testa, narrow endosperm with embryo; some cells of endosperm contain oil globules.

Powder:

Greenish; shows single or groups of stone cells; groups of aseptate fibres with tapering ends, pitted vessels; groups of spongy parenchyma, fragments of palisade tissue; anisocytic stomata; stellate hairs and simple, rounded to oval starch grains measuring upto 11 μm in diameter.

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	3	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	16	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Chloroform extractive of Alcoholic extract on silica gel 'G' plate using Chloroform: Methanol (9:1), on spraying with Anisaldehyde -Sulphuric acid reagent and heating the plate for five minutes at 105°C minutes ten spots appear at 0.28 (violet), 0.34 (violet), 0.49

(violet), 0.55 (violet), 0.58 (violet), 0.78(violet), 0.84, 0.88, 0.92 (all pinkish violet) and 0.96 (violet).

CONSTITUENTS

Solasodine, solamargine, β- solamargine, solasonine, cycloartenol, neocarpesterol, cholesterol and their derivatives.

PROPERTIES AND ACTIONS

Cuvai : Kārppu (கார்ப்பு)

Guṇam : Ilaku (இலகு), Va̲ṛaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvaka̲ṛṛi (அகட்டுவாய்வகற்றி), Ci̲runīrperukki (சிறுநீர்பெருக்கி), Kōz̲aiyaka̲ṛṛi (கோழையகற்றி), Peruṅkaz̲iccaluṇḍākki (பெருங்கழிச்சலுண்டாக்கி)

IMPORTANT FORMULATIONS

Vātacurak Kuḍinīr (வாதசுரக் குடிநீர்)

THERAPEUTIC USES

Curam/Kāyccal (சுரம்/காய்ச்சல்), Iḷaippu Nōy (இளைப்பு நோய்), Irumal (இருமல்), Nīrkōvai (நீர்கோவை), Pacittīkku̲raivu (பசித்தீக்குறைவு), Iraippu (இரைப்பு)

DOSE - Powder 2 - 4 g

Juice 5 - 10 ml

Decoction 30- 50 ml twice daily.

15 - 30 g coarse powder in 200 ml of water for preparing decoction.

KĀRPŌKARICI (Fruit) - கார்போகரிசி

Kārpōkarici is the dried fruit of ***Psoralea corylifolia*** L. (Fam. Fabaceae), an erect, 0.3 to 1.8 m. high annual herb distributed throughout India, found commonly in Uttar Pradesh, Bengal and Maharashtra.It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Akkantam (அக்கந்தம்), Pākuci (பாகுசி)
Assamese	:	Habucha
Bengali	:	Bakuchi, Somraji, Fiakucha Veeja
Gujrati	:	Bavachi
Hindi	:	Bakuchi, Bavachi, Babchi
Kannada	:	Bauchige, Bhavantibeeja, Bhavanchigid, Baukuchi
Kashmiri	:	Babchi
Malayalam	:	Karkokil
Marathi	:	Bawchi
Oriya	:	Bakuchi
Punjabi	:	Babchi, Bavchi
Sanskrit	:	Bakuci, Avalguja, Somaraji
Telugu	:	Bavanchalu
Urdu	:	Babchi

DESCRIPTION

a) Macroscopic

Fruits dark chocolate to almost black with pericarp adhering to the seed-coat, 3 to 4.5 mm. long, 2 to 3 mm. broad, ovoid-oblong or bean shaped, somewhat compressed, glabrous rounded or mucronate, closely pitted; seeds camphylotropous, non-endospermous, oily and free from starch; odourless, but when chewed smell of a pungent essential oil felt; taste bitter, unpleasant and acrid.

b) Microscopic

Transverse section of fruit shows pericarp with prominent ridges and depressions, consisting of collapsed parenchyma and large secretory glands containing oleo-resinous matter; testa, an outer layer of palisade epidermis, layer of bearer cells which are much thickened in the inner tangential and basal radial walls and 2 or 3 layers of parenchyma; cotyledons of polyhedral parenchyma and three layers of palisade cells on the adaxial side.

Powder:

Dark brown, oily; shows fragments of parenchyma cells containing oil globules and aleurone grains; palisade-like cells of testa; epidermal cells with brown contents, bearer cells of hypodermis and fragments of oil cells.

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	13	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	11	per cent, Appendix	2.2.7.

ASSAY

TLC densitometric estimation of psoralen.

TLC plates

Aluminium plate precoated with silica gel 60 F_{254} plates (E. Merck) 0.2 mm thickness.

Solvent system

Toluene: Ethyl acetate (7: 3).

Test solution

2.0 g of powdered drug is macerated in 75 ml methanol on a boiling water bath for 10 to 15 min., cooled and filtered. The process is repeated thrice. The filtered extracts are pooled and evaporated to dryness. The residue is dissolved in 100 ml methanol.

Standard solution

12.5 mg of standard, psoralen is dissolved in 25 ml of methanol in a volumetric flask. From this stock solution, standard solutions of 50 to 250 µg/ml concentration are prepared by taking aliquots (1.0 to 5.0 ml) of stock solution in 10 ml volumetric flasks and adjusting the volume to 10 ml with methanol.

Calibration curve

5 µl each of the standard solution (250 to 1250 ng per spot) is applied on TLC plate. The plate is developed in the solvent system to a distance of 8 cm. The plate is scanned under UV light at 366 nm. The area under the curves are recorded and plotted to get the calibration curve for psoralen.

Estimation of psoralen in the drug

5 µl of the test solution is applied on TLC plate. The plate is developed in the solvent system and recorded the chromatogram as described above for the calibration curve. The amount of psoralen present in the sample is calculated from the calibration curve of psoralen.

The percentage of psoralen ranges from 0.70 to 0.76 in the samples analyzed.

T.L.C.

T.L.C. of the Alcoholic extract on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm thickness using Toluene: Ethyl acetate (9:1) shows ten spots under UV light (366 nm) at Rf. 0.08 (blue), 0.12 (black), 0.15 (yellow), 0.24 (sky blue), 0.26 (blue), 0.29 (yellow), 0.35 (sky blue), 0.47 (blue), 0.55 (blue) and 0.62 (blue). On exposure to iodine vapours seven spots appear at Rf. 0.08, 0.12, 0.15, 0.24, 0.31, 0.41 and 0.62 (all yellow). With Anisaldehyde -Sulphuric acid reagent and heating the plate for five minutes at 105ºC eight spots appear at Rf. 0.12, (blue), 0.15 (yellow), 0.19 (blue), 0.24 (blue), 0.41 (violet), 0.44 (violet), 0.62(blue) and 0.72 (pink).

CONSTITUENTS

Psoralen, psoralidin, isopsoralen, bakuchiol, angelicin, neobavaisoflavone, bavachin, 4'-0-methyl bavachalcone, isobavachalcone, corylin, corylinal, bakuchicin, β- sitosterol, stigmasterol, fatty acids, behanic, palmitic, stearic, oleic, lignoceric, linoleic, linolenic, essential oil and fixed oil.

PROPERTIES AND ACTIONS

Cuvai	:	Kaippu (கைப்பு)
Guṇam	:	Vaṟaḍci (வறட்சி)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)
Ceykai	:	Malamiḷakki (மலமிளக்கி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Iracakanthi Meẕuku (இரசகந்தி மெழுகு), Karappāṉ Tailam (கரப்பான் தைலம்), Makāvallāti Iḷakam (மகாவல்லாதி இளகம்), Mānta Eṇṇai Eṇ2 (மாந்த எண்ணை எண்2), Mēkaviraṇak Kaḷimpu (மேகவிரணக் களிம்பு)

THERAPEUTIC USES

Karappāṉ (கரப்பான்), Namaiccal (நமைச்சல்), Nañcu (நஞ்சு), Veṇ Paḍai (வெண் படை), Puṇ (புண்)

DOSE - Powder 1 - 2 g

KARUÑCEMPAI ILAI (Leaf) - கருஞ்செம்பை இலை

Karuñcempai Ilai is the dried leaf of ***Sesbania sesban*** (L.) Merr., Syn. ***S. aegyptiaca*** (Poir) Pers. (Fam: Fabaceae), a quick growing, short lived tall shrub, upto 6 m. high; found cultivated on paddy field bunds in Tamil Nadu as well as throughout the plains of India upto an altitude of 1200 m. It grows in Kuṟiñci and Marutham thiṇai.

SYNONYMS

Tamil	:	Karuñciṟṟakatti (கருஞ்சிற்றகத்தி)
Bengali	:	Jayanti
Gujrati	:	Rajashinganee, Jayanti
Hindi	:	Jaita, Jayata
Kannada	:	Arinintajinamgi, Karijimangai, Arishimajingai
Malayalam	:	Semp, Atti, Itthikkanni
Marathi	:	Jait
Oriya	:	Jayantipatra
Punjabi	:	Jainta
Sanskrit	:	Jayanti, Jaya, Suksma patra
Telugu	:	Sominta, Jalugu, Nelichettu

DESCRIPTION

a) Macroscopic

Leaves pinnately compound, 7.5 to 15.5 cm. long, rachis shortly produced above last pair of leaflet; paripinnate, leaflets 6 to 16 pairs, opposite, linear, oblong, glabrous, entire, mucronate to acuminate, very shortly stalked, 1.0 to 3.3 cm. long, 0.3 to 0.8 cm. wide.

b) Microscopic

Leaflet

Rachis - Shows single layered epidermis, followed by 2 or 3 layered collenchymatous and 4 to 7 layered round, thin-walled parenchymatous cells; vascular bundles arranged in a ring, having secretory cavities in phloem, each bundle covered externally by sclerenchymatous sheath; one smaller vascular bundle present in each of the wings; pith small, consisting of thin-walled, polygonal, parenchymatous cells.

Lamina - Shows single layered epidermis on both surfaces, stomata anisocytic, present on both surfaces, palisade single layered, spongy parenchyma consisting of round cells, small veins situated

between palisade and spongy parenchyma cells, palisade ratio 3 to 5; stomatal index on upper surface 11 to 20 and on lower surface 11 to 25 and vein- islet number 27 to 36 per square mm.

Powder:

Dull green; shows spongy parenchyma, palisade cells; xylem vessels with scalariform thickening and fragments of epidermal cells with anisocytic stomata.

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	7 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: Ethyl acetate (9:1) shows under UV (366 nm) shows six fluorescent zones at Rf. 0.05, 0.11 0.19, 0.29, 0.56 (all pink) and 0.97 (yellow). On exposure to iodine vapours ten spots appear at Rf. 0.05, 0.11, 0.19, 0.29, 0.37, 0.48, 0.56, 0.69, 0.91 and 0.97 (all yellow). On spraying with 5 % Methanolic-Phosphomolybdic acid reagent and heating the plate at 105ºC until the colour develops , the plate shows nine spots at Rf. 0.05, 0.11, 0.19, 0.29, 0.37, 0.48, 0.56, 0.91 and 0.97(all grey).

CONSTITUENTS

Stigmasterolglucoside, chikusetsusaponin, ilexoside, lablaboside A, kaikasaponin, kaempferol glucoside and oleanolic acid.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Puzukkolli (புழுக்கொல்லி), Rutuvuṇḍākki (ருதுவுண்டாக்கி), Tuvarppi (துவர்ப்பி), Veppamuṇḍākki (வெப்பமுண்டாக்கி), Vīkkaṅkaraicci (வீக்கங்கரைச்சி)

IMPORTANT FORMULATIONS

Cempu Paṟpam (செம்பு பற்பம்)

THERAPEUTIC USES

Aiya Nōykaḷ (ஐய நோய்கள்), Irumal (இருமல்), Perumpāḍu (பெரும்பாடு)

DOSE - Powder 3 - 6 g

Juice 5 - 10 ml

KARUÑCĪRAKAM (Seed) - கருஞ்சீரகம்

Karuñcīrakam is the dried seed of ***Nigella sativa*** L. (Fam. Ranunculaceae), a small herb, 45 to 60 cm. high; cultivated mostly in Punjab, Himachal Pradesh, Bihar and Assam. It grows in Mullai thiṇai.

SYNONYMS

Tamil	:	Āraṇam (ஆரணம்), Upakuñcikai (உபகுஞ்சிகை)
Bengali	:	Mota Kalajira, Kalajira
English	:	Small fennel, Nigella seed
Gujrati	:	Kalonji jeeru, Kalounji
Hindi	:	Kalaunji, Mangaraila
Kannada	:	Karijirige
Malayalam	:	Karinjirakam
Marathi	:	Kalaunji jire, Kalejire
Punjabi	:	Kalvanji
Sanskrit	:	Upakuncika, Sthulajiraka, Susavi
Telugu	:	Peddajila karra
Urdu	:	Kalongi

DESCRIPTION

a) Macroscopic

Seeds, flattened, oblong, angular, rugulose, tubercular, about 0.2 cm. long and 0.1 cm. wide, black; odour slightly aromatic; taste bitter.

b) Microscopic

Transverse section of seed shows single layer of epidermis consisting of elliptical, thick-walled cells covered externally by a papillose cuticle, filled with reddish-brown contents; epidermis followed by 2 to 4 layers of thick-walled, tangentially elongated, parenchymatous cells, followed by a pigmented layer composed of tangentially elongated, cylindrical thick-walled cells filled with reddish-brown pigments; below pigmented layer, a layer of parenchyma composed of thick-walled rectangular, radially elongated cells present; endosperm consists of moderately thick-walled, rectangular to polygonal cells; a few filled with oil globules; embryo embedded in endosperm.

Powder:

Black, oily to touch; shows groups of parenchyma, 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	6	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	20	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: glacial Acetic acid: Water (5:1:4) v/v upper phase, on spraying with Anisaldehyde -Sulphuric acid reagent and heating the plate for five minutes at 105°C seven spots appear at Rf. 0.24, 0.29 (both greenish grey), 0.56, 0.65 (both grey), 0.78, 0.89 (both violet) and 0.95 (red).

CONSTITUENTS

Nigellinine- N-oxide, nigellicine, arenasterol-5-ene, lophenol, α-hederin and fatty acids.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Va̲ṛaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvaka̲ṛṛi (அகட்டுவாய்வகற்றி), Ci̲runīrperukki (சிறுநீர்பெருக்கி), Pacittītūṇḍi (பசித்தீதூண்டி), Pā̲rperukki (பாற்பெருக்கி), Pu̲zukkolli (புழுக்கொல்லி), Rutuvuṇḍākki (ருதுவுண்டாக்கி), Tūkkuṇippu̲zukkolli (தூக்குணிப்புழுக்கொல்லி), Va̲ṛaḍciyaka̲ṛṛi (வறட்சியகற்றி)

IMPORTANT FORMULATIONS

Akattiyar Ku̲zampu (அகத்தியர் குழம்பு), Nākkuppūcci(Kolli) Kuḍinīr (நாக்குப்பூச்சி(கொல்லி) குடிநீர்), Pa̲ṛaṅkippaḍḍai Iracāya̲ṇam (பறங்கிப்பட்டை இரசாயனம்), Viṣakku̲zampu (விஷக்குழம்பு)

THERAPEUTIC USES

Ciraṅku (சிரங்கு), Kāmālai (காமாலை), Ku̲ṉmam (குன்மம்), Maṇḍaikkarappā̲ṉ (மண்டைக்கரப்பான்), Puṇ (புண்), Vayi̲ṛṛupporumal (வயிற்றுப்பொருமல்)

DOSE - Powder 500 mg - 4 g

KAḌUKURŌKIṆI (Rhizome and Root) - கடுகுரோகிணி

Kaḍukurōkiṇi is the dried rhizome and root of ***Picrorhiza kurroa*** Royle ex Benth. (Fam. Scrophulariaceae), a perennial, more or less hairy herb common on the north-western Himalayas from Kashmir to Sikkim. Rhizome is cut into small pieces after harvesting It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Kaḍakarōkiṉi (கடகரோகினி), Kaḍurōkiṉi (கடுரோகினி)
Assamese	:	Katki, Kutki
English	:	Hellebore
Gujrati	:	Kadu, Katu
Hindi	:	Kutki
Kannada	:	Katuka rohini
Malayalam	:	Kaduk rohini, Katuka rohini
Marathi	:	Kutki, Kalikutki
Oriya	:	Katuki
Punjabi	:	Karru, Kaur
Sanskrit	:	Katuka, Tikta, Tiktarohini, Katurohini, Katvi, Sutiktaka
Telugu	:	Katukarohini
Urdu	:	Kutki

DESCRIPTION

a) Macroscopic

Rhizome - 2.5 to 8 cm. long and 4 to 8 mm. thick, subcylindrical, straight or slightly curved, externally greyish-brown, surface rough due to longitudinal wrinkles, circular scars of roots and bud scales and sometimes roots attached, tip ends in a growing bud surrounded by tufted crown of leaves, at places cork exfoliates exposing dark cortex; fracture short; odour pleasant; taste bitter.

Root - Thin, cylindrical, 5 to 10 cm. long, 0.05 to 0.1 cm. in diameter, straight or slightly curved with a few longitudinal wrinkles and dotted scars, mostly attached with rhizomes, dusky grey, fracture short, inner surface black with whitish xylem; odour pleasant; taste bitter.

b) Microscopic

Rhizome - Shows 20 to 25 layers of cork consisting of tangentially elongated, suberised cells; cork cambium 1 or 2 layered; cortex single layered or absent, primary cortex persists in some cases, one or two small vascular bundles present in cortex; vascular bundles surrounded by single layered endodermis of thick-walled cells; secondary phloem composed of phloem parenchyma and a few scattered fibres; cambium 2 to 4 layered; secondary xylem consists of vessels, tracheids, xylem fibres and xylem parenchyma, vessels vary in shape and size having transverse oblique articulation; tracheids long, thick-walled, lignified, more or less cylindrical with blunt tapering ends; xylem parenchyma thin-walled and polygonal in shape; centre occupied by a small pith consisting of thin-walled cells; simple round to oval, starch grains, measuring upto 105 mm in dia., abundantly found in all cells.

Root - Young root shows single layered epidermis, some epidermal cells elongate forming unicellular hairs; hypodermis single layered; cortex 8 to 14 layered; consisting of oval to polygonal, thick-walled, parenchymatous cells; primary stele tetrach to heptarch, enclosed by single layered pericycle and single layered, thick-walled cells of endodermis; mature root shows 4 to 15 layers of cork, 1 or 2 layers of cork cambium; secondary phloem poorly developed; secondary xylem consisting of vessels, tracheids, parenchyma and fibres; vessels have varying shape and size, some cylindrical with tail-like, tapering ends, some drum shaped with perforation on end walls or lateral walls; tracheids cylindrical with tapering pointed ends; fibres aseptate, thick-walled, lignified with tapering blunt chiesel-like pointed ends.

Powder:

Dusky grey; shows groups of fragments of cork cells, thick-walled parenchyma; pitted vessels and aseptate fibres; simple, round to oval starch grains, measuring 25 to 104 mm in diameter.

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	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 of the drug on silica gel 'G' plate using Chloroform: Methanol (95:5) shows under UV light (366 nm) three fluorescent zones at Rf. 0.05 (blue), 0.30 (blue), 0.35(green). On exposure to iodine vapours nine spots appear at Rf. 0.10, 0.17, 0.21, 0.30, 0.37, 0.41, 0.62, 0.72 and 0.84(all yellow). On spraying with 5 % Methanolic -Sulphuric acid reagent and heating the plate at 105° C until the colour develops, the plate shows seven spots at Rf. 0.05, 0.10, 0.17, 0.21, 0.30, 0.41 & 0.84 (all brownish grey).

CONSTITUENTS

Cucurbitacin glycosides, Kutkoside, picroside I, II and III, pikuroside, catalpol, 6-feruloylcatalpol, neronicoside, minecoside, picein, androsin, 4-hydroxy-3-methoxyacetophenone, veronicoside, arvenine III, kutakin and apocynin.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Kuḍaṟpuzuvakaṟṟi (குடற்புழுவகற்றி), Muṟaiveppakaṟṟi (முறைவெப்பகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Peruṅkaziccaluṇḍākki (பெருங்கழிச்சலுண்டாக்கி)

IMPORTANT FORMULATIONS

Emataṇḍak Kuḷikai (எமதண்டக் குளிகை), Keḷacikar Kuzampu (கௌசிகர் குழம்பு), Murukkaṉ Vitai Māttirai (முருக்கன் விதை மாத்திரை), Nākkuppūcci(Kolli) Kuḍiṉīr (நாக்குப்பூச்சி(கொல்லி) குடிநீர்), Vallārai Ney (வல்லாரை நெய்)

THERAPEUTIC USES

Curam/Kāyccal (சுரம்/காய்ச்சல்), Īral Nōy (ஈரல் நோய்), Karappāṉ (கரப்பான்), Māntam (மாந்தம்), Puṅkaḷ (புண்கள்)

DOSE - Powder 500 mg - 1 g

KĀṆṆU CĪRAKAM (Fruit) - காட்டு சீரகம்

Kāṇṇu Cīrakam is the seed of *Vernonia anthelmintica* (L.) Willd. Syn. *Centratherum anthelminticum* (L.) Kuntze (Fam. Asteraceae), an annual, robust, erect herb, found throughout India upto 1850 m. in Himalaya and Khasi hills and often cultivated. It is a weed growing in waste places near villages and bears seeds in the month of May to June. It grows in Mullai, Marutham and Neythal thiṇai.

SYNONYMS

Tamil	:	Kāṇṇu Cīrakam (காட்டு சீரகம்), Caṉi Ñāyiṟu (சனி ஞாயிறு)
Bengali	:	Somaraaj
English	:	Purple fleabane, Worm seed fleabane
Gujrati	:	Kaaleejeeree, Kadavijeeree
Hindi	:	Kaalijeeree, Karajiri, Soharaai
Kannada	:	Kaadujeerage, Kaarijirige
Malayalam	:	Krimishatru, Kattujirakam
Marathi	:	Kadujire
Sanskrit	:	Somaraji, Vanyajiraka, Aranyajirakah, Brhatpali
Telugu	:	Adavijilakara, Garetikamma

DESCRIPTION

a) Macroscopic

The fruits are cypsela, indehiscent, 3 to 5 mm. long and 1 to 2 mm. in diameter; tapering towards base, pappus present over flattened upper end; surface exhibits about 20 longitudinal ridges, hairy, blackish-brown to black in colour; taste bitter and odour indistinct.

b) Microscopic

T.S. of fruit exhibits about 20 ridges and furrows; the epidermis is single layered, covered externally with thick cuticle; trichomes are of two types - covering and glandular; covering trichomes unicellular, elongated with tapering ends, present mostly on the ridges; glandular hairs, sessile with unicellular heads are seen in the furrows; rest of the pericarp consists of thin walled parenchymatous cells; vascular bundles are present below the ridges, followed by discontinuous and laterally extending arches of thick walled and lignified sclerenchymatous tissues; testa is single layered followed by thin walled parenchymatous cells of the cotyledon, most of them consisting of aleurone grains and a few exhibit oil globules.

Powder:

Blackish brown to black; shows fragments of fibres, fibre sclereids, scalariform vascular elements; thin walled parenchymatous cells with aleurone grains and oil globules; covering as well as glandular trichomes; thin walled radially elongated cells of pappus.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	7.5	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	20	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	14	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Petroleum ether extract on silica Gel 'G' plate using Petroleum ether (60 -80ºC): Diethyl Ether: Acetic acid (35:16:1), shows under UV (366 nm) one spot at Rf. 0.48 (light blue). On exposure to iodine vapours 4 spots appear at Rf. 0.48 (dark orange), 0.57, 0.68 and 0.84 (all faint orange). On spraying with 5% Ethanolic- Sulphuric acid and heating the plate at 105ºC until the colour develops, the plate shows 4 spots at Rf. 0.48 (black) 0.57, 0.68 and 0.84 (all faint brown).

CONSTITUENTS

Avenasterol, vernosterol, essential oil, resins and fixed oil consisting of myristic, palmitic, stearic, oleic, linoleic and vernolic acids.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Muṟaiveppakaṟṟi (முறைவெப்பகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Puṯukkolli (புழுக்கொல்லி), Uramākki (உரமாக்கி), Uḍaṟtēṟṟi (உடற்தேற்றி)

IMPORTANT FORMULATIONS

Iracakanthi Meṯuku (இரசகந்தி மெழுகு), Karappāṉ Tailam (கரப்பான் தைலம்)

THERAPEUTIC USES

Kuṉmam (குன்மம்), Kuḍaṟpuzu (குடற்புழு), Veḷḷai (வெள்ளை), Veṇ Puḷḷi (வெண் புள்ளி)

DOSE - Powder 1 - 3 g

KAḌUKKĀY (Fruit) - கடுக்காய்

Kaḍukkāy is the pericarp of mature fruit devoid of seeds, of ***Terminalia chebula*** Retz. (Fam. Combretaceae), a moderate sized or large tree found throughout India, chiefly in deciduous forests and areas of light rainfall, but occasionally also in slightly moist forests, upto about 1500 m. elevation, throughout India; flowers appear from April-August and fruits ripen from October-January. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil : Ammai (அம்மை), Amutam (அமுதம்), Aritaki (அரிதகி), Pattiyam (பத்தியம்), Varikkāy (வரிக்காய்)

Assamese : Shilikha

Bengali : Haritaki

English : Myrobalan

Gujrati : Hirdo, Himaja, Pulo-harda

Hindi : Harre, Harad, Harar

Kannada : Alalekai

Kashmiri : Halela

Malayalam : Katukka

Marathi : Hirda, Haritaki, Harda, Hireda

Oriya : Harida

Punjabi : Halela, Harar

Sanskrit : Haritaki, Abhaya, Kayastha, Siva, Pathya

Telugu : Karaka, Karakkaya

Urdu : Halela

DESCRIPTION

a) Macroscopic

Fruit yellowish-brown, ovoid, 20 to 35 mm. long, 13 to 25 mm. wide, wrinkled and ribbed longitudinally; pericarp fibrous, 3 to 4 mm. thick, non-adherent to the seed; taste astringent.

b) Microscopic

Transverse section of pericarp shows epicarp consisting of one layer of epidermal cells, inner tangential and upper portions of radial wall thick; mesocarp, 2 or 3 layers of collenchyma,

followed by a broad zone of parenchyma in which fibres and sclereids in group and vascular bundles scattered; fibres with peg like out growth and simple pitted walls; sclereids of various shapes and sizes but mostly elongated, tannins and raphides in parenchyma; endocarp consists of thick-walled sclereids of various shapes and sizes, mostly elongated; epidermal surface view reveal polygonal cells, uniformly thick-walled, several of them divided into two by a thin septa; starch grains simple, rounded or oval in shape, measuring 2 to 7 µm in diameter, found in plenty in almost all cells of mesocarp.

Powder:

Brown; shows a few fibres, vessels with simple pits and groups of sclereids; epidermal fragments with cells showing division by a thin septa.

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	40	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	60	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Diethyl ether extract of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm thickness using Toluene: Ethyl acetate: Formic Acid (5:4:1) under UV light (254 nm) shows nine fluorescent zone at Rf. 0.09(blackish blue), 0.15(blackish blue), 0.27 (blackish blue), 0.35 (dark blackish blue), 0.43 (blue), 0.52 (blue) and 0.67 (blue) and 0.88 (blue). On spraying 5% Methanolic ferric chloride reagent six spots appear at Rf. 0. 09 (blackish blue), 0.15 (blackish blue), 0.27 (blackish blue), 0.35 (dark blackish blue), 0.43 (blackish blue) and 0.52 (blackish blue).

CONSTITUENTS

Gallic acid, chebupentol, terchebin, ellagitannin terchebulin, arjungenin, arjunolic acid, arjungenin, terminoic acid, ferulic acid, vanillic acid, p-coumaric acid, caffeic acid and fatty acids, tannin (30 - 32 %).

PROPERTIES AND ACTIONS

Cuvai : Mainly Tuvarppu (துவர்ப்பு), Slightly Iṉippu (இனிப்பு), Kārppu (கார்ப்பு), Kaippu (கைப்பு), Puḷippu (புளிப்பு)

Guṇam : Ilaku (இலகு), Vaṟaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Iṉippu (இனிப்பு)

Ceykai : Cerippuṇḍākki (செரிப்புண்டாக்கி), Kōẕaiyakaṟṟi (கோழையகற்றி), Malamiḷakki (மலமிளக்கி), Pacittīṯūṇḍi (பசித்தீதூண்டி), Uḍaluramākki (உடலுரமாக்கி)

IMPORTANT FORMULATIONS

Carapuṅka Vilvāti Iḷakam (சரபுங்க வில்வாதி இளகம்), Karuṇai Iḷakam (கருணை இளகம்), Maṇḍūrāti Aḍaikkuḍinīr (மண்டூராதி அடைக்குடிநீர்), Pāvaṉakkaḍukkāy (பாவனக்க டுக்காய்), Tāḷicāthi Cūraṇam (தாளிசாதி சூரணம்), Tiripalaic Cūraṇam (திரிபலைச் சூரணம்)

THERAPEUTIC USES

Kāmālai (காமாலை), Kaṇ Nōykaḷ (கண் நோய்கள்), Kuruti Aẕal (குருதி அழல்), Malakkaḍḍu (மலக்கட்டு), Peruvayiṟu (பெருவயிறு), Viḍam (விடம்)

DOSE - Powder 3 - 5 g

Decoction 30- 50 ml twice daily.

20 - 30 g coarse powder in 200 ml of water for preparing decoction.

KĪẔKKĀYNELLI CAMŪLAM (Whole Plant) - கீழ்க்காய்நெல்லி சமூலம்

Kīẓkkāynelli Camūlam is the whole plant of ***Phyllanthus amarus*** Schum.& Thonn.Syn: ***Phyllanthus fraternus*** Webst.; ***Phyllanthus niruri*** Hook. f. non L. (Fam. Euphorbiaceae), an annual herb, upto 60 cm. high; found wild throughout plains in India. It grows in Mullai, Marutham and Neythal thiṇai.

SYNONYMS

Tamil	:	Kīẓānelli (கீழாநெல்லி)
Assamese	:	Bhuin Amla
Bengali	:	Bhumamla, Bhumi amalaki
Gujrati	:	Bhoi Amali, Bhony amari, Bhonyamali
Hindi	:	Bhu Amala
Kannada	:	Nelanelli
Kashmiri	:	Embali, Amli
Malayalam	:	Kizanelli, Keezhanelli, Ajjahada
Marathi	:	Bhuiawali
Oriya	:	Bhuin Amla
Sanskrit	:	Tamalaki, Bhumyamalaki, Mahidhatrika, Bahuphala
Telugu	:	Nela vusirika

DESCRIPTION

a) Macroscopic

Root - Pieces 2.5 to 11.0 cm. long, nearly straight, gradually tapering, with a number of fibrous secondary and tertiary roots, external surface light brown; fracture short.

Stem - Slender, glabrous; light brown, cylindrical, 20 to 75 cm. long, branching profuse towards upper region bearing 5 to 10 pairs of leaves, internode, 1 to 3.5 cm. long; odour indistinct; taste slightly bitter.

Leaf - Compound, leaflets arranged in two rows on a rachis; alternate, opposite and decussate, almost sessile, stipulate, oblong, entire; upto 1.5 cm. long and 0.5 cm. wide, greenish-brown in colour; odour indistinct; taste slightly bitter.

b) Microscopic

Root - Transverse section shows, 4 to 6 layers of cork consisting of thin-walled, rectangular, tangentially elongated and radially arranged cells, filled with reddish-brown contents; secondary

cortex consists of 8 to 10 layers of thin-walled, tangentially elongated parenchymatous cells; secondary phloem narrow consisting of sieve elements, phloem parenchyma and traversed by narrow phloem rays; secondary xylem represented by a broad zone of tissue, composed of vessels, tracheids, fibres and parenchyma, all elements being thick-walled and lignified having simple pits; xylem rays uniseriate.

Stem - Transverse section shows a single layered epidermis composed of thick-walled, flattened, tangentially elongated cells; older stem shows 4 or 5 layers of cork, composed of thin-walled, tabular, tangentially elongated and radially arranged cells, filled with reddish-brown content; cortex composed of 4 to 6 layers of oval, tangentially elongated, thin-walled, parenchymatous cells, some cortical cells filled with yellowish-brown contents; endodermis quite distinct; pericycle represented by a discontinuous ring, composed of several tangentially elongated strands of lignified fibres with thick walls and narrow lumen; secondary phloem narrow, composed of sieve elements, dispersed in mass of phloem parenchyma; secondary xylem composed of vessels, fibres, parenchyma and traversed by numerous uniseriate rays; vessels mostly simple pitted, a few show spiral thickenings; fibres narrow, elongated, with narrow or sometimes blunt ends with simple pits; center, occupied by a pith composed of thin-walled, circular to oval parenchymatous cells, occasionally cluster crystals of calcium oxalate present in parenchymatous cells of ground tissue.

Leaflet:

Midrib: Shows epidermis on either side, single layered, covered externally by a thick cuticle; a single palisade layer present on the adaxial side intercepted by a few parenchymatous cells in the middle; meristele composed of small strands of xylem towards upper surface and phloem towards lower surface, rest of tissue of leaf composed of thin-walled, parenchymatous cells some having cluster crystals of calcium oxalate.

Lamina: Shows a dorsiventral structure, mesophyll differentiated into palisade and spongy parenchyma; epidermis on either side composed of thin-walled, tangentially elongated cells, covered externally by a thick cuticle; anisocytic stomata present on both epidermises; palisade single layered; mesophyll composed of 3 to 5 layers of loosely arranged cells having a number of veins traversed in this region, a few cluster crystals of calcium oxalate present in spongy parenchyma.

Powder:

Brown; shows fragments of cork cells; vessels and fibres; palisade cells, fragments of epidermal cells with anisocytic stomata and a few cluster 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	16	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	7	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	13	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Hexane fraction of alcoholic extract of the drug on silica gel 'G' plate using Toluene : Ethyl acetate (80:20) v/v, on exposure to iodine vapours shows eight spots at Rf. 0.21, 0.38., 0.44, 0.50, 0.62, 0.78, 0.92 and 0.97 (all yellow). On Spraying with Anisaldehyde -Sulphuric acid reagent and heating the plate, for five minutes at 105°C seven spots appear at Rf. 0.38 (grey), 0.44 (green), 0.57, 0.78,0.88, 0.92 (all grey) and 0.97 (pink); Prominent spots at Rf. 0.38 (grey), 0.44 (green) and 0.97 (pink).

CONSTITUENTS

Phyllanthin, hypophyllanthin, geranin, corilagin, 1, 6 - digalloyl - β-D-glucoside, rutin, quercetin - 3-O-glucoside, 2, 3 - desmethoxy seco - isolintetralin, 2, 3 - desmethoxy seco - isolintetralin diacetate and linnanthin.

PROPERTIES AND ACTIONS

Cuvai : Iṉippu (இனிப்பு), Kaippu (கைப்பு), Puḷippu (புளிப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Ilaku (இலகு), Vaṟaḍci (வறட்சி)

Vīrium : Taḍpam (தட்பம்)

Pirivu : Iṉippu (இனிப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Īral Tēṟṟi (ஈரல் தேற்றி), Kuḷircciyuṇḍākki (குளிர்ச்சியுண்டாக்கி), Vīkkamurukki (வீக்கமுருக்கி), Tuvarppi (துவர்ப்பி)

IMPORTANT FORMULATIONS

Karicālai Iḷakam (கரிசாலை இளகம்), Kīẓānelli Tailam (கீழாநெல்லி தைலம்)

THERAPEUTIC USES

Aẓal Nōykaḷ (அழல் நோய்கள்), Captatāthu Curam (சப்ததாது சுரம்), Kāmālai (காமாலை), Kaṇ Nōykaḷ (கண் நோய்கள்), Kurutikkaẓiccal (குருதிக்கழிச்சல்), Matumēkam (மதுமேகம்), Vayiṟu Mantam (வயிறு மந்தம்), Veppu Nōy (வெப்பு நோய்)

DOSE - Medicinal paste 3 - 5 g of fresh whole plant

Powder 2 g

Decoction 30- 50 ml twice daily.

15 - 30 g coarse powder in 200 ml of water for preparing decoction.

KOḶḶU (Seed) - கொள்ளு

Koḷḷu is the dried seed of *Vigna unguiculata* (L.) Walp. Syn. *Dolichos biflorus* Linn. (Fam. Papilionaceae), an annual branched, sub-erect or twining, downy or glabrescent herb, cultivated all over India more for use as cattle feed after cooking It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Kāṇam (காணம்), Mutirai (முதிரை)
Bengali	:	Kulattha, Kalaya
English	:	Horse gram
Gujrati	:	Kalathi, Kulathi
Hindi	:	Kulathi, Kurathi
Kannada	:	Huruli, Hurali
Malayalam	:	Mudiraa
Marathi	:	Kulitha
Sanskrit	:	Kulattha, Khalva, Vardhipatraka
Telugu	:	Ulavalu
Urdu	:	Kulthi

DESCRIPTION

a) Macroscopic

Seeds, hard, surface smooth, ellipsoid, flattened, greyish to reddish brown; 4 to 6 mm. long and 4 mm. wide; micropyle prominent; taste somewhat astringent.

b) Microscopic

Transverse section of seed shows testa consisting of a single layer of columnar, thin-walled, parenchymatous, palisade like cells covered with a thin cuticle followed by single layer of rectangular to square bearer cells and 3 or 4 layers of thin-walled rectangular parenchymatous cells, wider at micropylar region; cotyledon consisting of single layer of upper and lower epidermis covered with a thin cuticle; epidermal cells thin-walled, rectangular and parenchymatous followed by mesophyll, consisting of angular parenchymatous cells, filled with numerous simple starch grains and protein bodies also present.

Powder:

Whitish in colour; shows broken pieces of testa; parenchyma cells and starch grains.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Nil , 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 3 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 Petroleum ether (40-60°C) extractive of Alcoholic extract on silica gel 'G' plate using Toluene: Ethyl acetate (9:1) v/v, on spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate, for five minutes at 105°C shows seven spots at Rf. 0.20 (reddish violet), 0.29 (reddish violet), 0.33 (reddish violet), 0.55 (reddish violet), 0.63 (reddish violet), 0.95 (reddish violet) and 0.97 (reddish violet).

CONSTITUENTS

Galactosyl inositol and six oleanane glycosides -azukisaponins I, II, III, IV, V and VI.

PROPERTIES AND ACTIONS

Cuvai : Tuvarppu (துவர்ப்பு)

Guṇam : Acaivu (அசைவு), Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Tuvarppi (துவர்ப்பி), Uramākki (உரமாக்கி)

IMPORTANT FORMULATIONS

Iracakanthi Meẕuku (இரசகந்தி மெழுகு), Piraṇḍai Vaḍakam (பிரண்டை வடகம்)

THERAPEUTIC USES

Aiyanōykaḷ (ஐயநோய்கள்), Kaẕiccal (கழிச்சல்), Koẕuppaik Kuṟaikkum (கொழுப்பைக் குறைக்கும்), Kuḷirkāyccal (குளிர்காய்ச்சல்), Kuṉmam (குன்மம்), Vīkkam (வீக்கம்), Kallaik Karaikkum (கல்லைக் கரைக்கும்)

DOSE - Decoction 30- 50 ml twice daily.

30- 40 g coarse powder in 200 ml of water for preparing decoction.

KŌḌḌAM (Root) - கோட்டம்

Kōḍḍam is the dried root of ***Saussurea costus*** (Falc.) Lipsch. Syn. ***S. lappa*** (Decne.) C.B. Clarke (Fam. Asteraceae), a tall, robust, perennial herb 1 to 2 m. height found in Himalayas, Kashmir at an altitude of 2500 to 3600 m.; cultivated in Himachal Pradesh, Uttranchal and Sikkim; roots collected in September-October. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Kōṣḍam (கோஷ்டம்), Kurā (குரா), Oli (ஓலி)
Assamese	:	Kud, Kur
Bengali	:	Kudo
Gujrati	:	Upleta, Kath
Hindi	:	Kutha
Kannada	:	Changal Kustha
Kashmiri	:	Kuth
Malayalam	:	Kottam
Marathi	:	Upleta, Kustha
Oriya	:	Kudha
Punjabi	:	Kuth
Sanskrit	:	Kustha, Amaya, Pakala
Telugu	:	Changalva Koshtu
Urdu	:	Qust

DESCRIPTION

a) Macroscopic

Drug greyish to dull brown, thick, stout, fusiform to cylindrical, 7 to 15 cm. long, 1.0 to 5.5 cm. broad, thicker roots with collapsed center; occasionally ridged, wrinkles longitudinal and anastomosed; rootlets rarely present; cut surface shows two regions under 10 x; outer periderm ring thin, inner porous woody portion lighter in colour showing fine radial striations and often the central portion collapsed; fracture short, horny; odour strong, characteristically aromatic; taste slightly bitter.

b) Microscopic

Transverse section of thin root shows thin periderm, followed by broad zone of phloem and still broader zone of xylem traversed by wide medullary rays; cork 3 to 5 layered wide, secondary cortical cells polygonal, mostly elongated; secondary phloem consists of mostly storage

parenchyma, small groups of sieve tubes and companion cells and often phloem fibres, bast fibres thick-walled, lignified, upto 350 µm in length, with many simple pits associated with fibres, tracheids and parenchyma; wood fibres smaller than bast fibres; with wider lumen and obtusely tapering ends; medullary rays multiseriate and wider in phloem region; resin canals found throughout as large cavities; some roots possess a central cylinder of sclerenchyma, while others have parenchymatous center with scattered xylem elements; in older roots, wood parenchyma collapses and takes a spongy appearance in the center of root; inulin present in storage parenchyma.

Powder:

Deep or rusty brown; shows irregular bits of yellow, brown or orange-red fragments of resins and oil drops associated with thin-walled parenchymatous cells; broken bits of xylem vessels with scalariform, reticulate thickening

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 1 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 20 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Chloroform extractive of the Alcoholic extract on silica gel 'G' plate using n-Butanol :Acetic Acid : Water (5:1:4) v/v, on spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate, for five minutes at 105°C shows nine spots at Rf. 0.38, 0.50, 0.54 (violet), 0.61, 0.68 (violet), 0.74 (dark violet), 0.86 (grey), 0.90 and 0.97 (dark violet).

CONSTITUENTS

Costunolide, α-cyclocostunolide, β-cyclocostunolide, isoalantolactone, mokkolactone and dehydrocostus lactone.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு), Viṟuviṟuppu (விறுவிறுப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Kōṟaiyakaṟṟi (கோழையகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Uramākki (உரமாக்கி), Veppamuṇḍākki (வெப்பமுண்டாக்கி), Viyarvaiyuṇḍākki (வியர்வையுண்டாக்கி)

IMPORTANT FORMULATIONS

Amirtātik Kuḷikai (அமிர்தாதிக் குளிகை), Kēcari Iḷakam (கேசரி இளகம்), Kōrōcaṉai Māttirai (கோரோசனை மாத்திரை), Pittacurak Kuḍiṉīr (பித்தசுரக் குடிநீர்), Vacanta Kucumākaram (வசந்த குசுமாகரம்), Vallārai Ney (வல்லாரை நெய்)

THERAPEUTIC USES

Iraippu (இரைப்பு), Irumal (இருமல்), Mūlam (மூலம்), Nañcu (நஞ்சு), Tōḍam (தோடம்)

DOSE - Powder 2 - 4 g

KOTHTHUMALLI VITAI (Fruit) - கொத்துமல்லி விதை

Koththumalli Vitai is the dried, ripe fruit of *Coriandrum sativum* L. (Fam.Apiaceae), a slender, glabrous, branched, annual aromatic herb 30 to 90 cm. high; extensively cultivated throughout India; crop matures in 2 or 3 months after sowing; herb is pulled out with roots; dried and fruits threshed, winnowed, and stored in bags, after proper drying It grows in Mullai and Marutham thiṇai.

SYNONYMS

Tamil	:	Malli (மல்லி), Taṉiyā (தனியா), Uruḷarici (உருளரிசி)
Assamese	:	Dhaniya
Bengali	:	Dhane, Dhania
English	:	Coriander fruit
Gujrati	:	Dhana
Hindi	:	Dhaniya
Kannada	:	Havija, Kothambari bija
Kashmiri	:	Dhaniwal, Dhanawal
Malayalam	:	Malli, Kothampatayari
Marathi	:	Dhane, Kothimbir
Oriya	:	Dhania
Punjabi	:	Dhania
Sanskrit	:	Dhanyaka, Danya, Vitunnaka, Kustumburu
Telugu	:	Dhaniyalu
Urdu	:	Kishneez

DESCRIPTION

a) Macroscopic

Fruit globular, mericarps usually united by their margins forming a cremocarp about 2 to 4 mm. in diameter, uniformly brownish-yellow or brown, glabrous, sometimes crowned by the remains of sepals and styles, primary ridges 10, wavy and slightly inconspicuous, secondary ridges 8, straight, and more prominent; endosperm coelospermous; odour aromatic; taste spicy and characteristic.

b) Microscopic

Transverse section of fruit shows pericarp with outer epidermis, with slightly thickened anticlinal wall, a few stomata, and many cells with small prisms of calcium oxalate; trichomes absent; outer layer of mesocarp parenchymatous with inner cells in wavy longitudinal rows and degenerated vittae as tangentially flattened cavities; middle layer of mesocarp sclerenchymatous, forming a thick layer of fusiform pitted cells in very sinuous rows, layers often crossing at right angles with definite longitudinal strands in the secondary ridges; sinuous primary cosate with some spiral vessel; inner cells of mesocarp, large, hexagonal with rather thin, lignified walls; inner epidermis of very narrow thin-walled cells slightly sinuous anticlinal wall showing parquetry arrangement; two or rarely more, normal vittae occurring on commissural side of each mesocarp containing volatile oil; endosperm of thick-walled cellulosic parenchyma containing much fixed oil, numerous aleurone grains, about 4 to 8 in diameter containing micro rosettes of calcium oxalate; split carpophore passing at apex of each mericarp into raphe, adjacent to which is a large cavity; inner side of this is a flattened vascular strand; carpophore consists of fibres surrounded by spiral vessels.

Powder:

Fawn to brown; epidermal cells of pericarp when present, slightly thick-walled and many containing small prism of calcium oxalate; parenchymatous cells of mesocarp without reticulate thickening; masses of sclerenchymatous cells of mesocarp in sinuous rows, often crossing at right angles, large tubular hexagonal rather thin-walled sclerenchymatous cells of endocarp; cells of inner epidermis with slightly sinuous anticlinal walls; thick-walled polygonal parenchymatous cells of endosperm, containing fixed oil and numerous small aleurone grains and micro rosettes of calcium oxalate.

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 less than 1.5 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 19 per cent, Appendix	2.2.7
Volatile oil	Not less than 0.3 per cent v/w, Appendix	2.2.10

T.L.C.

T.L.C. of Alcoholic extract of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Toluene: Ethyl acetate (9:1) shows four spots under UV (366 nm.) at Rf. 0.24,0.43, 0.49 and 0.52 (all red). On exposure to iodine vapours seven spots appear at Rf. 0.20, 0.27, 0.36, 0.43, 0.49, 0.75 and 0.95 (all yellow). With Anisaldehyde- Sulphuric acid reagent, heating the plate for five minutes at 105ºC eight spots appear at Rf. 0.11(light violet), 0.20 (violet), 0.27, 0.36 (both light violet), 0.43 (violet), 0.49 (light green), 0.75 (violet) and 0.95(pink).

CONSTITUENTS

S-(+)-linalool, gnaphaloside A & B, quercetin, isorhamnetin, rutin, luteolin, furoisocoumarins - coriandrin and dihydro coriandrin, coriandrones A-E.

PROPERTIES AND ACTIONS

Cuvai : Kārppu (கார்ப்பு)

Guṇam : Ilaku (இலகு), Noymai (நொய்மை)

Vīrium : Taḍpaveppam (தட்பவெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Ciṟunīrperukki (சிறுநீர்பெருக்கி), Pacittītūṇḍi (பசித்தீதூண்டி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Iñci Vaḍakam (இஞ்சி வடகம்), Nārathtai Iḷakam (நாரத்தை இளகம்), Pittacurak Kuḍinīr (பித்தசுரக் குடிநீர்)

THERAPEUTIC USES

Cārāyaveṟi (சாராயவெறி), Kuḷirkāyccal (குளிர்காய்ச்சல்), Nāvaṟaḍci (நாவறட்சி), Puṇ (புண்), Tākam (தாகம்), Vānti (வாந்தி), Pittamāntam (பித்தமாந்தம்), Vikkal (விக்கல்), Veppam (வெப்பம்)

DOSE - Powder 1 - 3g

Decoction 20 - 30 ml twice daily.

20- 30 g coarse powder in 200 ml of water for preparing decoction

KUN̲R̲IMAṆI (Seed) - குன்றிமணி

Kun̲r̲imaṇi is the seed of ***Abrus precatorius*** L. (Fam.Papilionaceae), a climber common in the plains of India and ascending to 900 m. in the Himalayas; seeds are poisonous to cattle. The seeds are subjected to purification process (cutti) before use. It grows in Kur̲iñci, Mullai, Marutham and Pālai thiṇai.

SYNONYMS

Tamil	:	Kun̲r̲i (குன்றி), Kun̲r̲ivittu (குன்றிவித்து), Kuṇḍumaṇi (குண்டுமணி)
Assamese	:	Rati
Bengali	:	Kunch, Shonkainch
English	:	Jequirity
Gujrati	:	Rati, Chanothee
Hindi	:	Ratti, Ghungchi
Kannada	:	Galuganji, Gulagunjee
Malayalam	:	Kunni, Cuvanna Kunni
Marathi	:	Gunja
Oriya	:	Kainch
Punjabi	:	Ratti
Sanskrit	:	Gunja, Raktika, Kakananti
Telugu	:	Guriginia, Guruvenda
Urdu	:	Ghongcha, Ratti

DESCRIPTION

a) Macroscopic

Seed ovoid or sub globular, 5 to 8 mm. long, 4 to 5 mm. broad with the smooth, glossy surface and bright scarlet colour; hilum a black patch. The weight of 100 seeds is between 12 to 13 g

b) Microscopic

Transverse section of seed shows testa composed of radially much elongated cells, arranged irregularly and measuring 45 to 50 µm in length; inner region of testa consists of collapsed cells forming a hyaline layer; endosperm composed of thick-walled cellulosic parenchyma, isodiametric cells larger towards inside, walls mainly of hemicellulose and swell considerably in water; outer one or two layers of cells formed of rather smaller cells, walls of which swell to a less extent in water.

Powder:

Cream in colour; shows fragments of thick walled lignified palisade-like testa; pieces of numerous endosperm cells containing starch; a few rectangular, thick walled stone cells having wide lumen; simple, oval to rounded, starch grains measuring 3 to10 µm in diameter.

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 0.5 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 15 per cent, Appendix		2.2.7.

T.L.C.

T.L.C. of Alcoholic extract on silica gel 'G' plate using Toluene: Ethyl acetate: Formic acid (5:4:1) shows under UV (366 nm) seven spots fluorescent zones visible at Rf. 0.30, 0.35, 0.44 0.46, 0.71 (all blue), 0.85 and 0.91 (both green). On spraying with 4% Methanolic -Sulphuric acid reagent and heating the plate for five minutes at 105ºC three spots appear at Rf. 0.27, 0.77 and 0.85 (all violet).

CONSTITUENTS

Abrine, hypaphorine, choline, trigonelline, precatorine, 5 β-cholanic acid, antitumour proteins - abrin A and B, globulin, arabinose, hemagglutin glucoside, abralin, stigmasterol, β-sitosterol,abrus saponin I and II.

PROPERTIES AND ACTIONS

Cuvai	:	Kaippu (கைப்பு)
Guṇam	:	Ilaku (இலகு), Kūrmai (கூர்மை), Vaṟaḍci (வறட்சி)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)
Ceykai	:	Nīrmalampōkki (நீர்மலம்போக்கி), Uramākki (உரமாக்கி)

IMPORTANT FORMULATIONS

Makāvacanta Kucumākaram (மகாவசந்த குசுமாகரம்), Mūcāmpara Paṟṟu(Kuṉṟipaṟṟu) (மூசாம்பர பற்று(குன்றிப்பற்று))

THERAPEUTIC USES

Aẕal Nōy (அழல் நோய்), Aiya Nōy (ஐய நோய்), Kaṇ Nōy (கண் நோய்), Kāmālai (காமாலை), Viyarvaiyōḍukūḍiya Muṟaiccuram (வியர்வையோடுகூடிய முறைச்சுரம்)

DOSE - It cannot be administered as a single drug It should be used only in combination.

KURŌCĀṆI ŌMAM (Seed) - குரோசாணி ஓமம்

Kurōcāṇi Ōmam is the seed of ***Hyoscyamus niger*** L. (Fam. Solanaceae), an annual or biennial foetid herb upto 5 ft. high; native to the Mediterranean region and temperate Asia, but also occurring in Western Himalayas from Kashmir to Kumaon at an altitude of 1600 to 4000 m.; seeds are imported into India.It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Kārapi (காரபி), Kārcavai (கார்சவை), Tippiyam (திப்பியம்)
Bengali	:	Khorasani ajwan
English	:	Henbane
Gujrati	:	Khurasanee ajma, Khurasanee ajmo
Hindi	:	Khurasanee ajvayan
Kannada	:	Khurasajnee, Ajawaana
Malayalam	:	Khurasaanee, Paarasika, Yavaani
Marathi	:	Khurasanee ova
Punjabi	:	Khurasanee ajvain, Bangidewana
Sanskrit	:	Parasikayavani, Khurasani yavani, Turusaka, Madakarini
Telugu	:	Kurasanee vamu, Khurasanee omam
Urdu	:	Ajvayanee, Khursanee

DESCRIPTION

a) Macroscopic

Seeds irregularly reniform or sub-quadrate, slightly over a mm. in size, dark grey, surface concave, odour pleasantly aromatic; taste bitter, mucilaginous and pungent.

b) Microscopic

Transverse section of seed shows the presence of a thick cuticle, testa with two layers, outer one with a row of osteosclereids, ranging from 50 to 80 µm in size, inner one with crushed parenchyma; endosperm cells thin walled, containing oil globules; embryo coiled; starch absent.

Powder:

Dark brown; aromatic smell, bitter mucilagenous taste and an oily texture; shows a number of flask-shaped or dumb-bell shaped osteosclereids; fragments of testa in surface view, showing cells with sinuous walls; powder when treated with Sudan IV and mounted in glycerine shows the presence of oil globules which turn orange red; powder cleared with dilute nitric acid shows surface view of sculpturing on testa.

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	1	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	16	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	10	per cent, Appendix	2.2.7.

ASSAY

HPTLC densitometric estimation of hyoscyamine.

TLC plates

Aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm thickness.

Solvent system

Toluene: Ethyl acetate: Diethylamine (6.0:3.0:1.0).

Test solution

10 g of powdered drug is accularately weighed and refluxed with Methanol (2 x 50 ml) for 2 hr. The combined extract is concentrated to 10 ml and extracted with 2M Hydrochloric acid (2 x 15 ml). The aqueous solution is shaken with 2 x 25 ml portions of Petroleum ether (60-80º) to remove fatty material. The pH of the aqueous solution is adjusted to 10 using strong ammonia solution and extracted with Chloroform (3 x 30 ml). The combined Chloroform extract is concentrated and adjusted the volume to 10 ml with Chloroform.

Standard solution

1.0 mg/ml stock solution of hyoscyamine is prepared in Methanol. Aliquots of 0.5 to 3 ml in increments of 0.5 ml is pipetted out into 10 ml volumetric flask and made upto the volume with Methanol.

Calibration curve

10 µl of each concentration of standard solution is applied on TLC plate. The plate is developed in the solvent system to a distance of 8 cm. and dried in a current of hot air. The plate is scanned in the TLC scanner at 210 nm. The peak area for each concentration of hyoscyamine is recorded and the calibration curve is got.

Estimation of hyoscyamine in the drug

10 µl of the test solution is applied on TLC plate. The plate is developed in the solvent system to a distance of 8 cm. and the chromatogram is recorded and area of the peak is noted. The amount of hyoscyamine in the test sample is determined from the calibration curve of hyoscyamine.

The percentage of hyoscyamine ranges from 0.006 to 0.019 in the samples analyzed.

T.L.C.

T.L.C. of the Methanolic extract on silica gel 'G' plate using Toluene: Ethyl acetate: diethylamine (7:2:1) shows under UV (366 nm) one fluorescent spot at Rf. 0.49 (blue). After spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate at 105ºC until the colour develops, the plate shows three spots at Rf. 0.09 (brown), 0.49 (brown), 0.69 (greenish brown). After spraying with modified Dragendorff reagent spots appear at Rf.0.90, 0.77, 0.61, 0.23 and 0.10.

CONSTITUENTS

Hyoscyamine, hyoscine, isomeric N-oxides of hyoscyamine (equatorial and axial), hyoscine-N-oxide (equatorial isomer), tropine; 16á- acetoxyhyoscyamilactol, daturalactone-4, hyoscyamilactol; cannabisin D, cannabisin G, grossamide, hyoscyamide; rutin; daucosterol, ß-sitosterol, myristic, palmitic, stearic, oleic and linoleic acids, 1-O- (9Z, 12Z-octadecadienoyl) glycerol, 1-O-octadecanoylglycerol, 1-O- (9Z-12Z-octadecadienoyl) -3O-(9Z-Octadecenoyl) glycerol, 1-O- (9Z, 12Z-octadecadienoyl) -3-O-nonadecanoyl glycerol, 1-O- (9Z,12Z-octadecadienoyl) -2-O- (9Z,12Z-octadecadienoyl) glycerol, N-trans-feruloyl tyramine,1, 24-tetracosanediol diferulate and vanillic acid.

PROPERTIES AND ACTIONS

Cuvai : Cirukaippu (சிறுகைப்பு), Kārppu (கார்ப்பு)

Guṇam : Tiṇmai (திண்மை), Varaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Cirunīr Kuraipaḍaperukki (சிறுநீர் குறைபடபெருக்கி), Icivakarri (இசிவகற்றி), Tātuveppakarri (தாதுவெப்பகற்றி), Tuyaraḍakki (துயரடக்கி), Urakkamuṇḍākki (உறக்கமுண்டாக்கி)

IMPORTANT FORMULATIONS

Carapuṅka Vilvāti Iḷakam (சரபுங்க வில்வாதி இளகம்), Kapāḍa Mātthirai (கபாட மாத்திரை), Nanthi Mezuku (நந்தி மெழுகு), Tippili Irācāyaṉam (திப்பிலி இராசாயனம்), Veṇpūcaṇi Ney (வெண்பூசணி நெய்)

THERAPEUTIC USES

Ārampa Paittiyam (ஆரம்ப பைத்தியம்), Cūtakavali (சூதகவலி), Cūtakavāyu (சூதகவாயு), Mantāra Iraippu (மந்தார இரைப்பு), Niṉaivu Taḍumārram (நினைவு தடுமாற்றம்), Tamaraka Taḍippu (தமரக தடிப்பு), Tūkkaminmai (தூக்கமின்மை), Pallaḍi Nōykaḷ (பல்லடி நோய்கள்)

DOSE - Powder 125 - 500 mg

MAÑCAḶ (Rhizome) - மஞ்சள்

Mañcaḷ is the dried and cured rhizome of *Curcuma longa* L. Syn. *C. domestica* Valeton (Fam. *Zingiberaceae*), a perennial herb, extensively cultivated in all parts of the country; crop is harvested after 9 to 10 months when lower leaves turn yellow; rhizomes carefully dug up with hand-picks between October-April and cured by boiling in its own decoction and dried. It grows in Kuṟiñci and Marutham thiṇai.

SYNONYMS

Tamil	:	Aricaṉam (அரிசனம்), Kāṉcaṉi (கான்சனி), Mañcaḷ Kiẕaṅku (மஞ்சள் கிழங்கு), Nici (நிசி), Pīṯam (பீதம்)
Assamese	:	Haldhi, Haladhi
Bengali	:	Halud, Haldi
English	:	Turmeric
Gujrati	:	Haldar
Hindi	:	Haldi, Hardi
Kannada	:	Arishina
Kashmiri	:	Leadar, Ladhir
Malayalam	:	Manjal
Marathi	:	Halad
Oriya	:	Haladi
Punjabi	:	Haldi, Haldar
Sanskrit	:	Haridra, Rajant, Nisa, Nisi, Ratri, Ksanada, Dosa
Telugu	:	Pasupu
Urdu	:	Haldi

DESCRIPTION

a) Macroscopic

Rhizomes ovate, oblong or pyriform (round turmeric) or cylindrical, often short branched (long turmeric), former about half as broad as long, latter 2 to 5 cm. long and about 1 to 1.8 cm. thick, externally yellowish to yellowish-brown with root scars and annulations of leaf bases; fracture horny, fractured surface orange to reddish brown; central cylinder twice as broad as cortex; odour and taste characteristic.

b) Microscopic

Transverse section of rhizome shows epidermis with thick-walled, cubical cells of various dimensions; a few layers of cork developed under epidermis and oleo-resin cells with brownish contents scattered; cork generally composed of 4 to 6 layers of thin-walled, brick-shaped parenchyma; cortex characterized by the presence of mostly thin-walled rounded parenchyma cells and scattered collateral vascular bundles; cells of ground tissue contain starch grains of 4 to 15 µm in diameter; oil cell with suberised walls containing either orange-yellow globules of volatile oil or amorphous resinous matter; vessels mainly spirally thickened, a few reticulate and annular.

Powder:

Yellow; shows fragments of cork cells; parenchyma cells with gelatinised starch grains; oleo-resin cells with brownish content; vessels with spiral thickening; a few oil globules; starch grains simple, rounded, measuring 4 to 15 µm in diameter.

Identification

1. On the addition of concentrated Sulphuric acid or a mixture of concentrated Sulphuric acid and alcohol to the powdered drug, a deep crimson colour is produced.

2. A piece of filter paper is impregnated with an alcoholic extract of the powder, dried, and then moistened with a solution of Boric acid slightly acidified with Hydrochloric acid, dried again, the filter paper assumes a pink or brownish red colour which becomes deep blue or greenish-black on the addition of alkali.

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	8	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	12	per cent, Appendix	2.2.7.
Volatile oil	Not less than	4	per cent, Appendix	2.2.10

T.L.C.

T.L.C. of Alcoholic extract of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Toluene: Ethyl acetate (9:1) shows five spots under UV (366 nm) at Rf. 0.10 (yellow), 0.15 (greenish yellow), 0.38, 0.48 and 0.94 (all sky blue). With Anisaldehyde- Sulphuric acid reagent and heating the plate for five minutes at 105ºC ten spots appear at Rf. 0.10 (blackish yellow), 0.15 (dull yellow), 0.28, 0.35, 0.43, 0.51 (all violet), 0.58 (light pink), 0.64 (violet), 0.82 (red) and 0.94 (pink).

CONSTITUENTS

Curcumin, desmethoxy curcumin, bisdemethoxy curcumin, dihydrocurcumin, β-turmerone, bisabolane derivatives, ukonan A, B, C & D phytosterols and fatty acids.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு), Kārppu (கார்ப்பு)

Guṇam : Vaṟaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Īral Tēṟṟi (ஈரல் தேற்றி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Cīnthil Ney (சீந்தில் நெய்), Kummaḍḍik Kuzampu (கும்மட்டிக் குழம்பு), Nākaccentūram (நாகச்செந்தூரம்), Piraṇḍai Vaḍakam (பிரண்டை வடகம்), Piḍaṅku Nāṟikkuḍinīr (பிடங்கு நாறிக்குடிநீர்), Vallārai Ney (வல்லாரை நெய்), Veḷvaṅkap Paṟpam (வெள்வங்கப் பற்பம்)

THERAPEUTIC USES

Azal/Pittam (அழல்/பித்தம்), Aiya Nōykaḷ (ஐய நோய்கள்), Mūkkunīr Pāyccal (மூக்குநீர் பாய்ச்சல்), Puṇ (புண்), Vali (வலி), Vānti (வாந்தி), Vīkkam (வீக்கம்), Vaḷi (வளி)

DOSE - Powder 520 - 650 mg

MARAMAÑCAḶ (Stem) - மரமஞ்சள்

Maramañcaḷ is the dried stem of *Berberis aristata* DC. Var. *aristata*. (Fam. *Berberidaceae*), an erect, spinous, deciduous shrub, usually 1.8 to 3.6 m. in height found in the Himalayas at an elevation altitude of 1000 to 3000 m., and in the Nilgiri hills in South India. It grows in Kuṟiñci thiṇai.

SYNONYMS

Tamil	:	Kālēyakam (காலேயகம்), Tāruvi (தாருவி)
Bengali	:	Daruharidra
English	:	Indian berberry
Gujrati	:	Daruharidra, Daruhuladur
Hindi	:	Daruhaldi, Darhald
Kannada	:	Maradarishana, Maradarishina, Daruhaladi
Malayalam	:	Maramannal, Maramanjnal
Marathi	:	Daruhalad
Oriya	:	Daruharidra, Daruhalidi
Punjabi	:	Sumalu
Sanskrit	:	Daruharidra, Darvi, Katamkateri
Telugu	:	Manupasupu
Urdu	:	Darhald

DESCRIPTION

a) Macroscopic

Drug available in pieces of variable length and thickness, bark about 0.4 to 0.8 cm. thick, pale yellowish-brown, soft, closely and rather deeply furrowed, rough, brittle, xylem portion yellow, more or less hard, radiate with xylem rays; pith mostly absent, when present small, yellowish-brown when dried; fracture short in bark region, splintery in xylem; taste bitter.

b) Microscopic

Stem - Shows rhytidoma with cork consisting of 3 to 45 rows of rectangular and squarish, yellow coloured, thin-walled cells arranged radially; sieve elements irregular in shape, thin-walled, a few cells containing yellowish-brown contents; phloem fibres arranged in tangential rows, consisting of 1 to 4 cells, each fibre short thick-walled, spindle-shaped, lignified having wide lumen; half inner portion of rhytidoma traversed by secondary phloem rays; phloem rays run obliquely consisting of radially elongated parenchymatous cells, almost all phloem ray cells having single prismatic crystals of calcium oxalate, a few cells of rhytidoma also contain prismatic crystals of calcium

oxalate, stone cells also found scattered in phloem ray cells in groups, rarely single, mostly elongated, a few rounded, arranged radially, some of which contain a single prism of calcium oxalate crystals; secondary phloem, a broad zone, consisting of sieve elements and phloem fibres, traversed by multiseriate phloem rays; sieve elements arranged in tangential bands and tangentially compressed cells alternating with single to five rows of phloem fibres; short, lignified, thick-walled having pointed ends; secondary xylem broad consisting of xylem vessels, tracheids, xylem fibres and traversed by multiseriate xylem rays; xylem vessels numerous, small to medium sized, distributed throughout xylem region in groups or in singles, groups of vessels usually arranged radially; isolated vessels cylindrical with rounded or projected at one or both ends with spiral thickening; xylem fibres numerous, lignified, large, thick-walled with wide lumen and pointed tips; xylem rays quite distinct, straight, multiseriate, consisting of radially arranged rectangular cells, each ray 30 to 53 cells high, 8 to 12 cells wide, a few ray cells containing brown contents.

Powder:

Yellow; shows mostly fragments of cork cells; sieve elements, yellow coloured phloem fibres entire or in pieces; stone cells in singles or in groups; numerous prismatic crystals of calcium oxalate; xylem vessels having sprial thickening; thick-walled, lignified xylem fibres and ray cells; when an extract of the powder with chloroform and methanol is exposed under near UV light (254, 366 nm.) shows dark yellow and greenish yellow fluorescence respectively.

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 5 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 8 per cent, Appendix	2.2.7.

ASSAY

TLC densitometric estimation of berberine.

TLC plates

Aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness.

Solvent system

n- Butanol: Ethyl acetate: Acetic acid : Water (3:5:1:1).

Test solution

10 g of powdered drug is extracted in a Soxhlet apparatus with n-Hexane (150 ml) to defat the material (5 to 7 hr.) and further extracted with Methanol (150 ml) (8 to 9 hr.). The extract is filtered and concentrated and dried in vacuo. 2 mg of the residue is taken and dissolved in 1 ml of Methanol.

Standard solution

1 mg of the reference compound, berberine is dissolved, in 1 ml of Methanol.

Calibration curve

The calibration curve is drawn for berberine with 8 data points 1 to 8 µl of the standard solution is applied on a TLC plate. The plate is developed in the solvent system to a distance of 8 cm. The plate is scanned densitometrically at 366 nm. The peak area under curve is recorded and plotted the calibration curve for berberine.

Estimation of berberine in the drug

1 µl of the test solution in triplicate is applied on TLC plate. The plate is developed in the solvent system and recorded the chromatogram. The amount of berberine present in the samples is calculated from the calibration curve of the standard.

The percentage of berberine varies from 2.75 to 3.20 in the samples analyzed.

T.L.C.

T.L.C. of the Methanolic extract of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Butanol: Ethyl acetate: Acetic acid: Water (3:5:1:1) and visulalization with Dragendorff solution reagent shows seven spots at Rf. 0.15, 0.21, 0.26 (all yellowish brown), 0.32 (dark orange red), 0.40 (yellowish brown), 0.58 (orange red) and 0.67 (dark orange red, berberine marker).

CONSTITUENTS

Berberine, oxycanthine, palmatine, jatrorrhizine, karachine, taxilamine, pakistanine, kalashine, chitraline and 1 - o - methyl pakistanine.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Vaṟaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Pacittīṭūṇḍi (பசித்தீதூண்டி), Uramākki (உரமாக்கி), Veppakaṟṟi (வெப்பகற்றி)

IMPORTANT FORMULATIONS

Cāmpirāṇippū Paṭaṅkam (சாம்பிராணிப்பூ பதங்கம்)

THERAPEUTIC USES

Cuvaiyiṉmai (சுவையின்மை), Kaṇam (கணம்), Kāṇācuram (காணாசுரம்), Mūla Nōy (மூல நோய்), Uḍcuram (உட்சுரம்)

DOSE - Decoction 30- 50 ml twice daily.

50 g coarse powder in 200 ml of water for preparing decoction.

MARUTHAM PAḌṬAI (Stem bark) - மருதம் பட்டை

Marutham Paḍṭai is the stem bark of *Terminalia arjuna* (Roxb.) W. & A. (Fam. Combretaceae), a large deciduous tree commonly found throughout the greater parts of the country, and also planted for shade and ornamental purpose.It grows in Marutham and Neythal thiṇai.

SYNONYMS

Tamil	:	Arccuṉam (அர்ச்சுனம்), Intiraṉ Pār (இந்திரன் பார்), Veḷḷai Marutamaram (வெள்ளை மருதமரம்)
Assamese	:	Arjun
Bengali	:	Arjuna
Gujrati	:	Sadad, Arjuna, Sajada
Hindi	:	Arjuna
Kannada	:	Matti, Bilimatti, Neermatti, Mathichakke, Kudare Kivimase
Malayalam	:	Nirmasuthu, Vellamaruthi, Kellemasuthu, Mattimora,
Marathi	:	Arjuna, Sadada
Oriya	:	Arjuna
Punjabi	:	Arjon
Sanskrit	:	Arjuna, Kakubha, Partha, Svetavaha
Telugu	:	Maddi
Urdu	:	Arjun

DESCRIPTION

a) Macroscopic

Bark available in pieces, flat, curved, channelled to half quilled, 0.2 to 1.5 cm. thick, market samples upto 10 cm. in length and up to 7 cm. in width, outer surface somewhat smooth and grey, inner surface somewhat fibrous and pinkish, transversely cut smoothened bark shows pinkish surface; fracture short in inner and laminated in outer part; taste bitter and astringent.

b) Microscopic

Stem Bark - Mature bark shows cork consisting of 9 to 10 layers of tangentially elongated cells, a few outer layers filled with brown colouring matter; cork cambium and secondary cortex not distinct and medullary rays observed traversing almost upto outer bark; secondary phloem occupies a wide zone, consisting of sieve tubes, companion cells, phloem parenchyma and phloem fibres, traversed by phloem rays, usually uniseriate but biseriate rays also occasionally seen; in the middle and outer phloem region, sieve tubes get collapsed and form ceratenchyma; phloem fibres distributed in rows and present in groups of 2 to 10; rosette crystals of calcium oxalate measuring

80 to 180 mm in dia., present in most of the phloem parenchyma, alternating with fibres; idioblasts consisting of large cells having aggregates of prismatic and rhomboidal crystals of calcium oxalate in row throughout the zone, measuring 260 to 600 mm in dia.; starch grains, mostly simple, compound of 2 or 3 components, sometimes upto 5 components, round to oval, elliptical, measuring 5 to 13 mm in dia., distributed throughout the tissue (absent in ***T.alata***); in a tangential section, uniseriate phloem rays 2 to 10 cells high and biseriate, 4 to 12 cells high; in longitudinal section rosette crystals of calcium oxalate found in the form of strands in phloem parenchyma.

Powder:

Reddish-brown; shows fragments of cork cells, uniseriate phloem rays, fibres, a number of rosette crystals of calcium oxalate, a few rhomboidal crystals; starch grains simple and compound, round to oval, elliptic, having 2 or 3 components with concentric striations measuring 5 to 13 mm in diameter with small narrow hilum; shows pinkish red fluorescence under near UV light when an extract of the powder with light petroleum (40 to 60°) is exposed.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	25	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	20	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Methanolic extract of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm thickness silica using Toluene: Ethyl acetate: Formic acid: Methanol (6:3:0.1:1.0) shows nine spots at Rf. 0.079 (grey), 0.19 (pinkish blue), 0.23 (dark blue), 0.30 (blue), 0.41 (dark blue), 0.45 (grey), 0.65 (grey), 0.71 (greyish blue) and 0.80 (dark pink). With Anisaldehyde- Sulphuric acid reagent and heating the plate at 105ºC for 5 minutes. Development with the solvent system Toluene: Ethyl formate: Formic acid (5:5:2) shows 6 spots at Rf. 0.17, 0.26, 0.34 0.43(ellagic acid marker), 0.52 and 0.55 (all greyish blue), derivatization being carried out with 5 per cent methanolic ferric chloride solution.

CONSTITUENTS

Friedelin, oleanolic acid, arjunolic acid, arjunic acid, terminic acid, terminoic acid, tomentosic acid, arjunetin, arjungenin, arjun glucoside I,II,III,arjunoletin, arjunin, arjunoside I,II,III,IV,arjunolone,casuarinin, glucotannic acid, catechol, epicatechol,(-)gallocatechol, pyrocatechol, ellagic acid, leucodelphinidin, oxalic acid and ß-sitosterol.

PROPERTIES AND ACTIONS

Cuvai : Tuvarppu (துவர்ப்பு)

Guṇam : Vaṟaḍci (வறட்சி)

Vīrium : Taḍpam (தட்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Tamaraka Veppamuṇḍākki (தமரக வெப்பமுண்டாக்கி), Tuvarppi (துவர்ப்பி), Uramākki (உரமாக்கி)

IMPORTANT FORMULATIONS

Kantaka Paṟpam (கந்தக பற்பம்), Marutampaṭṭai Cūraṇam (மருதம்பட்டை சூரணம்)

THERAPEUTIC USES

Curam/Kāyccal (சுரம்/காய்ச்சல்), Iraippirumal (இரைப்பிருமல்), Itayanōy (இதயநோய்), Kaẓiccal (கழிச்சல்), Nīriẓivu (நீரிழிவு), Puṇ (புண்), Veḷḷai (வெள்ளை), Vayiṟu Vali (வயிறு வலி)

DOSE - Powder 3 - 6 g

MĀVILIṄKAPPAḌṬAI (Stem bark) - மாவிலிங்கப்பட்டை

Māviliṅkappaḍṭai is the dried stem bark of ***Crateva magna*** (Lour.) DC. Syn.***C. nurvala*** Buch.-Ham., ***C.religiosa*** Auct. non Foster f. (Fam. Capparidaceae), a small wild or cultivated tree found throughout the year in India, often found along streams and also in dry, deep boulder formation in Sub-Himalayan tracts.It grows in Kuṟiñci , Mullai, Marutham and thiṇai.

SYNONYMS

Tamil	:	Kumārakam (குமாரகம்), Māvilaṅku (மாவிலங்கு), Vāraṇi (வாரணி)
Bengali	:	Varuna
English	:	Three leaved caper
Gujrati	:	Vayvarno, Varano
Hindi	:	Baruna, Barna
Kannada	:	Bipatri, Mattamavu, Neervalamara
Malayalam	:	Neermatalam
Marathi	:	Haravarna, Varun, Vayavarna
Oriya	:	Baryno
Punjabi	:	Barna, Barnahi
Sanskrit	:	Varuna, Varana
Telugu	:	Bilvarani

DESCRIPTION

a) Macroscopic

Thickness of bark varies, usually 1 to 1.5 cm. according to the age and portion of the plant from where the bark is removed; outer surface, greyish to greyish-brown with ash-grey patches; at places, surface rough due to a number of lenticels, shallow fissures and a few vertical or longitudinal ridges; inner surface smooth and cream white in colour; fracture tough and short; odour indistinct; taste slightly bitter.

b) Microscopic

Transverse section of mature stem bark shows an outer cork composed of thin-walled, rectangular and tangentially elongated cells; phellogen single layered with thin-walled, tangentially elongated cells, followed by a wide secondary cortex, consisting of thin-walled, polygonal to tangentially elongated cells with a number of starch grains; starch grains mostly simple, occasionally compound with 2 or 3 components also present; large number of stone cells in groups of two or more, found scattered in secondary cortex, single stone cells not very common, stone

cells vary in size and shape, being circular to rectangular or elongated with pits and striations on their walls; stone cells distributed somewhat in concentric bands in phloem region except in inner region of phloem which is devoid of stone cells; secondary phloem comparatively a wide zone, consisting of sieve tubes, companion cells, parenchyma and groups of stone cells, alternating with medullary rays; sieve elements found compressed forming ceratenchyma in outer phloem region, whereas in inner region of phloem, intact; medullary rays mostly multiseriate composed of thin-walled, radially elongated cells, tangentially elongated towards outer periphery; a number of starch grains similar to secondary cortex also present in phloem and ray cells; few rhomboidal crystals of calcium oxalate also found in this region.

Powder:

Cream in colour; shows fragments of cork cells; a few rhomboidal crystals of calcium oxalate; pieces of phloem parenchyma, lignified thick-walled stone cells; simple starch grains measuring 3.5 to 8.2 μm in diameter, rarely 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 13 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 8 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Alcoholic extract on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using n-Butanol: Acetic Acid: water (5:1:4) v/v, and on exposure to iodine vapours three spots appear at Rf. 0.13, 0.88 and 0.92 (all yellow). With Anisaldehyde - Sulphuric acid reagent heating the plate at 105°C for five minutes five spots appear at Rf. 0.16, 0.26 (both grey), 0.74, 0.88 (both violet) and 0.92 (blackish violet), prominent spots at Rf. 0.88 (violet) and 0.92 (blackish violet).

CONSTITUENTS

Cadabacine, cadabacine diacetate, (-) -catechin, (-) - epicatechin-5- glucoside, (-)-epiafzelechin, isothicyanate glucoside, glucocapparin, taraxasterol, lupeol, 3-epilupeol, lupeol acetate, diosgenin, friedelin, betulinic acid, ceryl alcohol and spinasterol acetate.

PROPERTIES AND ACTIONS

Cuvai	:	Kaippu (கைப்பு)
Guṇam	:	Ilaku (இலகு), Vaṟaḍci (வறட்சி)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)

Ceykai : Kaṟkaraicci (கற்கரைச்சி), Malamiḷakki (மலமிளக்கி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Uramākki (உரமாக்கி), Veppakaṟṟi (வெப்பகற்றி)

IMPORTANT FORMULATIONS

Vātacurak Kuḍinīr (வாதசுரக் குடிநீர்)

THERAPEUTIC USES

Kallaḍaippu (கல்லடைப்பு), Kāṇākaḍi (காணாகடி), Puraiyōḍiya Puṇkaḷ (புரையோடிய புண்கள்), Vaḷi Nōykaḷ (வளி நோய்கள்)

DOSE - Decoction 30- 50 ml twice daily.

30- 50 g coarse powder in 200 ml of water for preparing decoction.

MIḶAKU (Fruit) - மிளகு

Miḷaku is the fully mature dried fruit of ***Piper nigrum*** L. (Fam. Piperaceae), a climber, cultivated from Konkan Southwards, especially in North Konkan Kerala, and also in Assam.; fruits ripen from December to March, depending upon climatic conditions; fruits harvested from December to April. It grows in Kuṟiñcithiṇai.

SYNONYMS

Tamil	:	Kaṟi (கறி), Kāyam (காயம்), Malaiyāḷi (மலையாளி), Mārīcam (மாரீசம்), Vallīcam (வல்லீசம்)
Bengali	:	Golmorich, Kalamorich, Morich
English	:	Black pepper
Gujrati	:	Kalimori
Hindi	:	Kalimirch
Kannada	:	Karimonaru, Menaru
Malayalam	:	Karumulaku
Marathi	:	Kalamiri
Punjabi	:	Galmirich, Kalimirch
Sanskrit	:	Marica, Vellaja, Usana
Telugu	:	Miriyalu, Marichamu
Urdu	:	Fulfil Siyah, Kalimirich

DESCRIPTION

a) Macroscopic

Fruits greyish-black to black, hard, wrinkled, 0.4 to 0.5 cm. in dia.; odour aromatic; taste pungent.

b) Microscopic

Fruit consists of a thick pericarp for about one third of fruit and an inner mass of perisperm, enclosing a small embryo; pericarp consists of epicarp, mesocarp and endocarp; epicarp composed of single layered, slightly sinuous, tabular cells forming epidermis, below which, are present 1 or 2 layers of radially elongated, lignified stone cells adjacent to group of cells of parenchyma; mesocarp wide, composed of band of tangentially elongated parenchymatous cells having a few isolated, tangentially elongated oil cells present in outer region and a few fibro-vascular bundles, a single row of oil cells in the inner region of mesocarp; endocarp composed of a row of beakershaped stone cells; testa single layered, yellow coloured, thick-walled sclerenchymatous cells; perisperm contains parenchymatous cells having a few oil globules and angular, polyhedral

cells packed with abundant, oval to round, simple and compound starch grains measuring 5.5 to 11.0 µm in dia.; having 2 or 3 components and a few minute aleurone grains.

Powder:

Blackish-grey; shows debris with a characteristic groups of more or less isodiametric or slightly elongated stone cells, interspersed with thin-walled, polygonal hypodermal cells; beaker-shaped stone cells from endocarp and abundant polyhedral, elongated cells from perisperm, packed tightly with masses of minute compound and single, oval to round, starch grains measuring 5.5 to 11.0 µm in dia.; having 2 or 3 component and a few 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	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	6	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 the Alcoholic extract on silica gel 'G' plate using Toluene: Ethyl acetate (7:3) shows in visible light four spots at Rf.0.05, 0.08 (both light green), 0.27 (light yellow) and 0.52 (yellow). Under UV (366 nm.) ten fluorescent zones are visible at Rf. 0.05, 0.08 (both light brown), 0.20 (light blue), 0.46 (blue), 0.52 (greenish yellow), 0.57 (bluish yellow), 0.66 (light blue), 0.74 (light pink), 0.82 and 0.97 (both blue). On exposure to iodine vapours eleven spots appear at Rf. 0.05, 0.08, 0.14, 0.20, 027, 0.34, 0.46, 0.57, 0.66, 0.74 and 0.97 (all yellow). On spraying with Dragendorff reagent followed by 5% Methanolic- Sulphuric acid reagent nine spots appear at Rf. 0.05 (light orange), 0.14, 0.20, 0.27 (all orange), 0.46, 0.57 (both yellowish orange), 0.66, 0.74 (both orange) and 0.97 (light orange). On spraying with Vanillin- Sulphuric acid reagent and heating the plate for five minutes at 105º C twelve spots appear at Rf. 0.05, 0.08, 0.20, 0.27, 0.46, 0.52, 0.57, 0.66, 0.74, 0.82, 0.90 and 0.97 (all violet).

CONSTITUENTS

Chavicine, piperine, piperidine, piperitine, pipercide, isochavinic acid, methyl caffeic acid, pipericide, α and β- cic-bergamotene, guineensine, N- dtransferuloyltyramine, N-5- (4-hydroxy-phenyl) 2E, 4E-pentadienoyl piperidine, N- isobutyl-2E, 4E, 8Z-eicosatrienamide, N-isobutyl- 2E, 4E- octadecadienamide, pellitorine, N-trans-feruloyl piperidine, feruperine, dihydroferuperine, (E, E) -N- (2-methyl propyl) -2, 4-decadienamide, (E, E, E)-13- (1, 3-benzodioxol-5-yl) -N- (2- methyl propyl) -2, 4, 12- tridecatrienamide, (E, E, E) -11 - 1, 3 - Benzodioxol-5-yl) N- (2-methyl propyl) -2, 4, 10 - tridecatrienamde, piperonal, pioperoleine B, (2E, 4E)- N-isobutyl-2, 4- decadienamide (-) cubelin, (-) 3-4-dimethoxy-3, 4-desmethylene dioxycubalin, dihydrocarveol, caryophylleneoxide,cryptone, α and β- pinene,1-α-phellanthrene, β-caryophyllene, epoxydihydrocaryophyllene, m - mentha - 3 (8), 6-dione (isosylreterpinolene) delta -3- carene, limonene and pipwaqarine.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை), Va̲ṛaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvaka̲ṛṛi (அகட்டுவாய்வகற்றி), Kāraluṇḍākki (காரலுண்டாக்கி), Mu̲ṛaiveppaka̲ṛṛi (முறைவெப்பகற்றி), Naccaka̲ṛṛi (நச்சகற்றி), Vātamaḍakki (வாதமடக்கி), Veppamuṇḍākki (வெப்பமுண்டாக்கி), Vīkkaṅkaraicci (வீக்கங்கரைச்சி)

IMPORTANT FORMULATIONS

Aśḍāthic Cūraṇam (அஷ்டாதிச் சூரணம்), Civa̲ṉār Amirtam (சிவனார் அமிர்தம்), Cuvācakuḍōri (சுவாசகுடோரி), Ēlātic Cūraṇaṃ (ஏலாதிச் சூரணம்), Nilavākaic Cūraṇam (நிலவாகைச் சூரணம்), Pañcatīpākki̲ṉi Cūraṇam (பஞ்சதீபாக்கினி சூரணம்), Tāḷicāti Vaḍakam (தாளிசாதி வடகம்), Tirikaḍukuc Cūraṇam (திரிகடுகுச் சூரணம்)

THERAPEUTIC USES

A̲ẓal Nōykaḷ (அழல் நோய்கள்), Ceriyāmai (செரியாமை), Curam/Kāyccal (சுரம்/காய்ச்சல்), Cuvaiyi̲ṉmai (சுவையின்மை), Ka̲ẓalai (கழலை), Timir Vātam (திமிர் வாதம்), Vaḷi Nōykaḷ (வளி நோய்கள்)

DOSE - Powder 250 - 500 mg

Decoction 30- 50 ml twice daily.

15 - 30 g coarse powder in 200 ml of water for preparing decoction.

MŪKKIRAḌṬAI CAMŪLAM (Whole Plant) - மூக்கிரட்டை சமூலம்

Mūkkiraḍṭai Camūlam is the dried, whole plant of ***Boerhaavia diffusa*** L. (Fam. Nyctaginaceae), a trailing herb found throughout India and collected after rainy season; herb is diffusely branched with stout root stock and many long, slender, prostrate or ascending branches.It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Irattapuḍpikā (இரத்தபுட்பிகா), Mūkkuraḍḍai(Civappu) (மூக்குரட்டை(சிவப்பு)), Puḍpakam (புட்பகம்)
Assamese	:	Ranga punarnabha
Bengali	:	Rakta punarnava
English	:	Horse purslene, Hog weed
Gujrati	:	Dholisaturdi, Motosatodo
Hindi	:	Gadapurna, Lalpunarnava
Kannada	:	Sanadika, Kommeberu, Komma
Kashmiri	:	Vanjula Punarnava
Malayalam	:	Chuvanna Tazhutawa
Marathi	:	Ghetuli, Vasuchimuli, Satodimula, Punarnava, Khaparkhuti
Oriya	:	Lalapuiruni, Nalipuruni
Punjabi	:	Itcit (lal), Khattan
Sanskrit	:	Punarnava (Rakta), Kathilla, Sophagnni, Sothaghni
Telugu	:	Atikamaidi, Erra galijeru

DESCRIPTION

a) Macroscopic

Root-Well developed, fairly long, somewhat tortuous, cylindrical, 0.2 to 1.5 cm. in diameter; yellowish brown to brown coloured, surface rough due to minute longitudinal striations and root scars; fracture short; no distinct odour; taste slightly bitter.

Stem-Greenish purple, stiff, slender, cylindrical, swollen at nodes, minutely pubescent or nearly glabrous, prostrate, divaricately branched, branches from common stalk, often more than a metre long

Leaf- Opposite in unequal pairs, larger ones 25 to 37 mm. long and smaller ones 12 to 18 mm. long, ovate-oblong or suborbicular, apex rounded or slightly pointed, base subcordate or rounded,

green and glabrous above, whitish below, margin entire or sub-undulate, dorsal side pinkish in certain cases, thick in texture, petioles nearly as long as the blade, slender.

Flowers- Small clusters of 4 to 10 corymb, axillary and in terminal panicles; very small, pink coloured, nearly sessile or shortly stalked, 10 to 25 cm., umbels, arranged on slender long stalks, bracteoles small, acute, perianth tube constricted above the ovary, lower part greenish, ovoid, ribbed, upper part pink, funnel-shaped, 3 mm. long, tube 5 lobed, stamen 2 or 3.

Fruit-One seeded nut, 6 mm. long, clavate, rounded, broadly and bluntly 5 ribbed, viscidly glandular.

b) Microscopic

Root - Transverse section of mature root shows anomalous secondary growth; cork composed of thin-walled tangentially elongated cells with brown walls in the outer few layers; cork cambium of 1 or 2 layers of thin-walled cells; secondary cortex consists of 2 or 3 layers of parenchymatous cells followed by cortex composed of 5 to 12 layers of thin-walled, oval to polygonal cells; several concentric bands of xylem tissue alternating with wide zone of parenchymatous tissue present below cortical regions; number of bands vary according to thickness of root and composed of vessels, tracheids and fibres; vessels mostly found in groups of 2 to 8, in radial rows, having simple pits and reticulate thickening; tracheids small, thick-walled with simple pits; fibres aseptate, elongated, thick-walled, spindle shaped with pointed ends; phloem occurs as hemispherical or crescentic patches outside each group of xylem vessels and composed of sieve elements and parenchyma; broad zone of parenchymatous tissue, in between two successive rings of xylem elements composed of thin-walled more or less rectangular cells arranged in radial rows, central regions of root occupied by primary vascular bundles; numerous raphides of calcium oxalate, in single or in group present in cortical region and parenchymatous tissue in between xylem tissue; starch grains simple and compound having 2 to 4 components found in abundance in most of cells of cortex and in parenchymatous tissue between xylem elements, starch grains mostly rounded in shape and measure 2.75 to 11 μm in diameter.

Stem- Transverse section of young stem shows epidermal layer containing multicellular, uni seriate glandular trichomes consisting of 9 to 12 stalked cells and an ellipsoidal head, 150 to 220 μm long; cortex consists of 1 or 2 layers of parenchyma; endodermis indistinct; pericycle 1 or 2 layered, thick-walled often containing scattered isolated fibres; stele consists of two medullary bundles, a middle ring of 6 to 14 bundles and an outer ring of 15 to 20 or more small bundles; intra fascicular cambium present. Mature stem shows anomalous secondary thickening in the form of a succession of rings of vascular bundles; the secondary bundles exhibit a concentric or irregular arrangement embedded in parenchymatous conjunctive tissue, thin walled lignified groups of parenchymatous cells frequently associated with the phloem; the phloem groups and adjoining ground parenchyma occasionally appear as concentric annular or band shaped strips of tissue.

Leaf- Dorsiventral; epidermis single layered; in surface view, the upper epidermal cells have straight walls and lower epidermal cell walls slightly wavy, stomata anomocytic present on both lower and upper surface, but more in number on lower surface; multicellular glandular trichomes present on both the surfaces; palisade single layered, followed by 2 to 4 layered spongy parenchyma cells with small intercellular spaces; vascular bundle surrounded by an incomplete bundle sheath; idioblasts containing raphides; occasionally cluster crystal of calcium oxalate and orange-red resinous matter present in mesophyll; dorsal side of the midrib composed of 2 layered collenchyma, ground tissue parenchymatous; vascular bundle protected by 2 to 3 layered thick walled cells on the dorsal side; palisade ratio 3 to 7; stomatal index 11 to 16 for upper surface, 10 to 14 for lower surface; vein- islet number 9 to 15 per square mm.

Powder:

Brown; shows parenchyma cells; fragments of tracheids, vessels with reticulate thickening; fragments of unicellular hairs; numerous acicular and cluster crystals of calcium oxalate; simple, rounded starch grains measuring 2.75 to 11 µm in dia., compound having 2 to 4 components.

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 6 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 4.0 per cent, Appendix	2.2.7.

ASSAY

Contains not less than 0.1 per cent of total alkaloids, when assayed by the following methods:-

About 100 g of the drug (60 mesh powder) is taken and moistened with dilute solution of Ammonia. It is extracted continuously in a Soxhlet apparatus for 18 hours with 95 per cent Alcohol. The Alcohol is removed by distillation. The residue is extracted with five 25 ml portions of 1 N Hydrochloric acid till complete extraction of the alkaloid is effected. The mixed acid solutions is transferred into a separating funnel and washed with 25 ml of Chloroform and the Chloroform washings are rejected. The aqueous acid solution is made distinctly alkaline with Ammonia and shaken with five 25 ml portions of Chloroform till complete extraction of alkaloids is effected. The combined Chloroform extract is washed with two portions each of 25 ml of water. The Chloroform layer is filtered in tared flask and evaporated to dryness. The percentage of the total alkaloid is calculated.

T.L.C.

T.L.C. of Alcoholic extract on silica gel 'G' plate using Toluene: Ethyl Acetate: Acetone (2:4:4) v/v, under UV (366 nm.) four fluorescent zones visible at Rf. 0.45, 0.62, 0.69 and 0.75 (all red). On spraying with 4% Methanolic- Sulphuric acid reagent and heating the plate for five minutes at 105°C six spots appear at Rf. 0.31, 0.45, 0.62, 0.69, 0.80 & 0.96 (all grey).

CONSTITUENTS

Punarnavoside, boeravinones A, B, C, D & E, liridodendrin, syringaresinol mono - ß - D-glucoside, boeravine and hypoxanthine - 9-L-arabinofuranoside.

PROPERTIES AND ACTIONS

Cuvai	:	Kaippu (கைப்பு)
Guṇam	:	Vaṟaḍci (வறட்சி)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Kōzaiyakaṟṟi (கோழையகற்றி), Kuḷircciyuṇḍākki (குளிர்ச்சியுண்டாக்கி), Malamiḷakki (மலமிளக்கி), Puzuvakaṟṟi (புழுவகற்றி), Vāntiyuṇḍākki (வாந்தியுண்டாக்கி)

IMPORTANT FORMULATIONS

Tāḷakacentūram (தாளகசெந்தூரம்)

THERAPEUTIC USES

Azal Nōykaḷ (அழல் நோய்கள்), Iraippu (இரைப்பு), Kāmālai (காமாலை), Kīlvāyu (கீல்வாயு), Namaiccal (நமைச்சல்), Nīrkkaḍḍu (நீர்க்கட்டு), Peruvayiṟu (பெருவயிறு), Vaḷi Nōykaḷ (வளி நோய்கள்)

DOSE - Powder 1 - 3g

NANNĀRI (Root) - நன்னாரி

Nannāri is the root of ***Hemidesmus indicus*** (L.) R. Br. (Fam. Asclepiadaceae), a prostrate or semi-erect laticiferous herb, found throughout India from upper Gangetic plains east-wards to Assam, throughout Central, Western and Southern India upto an elevation of 600 m

SYNONYMS

Tamil : Aṅkāri Mūli (அங்காரி மூலி), Cāriyam (சாரியம்), Kāmavalli (காமவல்லி), Kiruṣṇavalli (கிருஷ்ணவல்லி), Pātāḷa Mūli (பாதாள மூலி)

Assamese : Vaga sariva

Bengali : Anantamul, Shvetashariva

English : Indian sarasa parilla

Gujrati : Kabri, Upalsari

Hindi : Anantamul

Kannada : Anantamool, Bili namadaberu, Namada veru, Sogadeberu, Namadaberu

Kashmiri : Anant mool

Malayalam : Nannari, Nannar, Naruneendi

Marathi : Upalsari, Anantamula

Oriya : Dralashvan lai, Anantamool

Punjabi : Anantmool, Ushbah

Sanskrit : Sveta sariva, Ananta, Gopasuta

Telugu : Sugandhi pala, Tella Sugandhi

Urdu : Ushba hindi

DESCRIPTION

a) Macroscopic

Roots occur in pieces, about 30 cm. long and 3 to 8 mm. in diameter, cylindrical, thick, hard, somewhat tortuous, sparsely branched, provided with a few thick rootlets and secondary roots; external appearance dark brown, sometimes with violet-grey tinge; center yellow, woody, surrounded by a mealy white cortical layer; bark brownish, corky, marked with transverse cracks and longitudinal fissures and easily detachable from the hard central core; odour characteristic; taste sweetish, slightly acrid and aromatic.

b) Microscopic

Transverse section of root shows periderm consisting of three layers of tissues, cork, cork cambium and secondary cortex; cork cells radially flattened and rectangular in appearance filled

with dark brown contents giving reactions of tannins; cork cambium, 2 or 3 layered, compressed, and filled with deep brown contents; secondary cortex, 3 or 4 layers of cells, similar to cork cells, with very little or no dark brown contents; secondary phloem consists of sieve elements, parenchyma, phloem ray cells alongwith several laticiferous ducts; parenchyma cells filled with starch grains, diameter 7 to 10 µm, occasional prismatic crystals of calcium oxalate; laticiferous ducts scattered in parenchymatous tissue; cambium very narrow; xylem traversed by narrow medullary rays; vessels and tracheids characterized by the presence of pitted markings; pith absent and central region occupied by woody tissues.

Powder:

Brown; shows parenchyma cells filled with oval or rounded starch grains 7 to19 µm in dia., having 2 to 8 or more components or prismatic calcium oxalate crystals; pieces of laticiferous ducts; vessels with spiral thickenings.

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.
Alcohol-soluble extractive	Not less than 15 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than 13 per cent, Appendix	2.2.7.

T.L.C.

T.L.C of Chloroform soluble fraction of alcoholic extract on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Toluene: Ethyl acetate : Methanol (8:2:0.5), with Anisaldehyde- Sulphuric acid reagent and heating the plate, at 105ºC for five minutes shows six spots at Rf. 0.59 (bluish grey), 0.65 (blue), 0.72 (pinkish violet), 0.80 (bluish grey), 0.91 and 0.94 (both pinkish violet).

CONSTITUENTS

2-hydroxy, 4- methoxy-benzoic acid, essential oil containing mainly 2- hydroxy - 4- methoxy benzaldehyde, nerolidol, borneol, linalylacetate, dihydrocarvylacetate, salicylaldehyde, isocaryophyllene, á- terpinylacetate, 1, 8- cineol, lupeol acetate,oleanane, ursane and lupane derivatives, coumarino lignoids - hemidesminine, hemidesmin 1 and 2.

PROPERTIES AND ACTIONS

Cuvai : I**ṉ**ippu (இனிப்பு), Kaippu (கைப்பு)

Guṇam : Noymai (நொய்மை), Tiṇmai (திண்மை)

Vīrium : Taṭpam (தட்பம்)

Pirivu : I**ṉ**ippu (இனிப்பு)

Ceykai : Ci**ṟ**unīrperukki (சிறுநீர்பெருக்கி), U**ḷḷ**a**ẕ**alā**ṟṟ**i (உள்ளழலாற்றி), Uramākki (உரமாக்கி), Uṭda**ṟ**tē**ṟṟ**i (உடற்தேற்றி), Viyarvaiyuṇṭākki (வியர்வையுண்டாக்கி)

IMPORTANT FORMULATIONS

Maṇḍūrāti Aḍaikkuḍinīr (மண்டூராதி அடைக்குடிநீர்), Paṟaṅkippaḍḍai Iracāyaṉam (பறங்கிப்பட்டை இரசாயனம்), Pittacurak Kuḍinīr (பித்தசுரக் குடிநீர்)

THERAPEUTIC USES

Aẕal Nōykaḷ (அழல் நோய்கள்), Curavēḍkai (சுரவேட்கை), Nīrēṟṟam (நீரேற்றம்), Nīriẕivu (நீரிழிவு), Vaṇḍu Kaḍi (வண்டு கடி)

DOSE - Decoction 30- 50 ml twice daily.

30- 50 g coarse powder in 200 ml of water for preparing decoction.

NĀYURUVI CAMŪLAM (Whole Plant) - நாயுருவி சமூலம்

Nannāri is the root of ***Hemidesmus indicus*** (L.) R. Br. (Fam. Asclepiadaceae), a prostrate or semi-erect laticiferous herb, found throughout India from upper Gangetic plains east-wards to Assam, throughout Central, Western and Southern India upto an elevation of 600 m.It grows in Marutham thiṇai.

SYNONYMS

Tamil : Apamārkki (அபமார்க்கி), Allam (அல்லம்), Ciṟukaḍalāḍi (சிறுகடலாடி), Kāñcari (காஞ்சரி), Māmuṉi (மாமுனி)

Bengali : Apamg

English : Prickly chaff flower

Gujrati : Aghedo

Hindi : Chirchita, Latjira

Kannada : Uttarani

Malayalam : Katalati

Marathi : Aghada

Punjabi : Puthakanda

Sanskrit : Apamarga, Mayura, Pratyakpuspa, Kharamanjar, Sikhari

Telugu : Uttarenu

Urdu : Chirchita

DESCRIPTION

a) Macroscopic

Root - Cylindrical tap root, slightly ribbed, 0.1 to 1.0 cm. in thickness, gradually tapering, rough due to presence of some root scars; secondary and tertiary roots present, yellowish-brown; odour not distinct.

Stem - 0.3 to 0.5 cm. in cut pieces, yellowish-brown, erect, branched, cylindrical, hairy, solid but hollow when dry.

Leaf - Simple, sub sessile, exstipulate, opposite, decussate, wavy margin, obovate, slightly acuminate and pubescent.

Flower - Arranged in inflorescence of long spikes, greenish-white, numerous sessile, bracteate with two bracteoles, one spine lipped, bisexual, actinomorphic, hypogynous; perianth segments 5, free, membranous, contorted or quincuncial, stamens 5, opposite, the perianth lobes, connate forming a membranous tube-like structure, alternating with truncate and fimbriate staminodes, filament short;

anther, two celled, dorsifixed; gynoecium bicarpellary, syncarpous; ovary superior, unilocular with single ovule; style, single; stigma, capitate.

Fruit - An indehiscent dry utricle enclosed within persistent, perianth and bracteoles.

Seed - Sub-cylindric, truncate at the apex, round at the base, endospermic, brown.

b) Microscopic

Root - Mature root shows 3 to 8 layered, rectangular, tangentially elongated, thin-walled cork cells; secondary cortex consisting of 6 to 9 layers, oval to rectangular, thin-walled, parenchymatous cells having a few scattered single or groups of stone cells; followed by 4 to 6 discontinuous rings of anomalous secondary thickening composed of vascular tissues; small patches of sieve tubes distinct in phloem parenchyma, demarcating the xylem rings; xylem composed of usual elements; vessels simple pitted; medullary rays 1 to 3 cells wide; small prismatic crystals of calcium oxalate present in cortical region and numerous in medullary rays.

Stem - Young stem shows 6 to 10 prominent ridges; epidermis single layered, covered by thick cuticle having uniseriate, 2 to 5 celled, covering trichomes and glandular with globular head on a 3 to 4 celled stalk; cortex 6 to 10 layered, composed of parenchymatous cells, most of them containing rosette crystals of calcium oxalate; in the ridges cortex collenchymatous; vascular bundles lie facing each ridge capped by pericyclic fibres; transverse section of mature stem shows lignified, thin-walled cork cells; pericycle a discontinuous ring of lignified fibres; vascular tissues show anomalous secondary growth having 4 to 6 incomplete rings of xylem and phloem; secondary phloem consists of usual elements forming incomplete rings; cambial strip present between secondary xylem and phloem; vessels annular, spiral, scalariform and pitted, fibres pitted, elongated, lignified; pith wide consisting of oval to polygonal, parenchymatous cells; two medullary bundles; clustered crystals of calcium oxalate, microsphenoidal calcium oxalate crystals present in some epidermal, cortical and pith cells.

Leaf

Petiole - Shows crescent-shaped outline, having single-layered epidermis with thickcuticle; ground tissue consisting of thin-walled, parenchymatous cells containing rosette crystals of calcium oxalate; 4 or 5 vascular bundles situated in mid region.

Midrib - Shows a single layered epidermis on both surfaces; epidermis followed by 4 or 5 layered collenchyma on upper side and 2 or 3 layered on lower side; ground tissue consisting of thin-walled, parenchymatous cells having a number of vascular bundles; each vascular bundle shows below the xylem vessels, thin layers of cambium followed by phloem and a pericycle represented by 2 or 3 layers of thick-walled, non-lignified cell; rosette crystals of calcium oxalate found scattered in ground tissues.

Lamina - Dorsiventral; shows single layered, tangentially elongated epidermis cells covered with thick cuticle having covering trichomes which are similar to those of stem found on both surfaces; palisade 2 to 4 layered of thick parenchyma larger, slightly elongated in upper, while smaller and rectangular in lower surface; spongy parenchyma 3 to 5 layers thick, more or less isodiametric parenchymatous cells; idioblast containing large rosette crystals of calcium oxalate distributed in mesophyll; stomata anomocytic present on both surfaces; stomatal index 4.5 to 9.0 on upper surface, 9.0 to 20.0 on lower surface; palisade ratio 7.0 to 11; vein- islet number 7 to 13 per square mm.

Powder:

Light yellow; shows fragments of elongated, rectangular, thin-walled eipdermal cells; aseptate fibres, vessels with annular, spiral, scalariform and pitted thickening; uniseriate hair with bulbous base; rosette and prismatic 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 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 2 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 the Methanolic extract of the drug on silica gel 'G' plate using n- Hexane: Ethyl Acetate: glacial Acetic Acid (10.0:5.0:0.1) shows 3 spots at Rf. 0.20 (light pink), 0.49 (dark pink, oleanolic acid marker), 0.55 (dark yellow), and two brown spots one of which stays on the base and the other running to the solvent front with a green chlorophyll spot below it, on spraying with 1:1 aqueous Sulphuric acid reagent and heating the plate at 105ºC for five minutes.

CONSTITUENTS

Triterpenoid saponins A-D, possessing oleanolic acid as aglycone, ecdysone, ecdysterone, tritriacontane, pentatriacontane, hexatriacontane, 6- pentatria contanone, 4-tritria contanone, 10-tria cosanone,17 - pentatriacontanol, 27- cyclohexyl heptacosan- 7-ol, 16, hydroxy -26- methyl heptacosan - 2- one and 36, 47, dihydroxyhenpentacontan - 4 - one, betaine.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு), Kārppu (கார்ப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Acaivu (அசைவு), Kūrmai (கூர்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Muṟaiveppakaṟṟi (முறைவெப்பகற்றி), Tuvarppi (துவர்ப்பி), Uḍaṟtēṟṟi (உடற்தேற்றி)

IMPORTANT FORMULATIONS

Nākaccentūram (நாகச்செந்தூரம்)

THERAPEUTIC USES

Cevinōy (செவிநோய்), Cūtakataḍai (சூதகதடை), Aiya Nōykaḷ (ஐய நோய்கள்), Irumal (இருமல்), Kāmālai (காமாலை), Kuṉmam (குன்மம்), Veḷḷai (வெள்ளை), Veḷuppu Nōy/Pāṇḍu (வெளுப்பு நோய்/பாண்டு), Vīkkam (வீக்கம்)

DOSE - Decoction 30- 50 ml twice daily.20 - 50 g coarse powder in 200 ml of water for preparing decoction.

NELLIKKĀY (Fresh Fruit) - நெல்லிக்காய்

Nellikkāy is the fresh fruit of ***Phyllanthus emblica*** L. Syn. ***Emblica officinalis*** Gaertn. (Fam. Euphorbiaceae), a small or medium sized tree, found in mixed deciduous forests, ascending to 1300 m. on hills and cultivated in gardens and homeyards.It grows in Kuṟiñciand Marutham thiṇai.

SYNONYMS

Tamil	:	Āmalakam (ஆமலகம்), Kōraṅkam (கோரங்கம்), Miṟutupalā (மிறுதுபலா), Nelli (நெல்லி), Tāttiri (தாத்திரி)
Bengali	:	Amla, Dhatri
English	:	Amlaku, Amlakhi, Amlakhu, Emblic myrobalan
Gujrati	:	Ambala, Amla
Hindi	:	Amla, Aonla
Kannada	:	Nellikayi
Kashmiri	:	Embali, Amli
Malayalam	:	Nellikka
Marathi	:	Anvala, Avalkathi
Oriya	:	Ainla, Anala
Punjabi	:	Amla, Aula
Sanskrit	:	Amalaki, Amrtaphala, Dhatriphala
Telugu	:	Usirika
Urdu	:	Amla, Amlaj

DESCRIPTION

a) Macroscopic

Fruit, globose, 2.5 to 3.5 cm. in diameter, fleshy, smooth with six prominent lines; greenish when tender, changing to light yellowish or pinkish colour when mature, with a few dark specks; taste sour and astringent followed by delicately sweet taste.

b) Microscopic

Transverse section of mature fruit shows an epicarp consisting of single layer of epidermis and 2 to 4 layers of hypodermis; epidermal cell, tabular in shape, covered externally with a thick cuticle and appear in surface view as polygonal; hypodermal cells tangentially elongated, thick-walled, smaller in dimension than epidermal cells; mesocarp forms bulk of fruit, consisting of thin-walled parenchymatous cells with intercellular spaces, peripheral 6 to 9 layers smaller, ovoid or

tangentially elongated while rest of cells larger in size, isodiametric with prominent corner thickenings; several collateral fibrovascular bundles scattered throughout mesocarp consisting of xylem and phloem; xylem composed of tracheal elements, fibre tracheids and xylem fibres; tracheal elements show reticulate, scalariform and spiral thickenings; xylem fibres elongated with narrow lumen and pointed end; mesocarp contains large aggregates of numerous irregular silica crystals.

IDENTITY, PURITY AND STRENGTH

Moisture content	Not less than 80 per cent, Appendix	2.2.9
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 40 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than 50 per cent, Appendix	2.2.7.

T.L.C.

T.L.C of Dichloromethane- soluble fraction of Alcoholic extract of the drug on silica gel 'G' plate using Toluene: Ethyl Acetate : Formic Acid (5:4:1), on exposure to iodine vapours shows seven spots at Rf. 0.04, 0.12, 0.19, 0.32, 0.41, 0.48 and 0.61 (all yellow). On spraying with 5% Ferric chloride solution three spots appear at Rf. 0.04, 0.19 and 0.32 (all blackish violet).

CONSTITUENTS

Ascorbic acid, gallic acid, ellagic acid, L-malic acid-2-O-gallate, mucic acid-2-O-gallate, mucic acid-1,4-lactone, 2-O-gallate, 5-O-gallate, 3-O-gallate, 3,5-di-O-gallate and tannins.

PROPERTIES AND ACTIONS

Cuvai : I**ṉ**ippu (இனிப்பு), Pu**ḷ**ippu (புளிப்பு), Tuvarppu (துவர்ப்பு)

Guṇ**am** : Ilaku (இலகு), Va**ṟ**a**ḍ**ci (வறட்சி)

Vī**rium** : Ta**ḍ**pam (தட்பம்)

Pirivu : I**ṉ**ippu (இனிப்பு)

Ceykai : Ci**ṟ**unī**r**perukki (சிறுநீர்பெருக்கி), Kāyaka**ṟ**pamākki (காயகற்பமாக்கி), Ku**ḷ**ircciyu**ṇḍ**ākki (குளிர்ச்சியுண்டாக்கி), Malami**ḷ**akki (மலமிளக்கி)

IMPORTANT FORMULATIONS

Irunellik Ka**ṟ**pam (இருநெல்லிக் கற்பம்), Ki**ḷ**iñcal Me**ẕ**uku (கிளிஞ்சல் மெழுகு), Nelli I**ḷ**akam (நெல்லி இளகம்), Po**ṉṉ**ā**ṅ**kā**ṇ**it Tailam (பொன்னாங்காணித் தைலம்)

THERAPEUTIC USES

Aiya Nōykaḷ (ஐய நோய்கள்), Mayakkam (மயக்கம்), Pīṉicam (பீனிசம்), Piramēkam (பிரமேகம்), Vānti (வாந்தி), Veṟi Nōy (வெறி நோய்)

DOSE - Powder 10 - 20 g

Fresh juice 5 - 10 ml

NELLI VARRAL (Dried Fruit) - நெல்லி வற்றல்

Nelli Varral is the dried pericarp of mature fruit devoid of seeds, of ***Phyllanthus emblica*** L. Syn. ***Emblica officinalis*** Gaertn. (Fam. Euphorbiaceae), a small or medium sized tree, found in mixed deciduous forests, ascending to 1300 m. on hills and cultivated in gardens and homeyards.It grows in Kuriñciand Marutham thiṇai.

SYNONYMS

Tamil	:	Āmalakam (ஆமலகம்), Kōraṅkam (கோரங்கம்), Mirutupalā (மிறுதுபலா), Nelli (நெல்லி), Nellikkāy (நெல்லிக்காய்), Nellimuḷḷi (நெல்லிமுள்ளி), Tāttiri (தாத்திரி)
Assamese	:	Amlakhi, Amlaku, Amlakhu
Bengali	:	Amla, Dhatri
English	:	Emblic myrobalan
Gujrati	:	Ambala, Amla
Hindi	:	Amla, Aonla
Kannada	:	Nellikayi
Kashmiri	:	Amli, Embali
Malayalam	:	Nellikka
Marathi	:	Anvala, Avalkathi
Oriya	:	Ainla, Anala
Punjabi	:	Amla, Aula
Sanskrit	:	Amalaki, Amrtaphala, Dhatriphala
Telugu	:	Usirika
Urdu	:	Amla, Amlaj

DESCRIPTION

a) Macroscopic

Drug consists of curled pieces of pericarp of dried fruit occurring as separated segments; 1 to 2 cm. long or united with 3 or 4 segments; bulk colour grey to black, pieces showing a broad, highly shrivelled and wrinkled external convex surface to somewhat concave, transversely wrinkled lateral surface, external surface shows a few whitish specks, occasionally some pieces show a portion of stony testa; texture rough, cartilaginous, tough; taste sour and astringent.

b) Microscopic

Transverse section of fruit shows epicarp consisting of single layer of epidermis, cell appearing tabular and polygonal in surface view; cuticle present; mesocarp cells tangentially elongated parenchymatous and crushed, differentiated roughly into a peripheral 8 or 9 layers of tangentially elongated smaller cells, rest consisting of mostly isodiametric larger cells with walls showing irregular thickenings; ramified vascular elements occasionally present; occasionally stone cells may be present either isolated or in small groups towards endocarp; pitted vascular fibres, walls appearing serrated due to the pit canals leading into lumen.

Powder:

Black; shows epidermis with uniformly thickened straight walled, isodiametric parenchyma cells with irregular thickened walls; occasionally short fibres and tracheids.

IDENTITY, PURITY AND STRENGTH

Moisture content	Not less than	50 per cent, Appendix	2.2.9
Foreign matter	Not more than	3 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	40 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	50 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Dichloromethane- soluble fraction of Alcoholic extract on silica gel 'G' plate using Toluene: Ethyl Acetate : Formic Acid (5:4:1), on exposure to iodine vapours shows five spots at Rf.0.18, 0.32, 0.48,0.92 and 0.95 (all yellow). On spraying with 5% Ferric chloride solution two spots appear at Rf. 0.18 and 0.32 (both blackish violet).

CONSTITUENTS

Ascorbic acid, tannins gallic, ellagic, phyllemblic acid and emblicol.

PROPERTIES AND ACTIONS

Cuvai : I**ṉ**ippu (இனிப்பு), Pu**ḷ**ippu (புளிப்பு), Tuvarppu (துவர்ப்பு)

Guṇ**am** : Ilaku (இலகு), Va**ṟ**a**ḍ**ci (வறட்சி)

Vī**rium** : Ta**ḍ**pam (தட்பம்)

Pirivu : I**ṉ**ippu (இனிப்பு)

Ceykai : Ci**ṟ**unī**r**perukki (சிறுநீர்பெருக்கி), Ku**ḷ**ircciyu**ṇḍ**ākki (குளிர்ச்சியுண்டாக்கி), Malami**ḷ**akki (மலமிளக்கி)

IMPORTANT FORMULATIONS

Ā̲nanta Pairavam (ஆனந்த பைரவம்), Kantaka Iracāya̲nam (கந்தக இரசாயனம்), Nellikkāy Iḷakam (நெல்லிக்காய் இளகம்), Tiripalaic Cūraṇam (திரிபலைச் சூரணம்)

THERAPEUTIC USES

E̲npurukki Nōy (என்புருக்கி நோய்), Kuruti A̲zal (குருதி அழல்), Uḍcūḍu (உட்சூடு), Perumpāḍu (பெரும்பாடு), Veḷḷai (வெள்ளை)

DOSE - Powder 3 - 6 g

NERUÑCI MUḶ (Fruit) - நெருஞ்சி முள்

Neruñci Muḷ is the dried, ripe, entire fruit of ***Tribulus terrestris*** L.(Fam. Zygophyllaceae), an annual rarely perennial prostrate, common weed of the pasture lands, road sides and other waste places, chiefly in hot, dry and sandy regions; throughout India and upto 3,000 m. in Kashmir.It grows in Marutham , Neythal and Pālaithiṇai.

SYNONYMS

Tamil : Cutam (சுதம்), Kiṭṭiram (கிட்டிரம்), Kōkaṇṭam (கோகண்டம்), Neruñcil (நெருஞ்சில்), Tirikaṇṭam (திரிகண்டம்)

Assamese : Gokshura, Gokhurkata

Bengali : Gokshura, Gokhri

English : Caltrops fruit

Gujrati : Bethagokharu, Mithagokhru, Nanagokharu

Hindi : Gokhru

Kannada : Neggilamullu, Sannaneggilu, Neggilu

Kashmiri : Gokshura, Gokhurkata, Michirkand, Plakhada

Malayalam : Gokshura, Gokhri, Nerinjil

Marathi : Sarate, Gokharu

Oriya : Gukhura, Gokhyura

Punjabi : Bhakhra, Gokhru

Sanskrit : Goksura, Trikanta, Svadamstra, Traikantaka

Telugu : Palleru Kaya

Urdu : Khar-e-Khasak Khurd

DESCRIPTION

a) Macroscopic

Fruit stalked, light or greenish yellow, five ribbed or angled, more or less spherical in structure and covered with short stiff or pubescent hairs, 1 cm. in diameter with five pairs, of prominent short stiff spines, pointed downwards, about 0.5 cm. in length; tips of spines almost meet in pairs, whole together forming pentagonal frame-work around fruit; ripe fruit separates into five segments or cocci; coccus semi-lunar or plano-convex in structure, one chambered, armed with a pair of spines, starting from its middle containing four or more seeds; taste slightly astringent.

b) Microscopic

Transverse section of fruit shows rectangular epidermal cells of each coccus; unicellular trichomes in abundance; mesocarp 6 to 10 layers of large parenchymatous cells, rosette of calcium oxalate crystals abundantly present; mesocarp followed by 3 or 4 compact layers of small cells containing prismatic crystals of calcium oxalate.

Powder:

Creamish-brown; shows fragments of rectangular epidermal cells; unicellular trichomes with pointed tips; numerous rosette crystals of calcium oxalate and a few cells containing prismatic 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 15 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 6 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 aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Toluene: Ethyl acetate (9:1), on exposure to iodine vapours shows ten spots at Rf. 0.09, 0.23, 0.29, 0.35, 0.43, 0.56, 0.61, 0.66, 0.93 and 0.97 (all yellow). With Anisaldehyde- Sulphuric acid reagent heating the plate for five minutes at 105ºC twelve spots appear at Rf. 0.09 (bluish grey), 0.23 (greenish grey), 0.29 (greenish grey), 0.35 (dark grey), 0.43 (greenish grey), 0.49 (blue), 0.56 (greenish grey), 0.61 (greenish grey), 0.66 (greenish grey), 0.86 (blue), 0.93 (dark greenish grey) and 0.97 (dark greenish grey).

CONSTITUENTS

Terrestrosins A, B, C, D and E, desgalactotigonin, F-gitonin, desglucolanatigonin, gitonin, hydrolysed products include diosgenin, hecogenin and neotigogenin; tribulusamides A and B, N-trans- feruloyl tyramine, terrestriamide, N- trans- coumaroyl tyramine, ß-sitosterol and steroidal saponins.

PROPERTIES AND ACTIONS

Cuvai	:	Iṉippu (இனிப்பு), Tuvarppu (துவர்ப்பு)
Guṇam	:	Noymai (நொய்மை), Tiṇmai (திண்மை)
Vīrium	:	Taḍpam (தட்பம்)
Pirivu	:	Iṉippu (இனிப்பு)

Ceykai : Āṇmaiperukki (ஆண்மைபெருக்கி), Ciṟunīrperukki (சிறுநீர்பெருக்கி), Kuḷircciyuṇḍākki (குளிர்ச்சியுண்டாக்கி), Tuvarppi (துவர்ப்பி), Uḷḷaẕalāṟṟi (உள்ளழலாற்றி), Uramākki (உரமாக்கி)

IMPORTANT FORMULATIONS

Kantaka Iracāyaṉam (கந்தக இரசாயனம்)

THERAPEUTIC USES

Cataiyaḍaippu (சதையடைப்பு), Ciṟunīr Ericcal (சிறுநீர் எரிச்சல்), Ciṟunīr Kaḍḍu (சிறுநீர் கட்டு), Kallaḍaippu (கல்லடைப்பு)

DOSE - Powder 3 - 6 g

Decoction 30- 50 ml twice daily.

40- 80 g coarse powder in 200 ml of water for preparing decoction.

NERUÑCI VĒR (Root) - நெருஞ்சி வேர்

Neruñci Vēr is the root of ***Tribulus terrestris*** L. (Fam. Zygophyllaceae), an annual prostrate herb, rarely perennial prostrate common weed of the pasture lands, road sides and other waste land, chiefly growing in hot, dry and sandy regions throughout India and upto 3,000 m. in Kashmir. It grows in Marutham , Neythal and Pālaithiṇai.

SYNONYMS

Tamil	:	Cutam (சுதம்), Kiḍḍiram (கிட்டிரம்), Kōkaṇḍam (கோகண்டம்), Neruñcil (நெருஞ்சில்), Tirikaṇḍam (திரிகண்டம்)
Assamese	:	Gokshura, Gukhurkata
Bengali	:	Gokshura, Gokhri
English	:	Caltrops root
Gujrati	:	Be tha gokharu, Nana gokharu, Mithogokharu
Hindi	:	Gokhru
Kannada	:	Neggilamullu, Neggilu, Sannanaggilu
Kashmiri	:	Michirkand, Pakhada
Malayalam	:	Nerinjil
Marathi	:	Gokharu, Sarate
Oriya	:	Gukhura, Gokhyura
Punjabi	:	Bhakhra, Gokhru
Sanskrit	:	Goksura, Svadamstra, Trikanta, Traikantaka
Telugu	:	Palleruveru
Urdu	:	Khar-e-Khasak Khurd

DESCRIPTION

a) Macroscopic

Drug consists of root, 7 to 18 cm. long and 0.3 to 07 cm. in diameter, slender, cylindrical, fibrous, frequently branched bearing a number of small rootlets, tough, woody and yellow to light brown in colour; surface becomes rough due to presence of small nodules; fracture fibrous; odour aromatic; taste sweetish and astringent.

b) Microscopic

Transverse section of primary roots show a layer of epidermis followed by 4 or 5 layers of thin-walled parenchymatous cortex, endodermis distinct; pericycle enclosing diarch stele, in mature

root, cork 4 to 6 layered, cork cambium single layered followed by 6 to 14 layers of thin-walled parenchymatous cells with groups of fibres, distributed throughout; some secondary cortex cells show secondary wall formation and reticulate thickening; secondary phloem divided into two zones, outer zone characterized by presence of numerous phloem fibres with a few sieve tubes slightly collapsed, inner zone frequently parenchymatous, devoid of fibres often showing sieve tubes and companion cells; phloem rays distinct, a few cells get converted into fibres in outer region; cambium 3 to 5 layered; wood composed of vessels, tracheids, parenchyma and fibres and traversed by medullary rays; vessels scattered, arranged in singles or doubles towards inner side, in groups of three to four on outer side having bordered pits; tracheids long, narrow with simple pits; xylem parenchyma rectangular or slightly elongated with simple pits and reticulate thickening; a few xylem fibres; medullary rays heterogenous, 1 to 4 cells wide; starch grains and rosette crystals of calcium oxalate present in secondary cortex, phloem and medullary ray cells; a few prismatic crystals also present in xylem ray cells.

Powder:

Creamish-brown; shows parenchyma cells; fragments of lignified xylem vessels with reticulate thickening, tracheids, single or groups of phloem fibres; scattered rosette crystal of calcium oxalate, a few prismatic crystal of calcium oxalate; small, oval to rounded starch grains measuring 2 to 7 µm in diameter.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than 2 per cent, Appendix	2.2.2.
Total Ash	Not more than 13 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 10 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Chloroform- soluble fraction of the Alcoholic extract of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Chloroform : Methanol (9:1) as the developing system, with Anisaldehyde - Sulphuric acid reagent and heating the plate for five minutes at 105ºC shows nine spots at Rf. 0.13, 0.26 (violet), 0.34, 0.38, 0.42 (grey), 0.54 (violet), 0.63(blue), 0.83 (grey) and 0.93 (pinkish grey).

CONSTITUENTS

Diosgenin, hecogenin, gitogenin, tigogenin, neotigogenin, stigmasterol, β-sitosterol and campesterol .

PROPERTIES AND ACTIONS

Cuvai : I**ṉ**ippu (இனிப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Noymai (நொய்மை), Tiṉmai (திண்மை)

Vīrium : Taḍpam (தட்பம்)

Pirivu : Iṉippu (இனிப்பு)

Ceykai : Āṇmaiperukki (ஆண்மைபெருக்கி), Ciṟunīrperukki (சிறுநீர்பெருக்கி), Kuḷircciyuṇḍākki (குளிர்ச்சியுண்டாக்கி), Tuvarppi (துவர்ப்பி), Uḷḷaẕalāṟṟi (உள்ளழலாற்றி), Uramākki (உரமாக்கி)

IMPORTANT FORMULATIONS

Tirāḍcāticcūraṇam (திராட்சாதிச்சூரணம்)

THERAPEUTIC USES

Nīrkaḍuppu (நீர்கடுப்பு), Veḷḷai (வெள்ளை)

DOSE - Decoction 30- 50 ml twice daily.

40- 80 g coarse powder in 200 ml of water for preparing decoction.

NĒRVĀḶAM (Seed) - நேர்வாளம்

Nērvāḷam is the dried seed of ***Croton tiglium*** L. (Fam. Euphorbiaceae), a small evergreen tree, 5 to 7 m high, found throughout tropical India. The seeds are subjected to purification process before use.

SYNONYMS

Tamil	:	Cōpi (சோபி), Nākaṇam (நாகணம்), Nēpāḷam (நேபாளம்), Tanti (தந்தி), Vāḷam (வாளம்)
Assamese	:	Kanibish
Bengali	:	Jaipala
English	:	Croton
Gujrati	:	Nepalo, Jamalagota
Hindi	:	Jamalgota
Kannada	:	Nepal, Japal beej, Japala, Nervala
Malayalam	:	Nervalam, Neervalam
Marathi	:	Jepal, Japal
Punjabi	:	Japolota
Sanskrit	:	Jayapala, Mukula, Tintidiphala
Telugu	:	Nepalamu
Urdu	:	Jamalgota

DESCRIPTION

a) Macroscopic

Seed ovate, oblong, slightly quadrangular, convex on dorsal and somewhat flattened on ventral surface, about 12 mm. in length and resemble castor seed in shape, dull cinnamon-brown, often mottled with black due to abrasion in testa, caruncle easily detatched and usually absent, hilum on ventral side less distinct than that of castor seed, raphe runs along ventral surface of seed, terminating in a dark chalaza at opposite extremity, kernel yellowish and oily, consisting of a large endosperm, enclosing papery cotyledons and a small radicle, no marked odour; kernel gives at first oily taste followed by an unpleasant acridity.

b) Microscopic

Seed - Shows a hard testa, consisting of an epidermal layer, covered externally with a thick cuticle and composed of oval and tangentially elongated cells, filled with brownish content; epidermis followed by a layer of radially elongated cells, slightly bent at middle, upper half portion filled with reddish-brown and lower half filled with yellow contents; inner most zone consists of tangentially

elongated, thin-walled cells; endosperm consists of polygonal parenchymatous cells filled with oil globules, a few cells having rosette crystals of calcium oxalate; central region of endosperm shows a dicotyledonous embryo consisting of thin-walled parenchymatous cells.

Powder:

White with black particles of testa; shows elongated cells containing reddish-brown and yellow contents; oil globules and a few rosette 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 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 15 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 n-Butanol: Acetic acid: Water (4:1:5) shows under UV (366 nm.) three spots at Rf. 0.34, 0.54 and 0.84 (all violet). On exposure to iodine vapours six spots appear at Rf.. 0.10, 0.29, 0.39, 0.49, 0.63 and 0.90 (all yellow). On spraying with 5 % Methanolic- Sulphuric acid reagent and heating the plate at 105° C for five minutes three spots appear at Rf. 0.34(grey), 0.54 (yellow), 0.84 (brown).

CONSTITUENTS

4-deoxy-4α-phorbol, phorbol esters, b -sitosterol, fixed oil and resins.

PROPERTIES AND ACTIONS

Cuvai	:	Kaippu (கைப்பு)
Guṇam	:	Noymai (நொய்மை), Tiṇmai (திண்மை)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)
Ceykai	:	Nīrmalampōkki (நீர்மலம்போக்கி), Taḍippuṇḍākki (தடிப்புண்டாக்கி)

IMPORTANT FORMULATIONS

Akattiyar Kuẕampu (அகத்தியர் குழம்பு), Aṣḍapairavam (அஷ்டபைரவம்), Cittāti Eṇṇey (சித்தாதி எண்ணெய்), Mēkanāta Kuḷikai (மேகநாத குளிகை), Tāẕampū Māttirai (தாழம்பூ மாத்திரை)

THERAPEUTIC USES

Aẕal/Pittam (அழல்/பித்தம்), Mēkam (மேகம்), Vayiṟṟu Nōy (வயிற்று நோய்), Vaḷi Nōykaḷ (வளி நோய்கள்)

DOSE - It cannot be administered as a single drug, it should be used only in combination.

PAṟAṅKI CAKKAI (Tuberous root) - பறங்கி சக்கை

Paṟaṅki Cakkai is the tuberous root of ***Smilax china*** L. (Fam. Liliaceae), a deciduous climber with sparsely prickled or unarmed stem. It is imported from China and Japan. The tuberous roots are subjected to purification process before use.

SYNONYMS

Tamil	:	Cīṉappaṭṭai (சீனப்பட்டை), Matusmīki (மதுஸ்மீகி), Paṟaṅkippaṭṭai (பறங்கிப்பட்டை)
Bengali	:	Chopcheenee, Kumarika, Shukchin
English	:	Chinna root
Gujrati	:	Chopcheenee
Hindi	:	Chopcheenee
Malayalam	:	China Pavu
Marathi	:	Chopcheenee
Sanskrit	:	Madhusnuhi, Dvipantara vaca
Telugu	:	Pirngichekka

DESCRIPTION

a) Macroscopic

Tubers about 6 to 12 cm. long, 2 to 4 cm. wide, rough, irregular, cylindrical, curved, slightly tapering with brownish or blackish scars; externally brownish-yellow in colour, and internally brown in colour; fracture hard; odour not characteristic; taste slightly bitter.

b) Microscopic

Cortex shows several layers of thin-walled, polygonal, elongated mucilaginous parenchymatous cells, a few cells containing raphides of calcium oxalate; endodermis not distinguished; ground tissue having several vascular bundles consisting of usual elements; fibres long and aseptate; numerous simple and compound starch grains, measuring 16 to 38 µm in dia. with 2 to more than 9 components mostly spherical to ovoid, having hilum in centre.

Powder:

Light brown; shows fragments of mucilaginous parenchymatous cells of cortex, fibres and vessels with reticulate thickening; a few scattered needles of calcium oxalate from raphides; numerous simple and compound starch grains measuring 16 to 38 µm in dia. with 2 to more than 9 components, mostly spherical to ovoid having hilum in centre.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than	2	per cent, Appendix	2.2.2.
Total Ash	Not more than	0.6	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than	0.06	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	0.8	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: Ethyl acetate: Methanol (5:5:2) as mobile phase shows on spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate at 105ºC until the colour develops , ten spots at Rf. 0.09 (dark green), 0.17 (violet), 0.21 (dirty yellow), 0.26 (grey), 0.32 (yellow), 0.48, 0.55 and 0.58 (all violet), 0.73 (greenish blue) and 0.77 (violet).

CONSTITUENTS

Sarsaponin, parallin, β-sitosterol, stigmasterol and their glucosides, daucosterol, isoseryl-S-methyl-cysteamine sulphoxide and dihydrokaempferol-5-O- β-D- glucoside.

PROPERTIES AND ACTIONS

Cuvai : I**ṉ**ippu (இனிப்பு)

Guṇam : Ilaku (இலகு), Va**ṟ**a**ḍ**ci (வறட்சி)

Vī**rium** : Ta**ḍ**pam (தட்பம்)

Pirivu : I**ṉ**ippu (இனிப்பு)

Ceykai : Kāmamperukki (காமம்பெருக்கி), Mēkappi**ṇ**ivilakki (மேகப்பிணிவிலக்கி), Tūymaiyākki (தூய்மையாக்கி), U**ḍ**a**ṟ**tē**ṟ**ṟi (உடற்தேற்றி)

IMPORTANT FORMULATIONS

Iracakanthi Me**ẕ**uku (இரசகந்தி மெழுகு), Pa**ṟ**a**ṅ**kippa**ḍḍ**ai Cūra**ṇ**am (பறங்கிப்பட்டை சூரணம்), Pa**ṟ**a**ṅ**kippa**ḍḍ**ai Iracāya**ṉ**am (பறங்கிப்பட்டை இரசாயனம்), Pa**ṟ**a**ṅ**kippa**ḍḍ**ai Pata**ṅ**kam (பறங்கிப்பட்டை பதங்கம்)

THERAPEUTIC USES

Atika**ẕ**iccal (அதிகழிச்சல்), Cūlai (சூலை), Karappā**ṉ** (கரப்பான்), Kirā**ṇ**i (கிராணி), Māntam (மாந்தம்), N**ī**ri**ẕ**ivu (நீரிழிவு), N**ī**rvē**ḍ**kai (நீர்வேட்கை), Pi**ḷ**avai (பிளவை), Pu**ṇ** (புண்), Uppicam (உப்பிசம்), Vayi**ṟ**ṟiraiccal (வயிற்றிரைச்சல்), Ve**ḍḍ**ai (வெட்டை)

DOSE - Powder 3 - 6 g

PĀTHIRI VĒR (Root) - பாதிரி வேர்

Pāthiri Vēr is the dried root of ***Stereospermum chelonoides*** (L.f.) DC. Syn. ***S. suaveolens***(Roxb.) DC. (Fam. Bignoniaceae), a large deciduous tree upto 18 m. high and 1.8 m. in girth with a clear bole of about 9 m., found throughout the moist parts of the country. It grows in Kuṟiñcithiṇai.

SYNONYMS

Tamil	:	Kaṉṉi (கன்னி), Pāḍalimaram (பாடலிமரம்), Pāḍalam (பாடலம்), Puṉkāli (புன்காலி)
Assamese	:	Parul
Bengali	:	Parul
English	:	Rose flower fragrant
Gujrati	:	Podal
Hindi	:	Padal
Kannada	:	Padramora
Malayalam	:	Padiri
Marathi	:	Padal
Oriya	:	Boro, Patulee
Punjabi	:	Padal
Sanskrit	:	Patalai, Amogha, Madhuduti, Krsnvnta, Tamrapuspi
Telugu	:	Kaligottu, Kokkesa, Podira

DESCRIPTION

a) Macroscopic

Root occurs in about 6 to 9 cm. long, 1 to 1.5 cm. thick cut pieces, cylindrical, externally brown to creamy, rough due to vertical fissures, cracks, ridges and transverse fine lenticels, internally dark brown, lamellation or stratification due to presence of concentric bands of fibres; fracture tough and fibrous; odour not distinct; taste bitter.

b) Microscopic

Root cork consists of 25 to 35 layers of rectangular cells with 3 to 5 stratified layers, lignification being more prominent where the stratification starts, arranged with 1 to 3 tangential rows of narrow cells alternating with 3 to 5 tangential rows of wider cells; cork cambium composed of 1 or 2 layers of tangentially elongated cells; secondary cortex arranged more or less radially, becomes polyhedral to isodiametric in inner region, a few cells getting converted into stone cells

which are regular in shape and show projection; secondary phloem wide, forms ceratenchyma between two obliquely running rays; some rays and phloem cells get converted into irregular, polygonal stone cells, measuring 10 to 150 µm in width, phloem parenchyma being intact; medullary rays multiseriate, being 3 or 4 cells wide, and 8 to 15 cells high; fibres tapering, pointed or slightly blunt, with a small peg-like projection at both ends; sieve tube gets collapsed in outer region forming strips of ceratenchyma; a few small microsphenoidal crystals of calcium oxalate present in phloem parenchyma and rays; secondary xylem wide having usual elements; vessels simple, pitted, lignified; fibres large, pointed, aseptate; rays multiseriate, 2 or 3 cells wide.

Powder:

Dark brown; shows fragments of rectangular cork and phloem parenchyma cells; groups of single, thick walled, cubical to rectangular, lignified stone cells having striations and wide lumen; a number of microsphenoidal crystals of calcium oxalate, intact and scattered outside.

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 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 n-Butanol: Acetic acid: Water (4:1:5) shows in visible light three spots at Rf. 0.62, 0.85 and 0.92 (all light yellow). Under UV (366 nm) five fluorescent zones are visible at Rf. 0.47, 0.53 (both light blue), 0.62 (bluish pink), 0.74 (blue) and 0.85 (light green). On exposure to iodine vapours seven spots appear at Rf. 0.14, 0.28, 0.45, 0.53, 0.74, 0.85 and 0.92 (all yellow). On spraying with 5% Methanolic-Phosphomolybdic acid reagent and heating the plate at 105ºC until the colour develops, the plate shows four spots at Rf. 0.47, 0.74, 0.85 and 0.92 (all bluish grey).

CONSTITUENTS

n-Triacontanol, β-sitosterol, lapachol, dehydro-α-lapachone, dehydrotectol, 6-0-glucosylscutellarein and stereolensin.

PROPERTIES AND ACTIONS

Cuvai	:	Tuvarppu (துவர்ப்பு)
Guṇam	:	Ilaku (இலகு), Vaṟaḍci (வறட்சி)
Vīrium	:	Taḍpam (தட்பம்)
Pirivu	:	Iṉippu (இனிப்பு)
Ceykai	:	Ciṟuṉīrperukki (சிறுநீர்பெருக்கி), Veppakaṟṟi (வெப்பகற்றி)

IMPORTANT FORMULATIONS

Maṇḍūrāti Aḍaikkuḍiṉīr (மண்டூராதி அடைக்குடிநீர்), Pittacurak Kuḍiṉīr (பித்தசுரக் குடிநீர்)

THERAPEUTIC USES

Coṟiciraṅku (சொறிசிரங்கு), Ericcal (எரிச்சல்), Eruvāy Muḷai (எருவாய் முளை), Karappāṉ (கரப்பான்), Nīriṟivu (நீரிழிவு), Puṇ (புண்)

DOSE - Powder 2 - 5g par Decoction 30- 50 ml twice daily.

15 - 30 g coarse powder in 200 ml of water for preparing decoction.

PĒRARATTAI (Rhizome) - பேரரத்தை

Pērarattai is the dried rhizome of *Alpinia galanga* Willd. (Fam. Zingiberaceae), a herb upto 2.5 m. in height, bearing perennial rhizome, growing in eastern Himalayas and southwest India and extensively cultivated all over India.

SYNONYMS

Tamil	:	Arattai (அரத்தை)
Bengali	:	Kulanjan, Kurachi Vach
English	:	Greater galangal, Java galangal
Gujrati	:	Kulinjan Jaanu, Kolinjan
Hindi	:	Kulanjan, Kulinjan
Kannada	:	Doddarasagadde, Dhoomraasmi
Malayalam	:	Aratta
Marathi	:	Kulinlan, Koshta Kulinjan, Mothe kolanjan
Oriya	:	Kulanjana, Sugandhamula, Malaya Vaca, Mahabhari Vaca, Rasna (South)
Punjabi	:	Dumparaastramu

DESCRIPTION

a) Macroscopic

Root - The roots are adventitious, in groups, fibrous, persistent in dried rhizomes, about 0.5 to 2 cm. long and 0.1 to 0.2 cm. in diameter and yellowish-brown in colour.

Rhizome - Rhizome cylindrical, branched, 2 to 8 cm. in diameter, longitudinally ridged with prominent rounded warts (remnants of roots) marked with fine annulations; scaly leaves arranged circularly; externally reddish-brown, internally orange yellow in colour; fracture hard and fibrous; surface rough; odour pleasant and aromatic; spicy and sweet in taste.

b) Microscopic

Root - Transverse section of root circular in outline, single layered epidermis with barrel shaped cells having unicellular root hairs, hypodermis 3 or 4 cells deep and sclerenchymatous, cortex parenchymatous, many cells deep, with well developed intercellular spaces; endodermis showing prominent casparian strips and 'v' shaped thickening, followed by many celled sclerenchymatous pericycle; xylem and phloem in separate radial strands; centre occupied by a parenchymatous pith.

Rhizome - Transverse section of young rhizome circular in outline; epidermal cells small and angular, thick cuticle present, rhizome differentiated into a wide cortex and a central cylinder, both regions having irregularly scattered vascular bundles, each vascular bundle with a prominent fibrous sheath; inner limit of cortex marked by rectangular parenchymatous cells; stele with

irregular, closely placed vascular bundles towards periphery, root traces present, schizogenous canals and oil cells with suberized walls found in cortex and in central region; most of the parenchymatous cells filled with starch grains which are ellipsoidal to ovoid, sometimes beaked, simple, 10 to 64 µm, hilum eccentric, circular or crescent shaped at the broad end, the narrow beak-like end become black when stained with dil. iodine water and chlor-zinc iodide but the remaining part become light blue or brown. Macerated preparation shows vessels 95 to 710 µm long and 19 to 190 µm broad, tracheidal fibres 68 to 920 µm long and 19 to 30 µm broad.

Powder:

Orange brown; spicy and sweet in taste; shows parenchyma cells containing starch (as described under microscopy of rhizome), oil cells, schizogenous canals; vessels with scalariform and reticulate thickenings and tracheidal fibres.

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 2 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 13 per cent, Appendix	2.2.7.
Starch	Not less than 22 percent, Appendix	2.2.13
Essential oil	Not less than 0.4 percent, Appendix	2.2.10

T.L.C.

T.L.C. of the Methanolic extract on silica gel 'G' plate using Toluene: Ethyl acetate: Methanol (80:20:0.4) shows under UV (366 nm.) blue fluorescent zones of yellow, green and blue at Rf.0.15, 0.25, 0.69 respectively. On spraying with Anisaldehyde - Sulphuric acid reagent and heating the plate for five minutes at 105ºC, six spots appear at Rf.0.15 (greyish green), 0.35 (violet), 0.48 (greyish green), 0.63 (greyish green), 0.69 (green) and 0.91 (violet).

CONSTITUENTS

Esential oil, containing a - pinene, ß - pinene, limonene, cineol, linalool, cedrol, eugenol, terpinen - 4 -ol and a - terpineol. Galanganal, galanganol B and C, 1'-S-1'-acetoxychavicol acetate, 1'S-1'-acetoxyeugenol acetate, trans-parahydroxy-cinnamaldehyde, trans-para-coumaryl alcohol, trans-para-coumaryl acetate, galanolacetone, and di (p-hydroxy-cis-styryl) methane.

PROPERTIES AND ACTIONS

Cuvai	:	Kārppu (கார்ப்பு)
Guṇam	:	Tiṇmai (திண்மை)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)

Ceykai : Kōz̲aiyaka̲r̲̲ri (கோழையகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Veppaka̲r̲̲ri (வெப்பகற்றி)

IMPORTANT FORMULATIONS

Kakkuvā̲n̲ Iḷakam (கக்குவான் இளகம்), Tippili Irācāya̲n̲am (திப்பிலி இராசாயனம்), Tūtuvēḷai Ney (தூதுவேளை நெய்), Uḷuntu Tailam (உளுந்து தைலம்), Vātacurak Kuḍinīr (வாதசுரக் குடிநீர்)

THERAPEUTIC USES

Cūtakavali (சூதகவலி), Aiyacuram (ஐயசுரம்), Muppiṇi (முப்பிணி), Nañcu (நஞ்சு), Nīrēr̲̲ram (நீரேற்றம்), Talaippuṇ (தலைப்புண்), Uḍal Vali (உடல் வலி), Vaḷi Nōykaḷ (வளி நோய்கள்)

DOSE - Powder 1 - 3 g

PERUṄKĀYAM (Oleo-gum-resin) - பெருங்காயம்

Peruṅkāyam is the oleo-gum-resin obtained from rhizome and root of ***Ferula foetida*** Regel., ***Ferula narthex*** Boiss, and other species of ***Ferula*** (Fam. Apiaceae), a perennial herb, occurring in Persia and Afghanistan. Incisions are made at the upper part of tap root of more than five year old plants and resin collected by scrapping in March, April, after one or two days or after a few weeks when it gets hardened; the process is repeated several times. It grows in Kuṟiñcithiṇai.

SYNONYMS

Tamil	:	Cantunācam (சந்துநாசம்), Iṅku (இங்கு), Kanti (கந்தி), Kāyam (காயம்), Vallīkam (வல்லீகம்)
Assamese	:	Hin
Bengali	:	Hing
English	:	Asfoetida
Gujrati	:	Hing, Vagharni
Hindi	:	Hing, Hingda
Kannada	:	Hingu, Ingu
Kashmiri	:	Eng
Malayalam	:	Kayam
Marathi	:	Hing, Hira, Hing
Oriya	:	Hengu, Hingu
Punjabi	:	Hing
Sanskrit	:	Hingu, Ramatha, Sahasravedhi
Telugu	:	Inguva
Urdu	:	Hitleet, Hing

DESCRIPTION

a) Macroscopic

Rounded, flattened or masses of agglutinated tears, greyish-white to dull yellow, mostly 12 to 25 mm. in diameter; freshly exposed surface, yellowish and translucent or milky white, opaque, slowly becoming pink, red, finally reddish brown; odour strong, characteristic and persistent; taste bitter and acrid.

b) Microscopic

Identification

1) Freshly broken surface when touched with sulphuric acid a bright red or reddish-brown colour is produced, changing to violet when acid is washed off with water.

2) Boil 0.2 g with 2 ml Hydrochloric acid for about 1 minute, cool, dilute with an equal volume of water, and filter into 3 ml of dilute solution of Ammonia; fluorescence is produced.

3) Triturate 1 g with 10 ml of light Petroleum (b.p. 40º to 60º) for 2 minutes, filter into a test tube and add to the filtrate 10 ml of a fresh 0.5 per cent w/v aqueous solution of copper acetate; shake well and allow the liquids to separate; petroleum layer does not show any green colour, indicating absence of colophony resin.

IDENTITY, PURITY AND STRENGTH

Alcohol-soluble extractive	Not less than	50	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	50	per cent, Appendix	2.2.7.
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	3	per cent, Appendix	2.2.4.

ASSAY

(Alcohol insoluble fraction)

About 5 g accurately weighed drug is placed in a small beaker furnished with a glass rod, and tared; 50 ml of Alcohol (90 per cent) is added and boiled gently. The hot solution is filtered through a tared filter paper the residue is boiled with further quantitòies of alcohol (90 per cent); until all soluble matter is removed, using the glass rod to disintegrate the insoluble matter. The filter paper is washed with hot alcohol (90 per cent) and the paper is transferred to the beaker, dried at 100ºC, and weighed. The residue weighs not more than 50 per cent of the original sample taken.

T.L.C.

T.L.C. of Alcoholic extract of the drug on silica gel 'G' plate using Toluene: Ethyl acetate (7:3) v/v, shows eleven spots under UV light (366 nm.) at Rf.0.12, 0.22, 0.34, 0.42, 0.51,0.55, 0.55, 0.60, 0.67, 0.77, 0.85 and 0.91 (all blue). On spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate, for five minutes at 105°C ten spots appear at Rf. 0.05 (violet), 0.12 (brown), 0.22(violet), 0.32 (brown), 0.42 (violet), 0.51 (pink), 0.60 (grey), 0.77 (pink), 0.85 (pink) and 0.94 (orange).

CONSTITUENTS

Dimethyl trisulphide, 2- butyl methyl disulphide, 2- butyl methyl trisulphide, di- 2-butyl disulphide, di- 2-butyl trisulphide, di-2- butyl - tetrasulphide, asadisulphide, asacoumarin A and B, R-2-butyl-1-propenyl disulphide, 1- (-1- methyl thio propenyl)-1-propenyl disulphide, ferulic acid, asaresinol ferulate, fenchone, linalool, foetidin, asafoetidin, ß- caryophyllene, ß- selinene, ferocolicin.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Kūrmai (கூர்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Icivakaṟṟi (இசிவகற்றி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Akattiyar Kuẕampu (அகத்தியர் குழம்பு), Aśḍāthic Cūraṇam (அஷ்டாதிச் சூரணம்), Kuṉmakuḍōri Meẕuku (குன்மகுடோரி மெழுகு), Mūcāmparappaṟṟu (மூசாம்பரப்பற்று), Tāḷicāthi Cūraṇam (தாளிசாதி சூரணம்)

THERAPEUTIC USES

Cūtakacūlai (சூதகசூலை), Ēppam (ஏப்பம்), Kuṉmam (குன்மம்), Māntam (மாந்தம்), Palladi Nōykaḷ (பல்லடி நோய்கள்), Peruvayiṟu (பெருவயிறு), Vaḷi Nōykaḷ (வளி நோய்கள்)

DOSE - Powder 16 - 650 mg

PIRAMMI VAZ̲UKKAI (Whole Plant) - பிரம்மி வழுக்கை

Pirammi Vaz̲ukkai is the dried whole plant of ***Bacopa monnieri*** (L.) Wettst., Syn. ***Herpestis monniera*** (L.) H.B. & K. (Fam. Scrophulariaceae), a glabrous, succulent, small, prostrate or creeping annual herb, found throughout India in wet and damp places.

SYNONYMS

Tamil	:	Captaḷai (சப்தளை), Nīrpirammi (நீர்பிரம்மி)
Assamese	:	Brahmi
English	:	Thyme leaved gratiola
Gujrati	:	Neerbrahmi, Bamanevari
Hindi	:	Manduka Parni, Brahmi
Kannada	:	Nirubrahmi, Valabrahmi, Ondelaga, Mandukaparni
Malayalam	:	Brahmi
Marathi	:	Jalnam, Brahmi, Birami
Oriya	:	Brahmi
Punjabi	:	Brahmibuti
Sanskrit	:	Brahmi, Saraswati, Kapotavamka
Telugu	:	Sambarenu, Sambarani
Urdu	:	Brahmi

DESCRIPTION

a) Macroscopic

Root - Thin, wiry, small, branched, creamish-yellow.

Stem - Thin, green or purplish green, about 1 to 2 mm. thick, soft, nodes and internodes prominent, glabrous; taste slightly bitter.

Leaf - Simple, opposite, decussate, green, sessile, 1 to 2 cm. long, obovate-oblong; taste slightly bitter.

Flower - Small, axillary and solitary, pedicels 6 to 30 mm. long, bracteoles shorter than pedicels.

Fruit - Capsules upto 5 mm. long, ovoid and glabrous.

b) Microscopic

Root - Shows a single layer of epidermis, cortex having large air cavities; endodermis single layered; pericycle not distinct; stele consists of phloem with a few sieve elements and isolated material from xylem shows vessels with reticulate thickenings.

Stem - Shows single layer of epidermis followed by a wide cortex of thin-walled cells with very large intercellular spaces; endodermis single layered; pericycle consisting of 1 or 2 layers; vascular ring continuous, composed of a narrow zone of phloem towards periphery and a wide ring of xylem towards centre; centre occupied by a small pith with distinct intercellular spaces; starch grains simple, round to oval, measuring 4 to 14 mm in dia. in cortical cells and 8.0 to 14.0 x 2.5 to 9.0 mm in dia., in a few cells of endodermis.

Leaf - Shows a single layer of upper and lower epidermis covered with thin cuticle; glandular hairs sessile, subsidiary cells present on both surface; a few prismatic crystals of calcium oxalate occasionally found distributed in mesophyll cells; mesophyll traversed by small veins surrounded by bundle sheath; no distinct midrib present. Stomatal index 13 to 18 for upper surface and 12 to 16 for lower surface; vein - islet number 6 to 13 per square mm.

Powder:

Yellowish-brown; shows xylem vessels with reticulate thickening; glandular hairs; simple, round and oval starch grains, measuring 4.14 mm in diameter.

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	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	15	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Methanolic extract of the drug on silica gel 'G' plate using Toluene: Ethyl Acetate: Methanol: glacial Acetic Acid (3:4:3:1) shows 3 spots at Rf. 0.38 (yellowish brown) ,0.68 (light brown) and 0.88 (dark pink, bacoside A marker) on spraying with 20% Sulphuric acid in Methanol and heating the plate at 105º C for five minutes.

CONSTITUENTS

Bacosides A, A3 & B, monnierin, bacopasaponins A - D and G, bacopasides I - V, hersaponin, betulinic acid, herpestine, brahmine, nicotin, luteolin and its 7- glucoside, 3-formyl - 4 - hydroxy - 2H - pyran, monnierasides I - III, plantainoside B, ß- sitosterol, stigmasterol and stigmastanol.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Acaivu (அசைவு), Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ciṟunīrperukki (சிறுநீர்பெருக்கி), Kāmamperukki (காமம்பெருக்கி), Kōẕaiyakaṟṟi (கோழையகற்றி), Malamiḷakki (மலமிளக்கி), Aẕalakaṟṟi (அழலகற்றி)

IMPORTANT FORMULATIONS

Piramminey (பிரம்மிநெய்)

THERAPEUTIC USES

Aiya Nōykaḷ (ஐய நோய்கள்), Malakkaḍḍu (மலக்கட்டு), Nīrcurukku (நீர்சுருக்கு), Vīkkam (வீக்கம்), Pittātikkam (பித்தாதிக்கம்), Valippu Nōy (வலிப்பு நோய்)

DOSE - Powder 1 - 3 g

PONNĀṄKĀṆI (Whole Plant) - பொன்னாங்காணி

Ponnāṅkāṇi is the dried whole plant of *Alternanthera sessilis* (L.)R.Br.,ex DC. Syn. *A. triandra* Lam., *A. denticulata* R. Br., *A. nodiflora* R. Br., *A. repens* Gmel., non Link. (Fam. Amaranthaceae), a small prostrate or ascending herb with several spreading branches growing throughout the warmer parts of the country and frequently found in wet places especially around tanks and ponds.It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Cīrai (சீரை), Koḍuppai (கொடுப்பை)
Bengali	:	Sanchesak, Salincha Sak
Gujrati	:	Jalajambo
Hindi	:	Gudari Sag
Kannada	:	Honagonne soppu
Malayalam	:	Ponnankanni, Kozuppa
Marathi	:	Kanchari
Oriya	:	Matsagandha, Salincha Saaga
Sanskrit	:	Matsyaksi, Matsyagandha, Bahli, Gandali, Gartkalambuk
Telugu	:	Ponnaganti Koora

DESCRIPTION

a) Macroscopic

Root - Cylindrical, 0.1 to 0.6 cm. diameter, cream to grey, numerous roots arising from the main tap root as lateral rootlets; fracture short; no characteristic odour and taste.

Stem - Herbaceous, weak, mostly cylindrical occasionally sub-quadrangular at the apical region, with spreading branches from the base; yellowish-brown to light-brown; nodes and internodes distinct; internodes 0.5 to 5 cm. long, often rooting at lower nodes; fracture short; no characteristic odour and taste.

Leaf - 1.3 to 7.5 cm. long, 0.3 to 2 cm. wide, sometimes reaching 10 cm. long, 2.5 cm. wide, sessile, linear-oblong, or elliptic, obtuse or subacute; no characteristic odour and taste.

Flower - Flower in small axillary sessile heads, white often tinged with pink, bracteoles about a cm long, ovate, scarious; perianth 2.5 to 3 mm. long, sepals ovate, acute, thin, ovary obcordate, compressed, style very short, capitellate; no characteristic odour and taste.

Fruit - Utricle 1.5 mm. long, orbicular, compressed with thickened margins; no characteristic odour and taste.

b) Microscopic

Root - Shows circular outline consisting of 5 to 7 layered, thin-walled tangentially elongated and squarish, radially arranged cork cells; secondary cortex narrow, consisting of thin-walled, round or oval, parenchymatous cells, vascular bundles radially arranged, numerous, consisting of thin-walled cells; xylem tissues lignified; conjunctive tissue between bundles consisting of oval, thin-walled, parenchymatous cells; anomalous secondary growth occurs in the form of succession of rings of vascular bundles which are bicollateral, open and exarch; in the pith there are two large vascular bundles composed of xylem and phloem; pith consisting of thin-walled, round to oval, isodiametric, parenchymatous cells.

Stem - Shows single layered epidermis consisting of round or oval, thin-walled cells covered with striated cuticle; cortex 6 to 10 layered consisting of thin-walled oval to round, parenchymatous cells and rosette crystals of calcium oxalate measuring upto 80 mm in diameter; vascular bundles arranged in a ring, with anomalous secondary growth; which are conjoint, bicollateral, open and endarch; phloem narrow consisting of thin-walled cells traversed by phloem rays; xylem consisting of usual elements traversed by xylem rays; there are two vascular bundles situated in the peripheral region of pith, each bundle consisting of xylem and phloem; pith distinct, composed of thin-walled, round to oval parenchymatous cells with intercellular spaces, a few parenchymatous cells contain rosette crystals of calcium oxalate.

Leaf

Midrib - shows single layered epidermis on both surface, covered with striated cuticle; collenchymatous cells, 2 to 4 layered towards ventral side forming 1 or 2 small patches, 1 or 2 layered towards dorsal side; parenchymatous cells, thin-walled round or oval, isodiametric cells, a few of them containing rosette crystals of calcium oxalate; vascular bundles three, each consisting of xylem and phloem, present in the centre.

Lamina - Dorsiventral; shows single layered epidermis; stomata diacytic more on ventral side; upper epidermal cells with slightly wavy walls, lower with sinuous walls; palisade 2 or 3 layers; spongy parenchyma 3 or 4 layered of oval or irregular loosely arranged cells; a few of them containing rosette crystals of calcium oxalate; stomatal index 20 to 26 in lower surface and 12 to 20 upper surface; palisade ratio 3 to 5; vein -islet number 6 to 12 and veinlet termination number 8 to 10 per square mm.

Powder:

Olive green; shows fragments of parenchymatous cells, wavy or undulate irregular epidemal cells in surface view, diacytic stomata; palisade cells; xylem vessels with pitted and reticulate thickening and rosette 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	10	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 19 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 : Ethyl acetate (9:1) shows in visible light three spots at Rf. 0.16, 0.33 and 0.44 (all green). Under UV (366 nm.) five fluorescent zones are visible at Rf. 0.16, 0.33, 0.44, 0.54 and 0.68 (all red). On exposure to iodine vapours eight spots appear at Rf. 0.18, 0.25, 0.35, 0.44, 0.59, 0.81, 0.94 and 0.96 (all yellow).

CONSTITUENTS

a and b - spinasterols, stigmasterol, campesterol, ß-sitosterol, 5a- stigmast-7-en-3-ol, sterol palmitates, lupeol, 24-methylene cycloartanol,oeucalenol, oleanolic acid glycosides and robinetin-7-0-ß-glucopyranoside.

PROPERTIES AND ACTIONS

Cuvai : I**ṉ**ippu (இனிப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Taḍpam (தட்பம்)

Pirivu : I**ṉ**ippu (இனிப்பு)

Ceykai : Kāyaka**ṟ**pamākki (காயகற்பமாக்கி), Kuḷircciyuṇḍākki (குளிர்ச்சியுண்டாக்கி), Uḍa**ṟ**tē**ṟṟ**i (உடற்தேற்றி)

IMPORTANT FORMULATIONS

Kaṇattailam (கணத்தைலம்), Po**ṉṉ**āṅkāṇit Tailam (பொன்னாங்காணித் தைலம்), Puḷiyārai Ney (புளியாரை நெய்)

THERAPEUTIC USES

A**ẓ**al Nōykaḷ (அழல் நோய்கள்), Īral Nōy (ஈரல் நோய்), Kaṇkācam (கண்காசம்), Vāyvu (வாய்வு)

DOSE - Powder 2 - 3 g

POḌUTHALAI (Whole Plant) - பொடுதலை

Poḍuthalai is the dried whole plant of ***Phyla nodiflora*** (L.) Greene Syn. ***Lippia nodiflora*** (L.) A. Mich. (Fam. Verbenaceae), a small creeping perennial herb found commonly in sandy wet, grassy places along bunds of irrigation channels, canal edges and river banks almost throughout greater part of India and up to 900 m., on the hills.It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Nīrtippili (நீர்திப்பிலி), Poḍutilai (பொடுதிலை), Pūṟcātam (பூற்சாதம்)
Bengali	:	Bukkana, Kaanchadaa
English	:	Purple lippia
Gujrati	:	Rataveliyo
Hindi	:	Jalpipali, Panisigaa, Bhuiokaraa
Kannada	:	Nelahippali
Malayalam	:	Nirtippali, Podutalai
Marathi	:	Jalpippali, Ratavel
Oriya	:	Nili, Nila
Sanskrit	:	Jalapippali, Saradi, Matsyadani, Jalakana, Vashira
Telugu	:	Bokkena

DESCRIPTION

a) Macroscopic

Root - Fibrous, branched, brown in colour, 2 to 10 cm. in length and 1.0 to 1.5 mm. in dia., nodal roots are smaller, 0.5 to 1.0 cm. in length and unbranched.

Stem - Much branched, sub quadrangular, 1 to 2 mm. in dia., rooting at nodes, more or less clothed with appressed, two armed, white hairs when seen under 10x, brownish-green, length of internode 5.0 to 9.0 cm.

Leaf - Opposite, sub-sessile, 1.5 to 3.7 cm. long and 1 to 2 cm. broad, spathulate, cuneate at the base, deeply and sharply serrate in the upper part, appressed by two armed, white minute hairs on both sides.

Flower - Sessile, densely packed in long pedunculate axillary spikes, mature ones 1.0 to 2.0 cm long and 0.4 to 0.5 cm. broad, flowering densely becoming oblong during fruiting; peduncles 2.5 to 7.5 cm. long, bracts about 2.5 mm. long, broadly elliptic or obovate, cuneate at base, mucronate, glabrous; calyx 2.0 mm. long, membranous, bilobed, compressed, mitre-shaped, pubescent underneath with ordinary trichomes closely covering the fruit, the acuminate lobes projecting

beyond it; corolla 2.5 to 3.0 mm. long, white or light pink, bilipped, upper lip erect and bifid, lower lip 3 lobed of which the middle lobe largest, falling off as calyptra when fruit ripens; stamens 4, didynamous, anthers 2-celled, dehiscing longitudinally, dorsifixed; ovary superior, bicarpellary, ovules in each cell solitary; style short, stigma oblique, subcapitate.

Fruit - Small, 1.5 to 2.0 mm. long, globose, oblong, splitting into two 1-seeded planoconvex pyrenes; seeds exalbuminous about 1 mm. in size.

b) Microscopic

Root - Transverse section shows slightly wavy outline composed of a single layered epiblema; cortex 6 to 9 cells deep, most of the outer cortical cells in the nodal roots contain chloroplast; some of the cortical cells towards the inner side are thick walled; phloem cells are irregularly thick walled consisting of sieve tubes, companion cells and phloem parenchyma; xylem composed of vessels, tracheids, parenchyma and fibers; vessels are variable in size, range in diameter from 16 to 65 µm; medullary rays about 2 or 3 cells in width, cells are pitted; pith absent.

Stem - Transverse section shows a nearly quardrant outline with ridges and deep furrows, striated cuticle, a single layer of epidermis with cells longer than broad; surface possesses unicellular trichomes with two unequal arms which usually gets detached; cortex is about 7 cells deep in the furrows, mainly chlorenchyma while those of ridges are of collenchyma; a few cells contain amorphous inclusions and many inner cells contain chloroplast; endodermis observed; pericycle 2 or 3 layers of cells, thick walled; phloem compressed and 5 or 6 cells deep; xylem a continuous ring, broader at the troughs; pith large, composed of thin walled parenchymatous cells; central cells usually degenerated, but several others may occasionally contain a few chloroplasts.

Leaf - Isobilateral, epidermis single layered followed by a layer of palisade cells; occasionally, a layer of palisade also occurs adjacent to the lower epidermis; in surface view, the epidermal cells have straight walls; stomata diacytic, present on both lower and upper surface, but more in number on lower surface, covering and glandular trichomes occur on both the surface; unicellular, 2 unequally armed warty trichomes, with pointed tips are frequent on both the surface; midrib vascular bundle possess xylem on dorsal side and phloem on ventral side; stomatal index of upper and lower surface 11 to 18 and 18 to 30 respectively; the palisade ratio of upper surface 6 to 11 and that of lower 8 to 13.

Powder:

Greenish- brown; fibrous, free flowing, characterized by the presence of glandular hairs, 2 armed trichomes which are usually attached to a epidermal cell from the slightly protruded stalk present in the middle, trichomes warty, leaf epidermis characterized by the presence of circular trichome scars, vessels and palisade cells.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than 2 per cent, Appendix	2.2.2.
Total Ash	Not more than 27 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 12 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Methanol extract on silica gel 'G' plate using Chloroform: Methanol (19:1) shows five spots at Rf. 0.21, 0.26, 0.34, 0.40 and 0.79 on spraying with Vanillin- Sulphuric acid reagent and heating the plate for 5 minutes at 105ºC.

CONSTITUENTS

Nodiflorin - A and B, nodifloridine- A and B, calamene, β- caryophyllene, 1- octen-3-ol, phenylethyl alcohol, linalool, p- cymen-δ-ol, methyl salicylate, 6- hydroxy luteolin-7-O-apioside, luteolin-7-O- glucoside, 6- hydroxyluteolin, nepetin, nodifloeretin lactose, maltose, glucose, fructose, xylose, lippiflorin A and B.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Kūrmai (கூர்மை), Va̱ṛaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Ci̱runīrperukki (சிறுநீர்பெருக்கி), Kōẕaiyaka̱ṛṛi (கோழையகற்றி), Tuvarppi (துவர்ப்பி), Uḷḷaẕalā̱ṛṛi (உள்ளழலாற்றி), Uramākki (உரமாக்கி), Vīkkaṅkaraicci (வீக்கங்கரைச்சி)

IMPORTANT FORMULATIONS

Aṣḍapairavam (அஷ்டபைரவம்), Karicālai Iḷakam (கரிசாலை இளகம்), Pa̱ṛaṅkippaḍḍai Pataṅkam (பறங்கிப்பட்டை பதங்கம்)

THERAPEUTIC USES

Cītakkaẕiccal (சீதக்கழிச்சல்), Cūlai Nōy (சூலை நோய்), Irumal (இருமல்), Peruṅkaẕiccal (பெருங்கழிச்சல்), Vaḷi Nōykaḷ (வளி நோய்கள்), Veḷḷai (வெள்ளை)

DOSE - Decoction 30- 50 ml twice daily.

20- 40 g coarse powder in 200 ml of water for preparing decoction.

PUṄKAM VĒRPḌṬAI (Root bark) - புங்கம் வேர்ப்பட்டை

Puṅkam Vērpḍṭai is the dried root bark of *Pongamia pinnata* L. Syn. *P. glabra* Vent. *Derris indica* (Lam.) Bennett (Fam. Fabaceae), a glabrous tree, upto 18m. or sometimes more in height, found almost throughout the country upto an altitude of 1200 m.

SYNONYMS

Tamil	:	Amirtavalli (அமிர்தவல்லி), Puṅku (புங்கு)
Assamese	:	Korach
Bengali	:	Natakarnaja, Dahara Karanja
English	:	Smooth leaved pongamia
Gujrati	:	Kanaji
Hindi	:	Karanj
Kannada	:	Honge Beru
Malayalam	:	Pongu, Ungu
Marathi	:	Karanja
Oriya	:	Karanja
Punjabi	:	Karanj
Sanskrit	:	Karanja, Naktamala, Naktahva, Ghrtakaranja
Telugu	:	Ganuga, Kanuga
Urdu	:	Karanj

DESCRIPTION

a) Macroscopic

Drug occurs in pieces of varying sizes; reddish-brown externally and yellowish-white internally; external surface rough, due to peeling off of outer thin skin and presence of numerous irregularly scattered and transversely arranged rows of lenticels; fracture fibrous; taste very bitter.

b) Microscopic

Root Bark - Shows cork consisting of 5 to 15 rows of rectangular, tangentially elongated thin-walled cells; secondary cortex wide composed of polygonal, tangentially elongated cells, most of the cells containing both simple and compound starch grains having 2 to 5 components round to oval in shape, 3 to 11mm in dia., a few cells contain yellowish-brown contents and prismatic crystals of calcium oxalate; stone cells found scattered in this region in singles and groups, single cells of varying shape and size; secondary phloem very wide, composed of tangentially arranged fibres alternating with sieve tubes and phloem parenchyma, traversed by phloem rays; most of phloem parenchyma cells contain starch grains and crystals, similar to those present in secondary

cortex; phloem rays many, mostly straight, 1 or 2 seriate, consisting of thin-walled, radially elongated cells towards inner region and tangentially elongated towards periphery; most of ray cells contain starch grain, similar to those present in secondary cortex.

Powder:

Reddish brown; shows thin-walled, parenchymatous cells, cork cells; phloem fibres, stone cells and simple and compound starch grains measuring 3 to 11mm in diameter.

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	2 per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	3.5 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 Toluene: Ethyl acetate (9:1) shows under UV light (366 nm.) eleven fluorescent zones at Rf. 0.04 (blue), 0.08 (greenish blue), 0.13(sky blue) 0.18 (blue) 0.25 (sky blue), 0.31 (sky blue), 0.37 (greenish yellow), 0.42 (sky blue), 0.47 (greenish yellow), 0.51 (light blue), 0.80 (light blue). On exposure to iodine vapours nine spots appear at Rf. 0.09, 0.18, 0.31, 0.37, 0.47, 0.47, 0.51, 0.80 and 0.98 (all yellow).

CONSTITUENTS

Ponganone I to XI, flavones, kanugin and demethoxy kanugin.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Kūrmai (கூர்மை)

Vīrium : Kārppu (கார்ப்பு)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Tūkkuṇippuẓukkolli (தூக்குணிப்புழுக்கொல்லி), Tuvarppi (துவர்ப்பி), Uḍaṟtēṟṟi (உடற்தேற்றி)

IMPORTANT FORMULATIONS

Puṅkat Tailam (புங்கத் தைலம்)

THERAPEUTIC USES

Īḷai (ஈளை), Irumal (இருமல்), Mūrccai (மூர்ச்சை), Puṇ (புண்), Va̲ra̲ḍcuram (வறட்சுரம்), Vāta Ku̲nmam (வாத குன்மம்), Vāyvu (வாய்வு)

DOSE - Decoction 30- 50 ml twice daily.

15 - 30 g coarse powder in 200 ml of water for preparing decoction.

60. Pungam vitthu

PUṄKAM VITHTHU (Seed) - புங்கம் வித்து

Puṅkam Viththu is the seed *Pongamia pinnata* L. Syn. *P. glabra* Vent. *Derris indica* (Lam.) Bennett (Fam.Fabaceae), a medium sized glabrous tree with a short bole and spreading crown and found almost throughout India upto an altitude of 1200 m.

SYNONYMS

Tamil	:	Amirtavalli (அமிர்தவல்லி), Puṅku (புங்கு)
Assamese	:	Korach
Bengali	:	Dahara Karanja, Nata Karanja
English	:	Smooth leaved pongamia
Gujrati	:	Kanaji, Kanajo
Hindi	:	Dithouri, Karuaini
Kannada	:	Honge, Hulagilu
Malayalam	:	Avittal, Ungu, Unu, Pungu
Marathi	:	Karanja
Oriya	:	Karnja
Punjabi	:	Karanj
Sanskrit	:	Naktahva, Naktamala, Karanjaka, Grtakaranja
Telugu	:	Kanuga, Lamiga
Urdu	:	Karanj

DESCRIPTION

a) Macroscopic

Seed usually one and rarely two per fruit, elliptic or reniform in shape, 1.7 to 2.0 cm. long and 1.2 to 1.8 cm. broad, wrinkled with reddish leathery testa; micropylar end of cotyledons slightly depressed while other side semicircular in shape.

b) Microscopic

Transverse section of seed shows layers of testa composed of palisade - like outer epidermis, filled with brown pigment, covered externally with a thick cuticle; this is followed by a layer of large, thin walled, somewhat rectangular cells, 2 to 4 layers of thick-walled parenchyma cells, and a few rows of cells with small intercellular spaces, a few layers of spongy parenchyma having large intercellular spaces and a number of parenchyma cells containing brown pigments; cotyledons composed of outer layer of epidermis with cylindrical cells, externally covered with thin cuticle; epidermis followed by rectangular to polygonal cells of mesophyll, filled with globules, also present scattered in this region.

Powder:

Creamish- brown, oily; shows fragments of palisade - like testa cells; parenchyma cells containing brownish content and oil globules.

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	0.1 per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	23 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	13 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Alcoholic extract on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Toluene: Ethyl acetate (70:30) v/v shows under UV (366 nm.) nine flurescent spots at Rf. 0.21 (blue), 0.31 (blue), 0.39 (blue), 0.42 (yellow), 0.46 (blue), 0.58 (sky blue), 0.67 (sky blue), 0.74 (yellow), 0.90 (yellow). With Anisaldehyde - Sulphuric acid reagent and heating the plate for about ten minutes at 110°C six spots appear at Rf. 0.39 (violet), 0.49 (violet), 0.58 (yellow), 0.70 (yellowish blue), 0.81 (violet) and 0.90(violet).

CONSTITUENTS

Glabrachromene, glabrachromene II, ß- sitosterol, karangin, pongamol, pongaglabrone, pongapin, kanjone, demethoxy kanugin, karanjachromene, 6- methoxy - 4-oxo- 2- phenylfuro (2,3- h) -1- benzopyran, pongol, glabrachalcone, isolonchocarpin gamatin, pinnatin, glabrin, lanceolatin- B pongarotene, isoponga flavone, isoponga chromene 2'- methoxy- furano (2", 3": 7, 8) flavone, 5'- methoxy-furano - (2"- 3": 7,8) flavone, 3' 4-dimethoxy - (2", 3": 7, 8) - furano flavone, 2'- methoxy - ß- hydroxyl (2" 3": 4' 3') furano chalcone, karangin, lanceolatin- B, pongaglabroic lipids, palmitic acid, oleic acid, linoleic acid, amino acids and fatty acids.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Kūrmai (கூர்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Tuvarppi (துவர்ப்பி), Uḍaṟtēṟṟi (உடற்தேற்றி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Kaṇkāca Māttirai (கண்காச மாத்திரை)

THERAPEUTIC USES

Ca̲n̲i (சன்னி), Kaṇ Nōy (கண் நோய்), Karappā̲n̲ (கரப்பான்), Paḍai (படை)

DOSE - Powder 250 mg

Decoction 30- 50 ml twice daily.

20- 40 g coarse powder in 200 ml of water for preparing decoction.

PŪVARACAM PAḌṬAI (Stem bark) - பூவரசம் பட்டை

Pūvaracam Paḍṭai is the stem bark of ***Thespesia populnea*** (L.) Soland. ex Correa Syn. ***Hibiscus populneus*** L. (Fam. Malvaceae), a fast growing, medium-sized evergreen tree, upto 10 m. tall with yellow, cup-shaped flowers having maroon centre and distributed throughout coastal forests of India and also largely grown as a roadside tree.It grows in Mullai , Marutham and Neythal thiṇai.

SYNONYMS

Tamil	:	Ammai (அம்மை), Pūḷam (பூளம்), Puvirācaṉ (புவிராசன்), Tarāpati (தராபதி)
Bengali	:	Gajashundi, Paraasapipula
English	:	Portia tree, Umbrella tree
Gujrati	:	Paaraspipalo
Hindi	:	Paaraspipal
Kannada	:	Huvarasi
Malayalam	:	Puvarasa, Pupparutti
Marathi	:	Parasa pimpala
Sanskrit	:	Kapitana, Parisah, Kandarala, Phalisah, Gardabhandah
Telugu	:	Ganyaraavi, Munigangaraavi

DESCRIPTION

a) Macroscopic

Bark occurs in flat to slightly curved pieces, varying in thickness according to age and parts of tree from where it is taken; external surface rough due to numerous irregularly scattered lenticels, fissured, exfoliating in irregular scales, greyish-brown; inner surface, laminated, foliaceous, reddish-brown; fracture fibrous; no characteristic odour; taste astringent.

b) Microscopic

Shows outer exfoliating layer in hard, woody, older barks; cork cells, thin-walled, 10 to 20 layered, rectangular; cortex many layered, outer cortex consisting of closely packed, small, polygonal cells, inner cortex composed of large, rectangular to polygonal cells; bast fibres, abundant in groups, outer groups radially elongated and inner tangentially; medullary rays of two types, narrow, uni to triseriate of slightly elongated rectangular cells and wide, multiseriate, irregularly arranged; large ducts in cortex filled with yellow to orange contents; yellow inclusions present in the cells of outer cortex; rosette calcium oxalate crystals scattered in cortex and medullary rays; starch grains, simple or compound in phloem region.

Powder:

Reddish-brown; shows stratified cork tissue; numerous fibres in groups with narrow lumen and bluntly pointed ends; phloem parenchyma cells with large single rosette calcium oxalate crystal; starch grains, simple to 2 or 3 compound; hilum, distinct.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than 2 per cent, Appendix	2.2.2.
Total Ash	Not more than 13 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 2 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Alcoholic extract on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Chloroform: Methanol: Formic acid (100:2.5:1) shows spots at Rf. 0.12 (brown), 0.18 (brown), 0.29 (brown) and 0.61 (reddish when hot turns yellowish on cooling) with Vanillin- Sulphuric acid reagent and heating the plate at 105ºC for about five minutes.

CONSTITUENTS

(+) Gossypol, flavonoids, steroids and sesquiterpenoidal quinones.

PROPERTIES AND ACTIONS

Cuvai	:	Kaippu (கைப்பு), Tuvarppu (துவர்ப்பு)
Guṇam	:	Ilaku (இலகு), Vaṟaḍci (வறட்சி)
Vīrium	:	Veppam (வெப்பம்)
Pirivu	:	Kārppu (கார்ப்பு)
Ceykai	:	Puzukkolli (புழுக்கொல்லி), Tūymaiyākki (தூய்மையாக்கி)

IMPORTANT FORMULATIONS

Mēkanātat Tailam (மேகநாதத் தைலம்)

THERAPEUTIC USES

Kāṇākaḍi (காணாகடி), Nañcu (நஞ்சு), Peruvayiṟu (பெருவயிறு), Vīkkam (வீக்கம்)

DOSE - Decoction 30- 50 ml twice daily.

20 - 30 g coarse powder in 200 ml of water for preparing decoction.

TĀMARAI MALAR (Flower) - தாமரை மலர்

Tāmarai Malar is the dried flowers (devoid of stalk) of ***Nelumbo nucifera*** Gaertn. Syn. ***Nelumbium speciosum*** Willd. (Fam. Nymphaeaceae), a large, aquatic herb with creeping stem, occurring throughout warmer parts of the country upto an altitude of 1000 m. It grows in Marutham thiṇai (ponds and tanks).

SYNONYMS

Tamil : Aravintam (அரவிந்தம்), Cūriyanaḍpu (சூரியநட்பு), Kamalam (கமலம்), Muṇḍakam (முண்டகம்), Naḷiṉam (நளினம்), Ampu (அம்பு), Tāmaraippū (தாமரைப்பூ)

Assamese : Podum

Bengali : Padma phool, Salaphool

English : Lotus

Gujrati : Kamal

Hindi : Kamal, Kanwal

Kannada : Kamal, Tavare, Naidile, Tavaregedd

Malayalam : Tamara, Venthamara, Chenthamara, Senthamara

Marathi : Komala

Oriya : Padma

Punjabi : Kanwal, Pamposh

Sanskrit : Kamala, Abja, Aravinda, Padma, Kalhara, Sitotpala, Pankaja

Telugu : Kaluva, Tamarapuvow

Urdu : Kamal

DESCRIPTION

a) Macroscopic

Drug occurs as entire or pieces of flowers, comprising of calyx, corolla, androecium, gynoecium and thalamus; entire flower 10 to 15 cm. in dia., yellowish-brown; sepals leaf-like, crimpled, 3 to 5 cm. long, 1.3 to 2 cm. wide, dark brown, broken pieces also occur; petals numerous, crimpled, elliptic, obtuse, membranous, finely veined, 2 to 4 cm. long, 1.2 to 2 cm. wide yellowish-brown; anther, erect, linear 1.4 to 2 cm. long, extended into clavate appendages; gynoecium apocarpous; carpels many, free, embedded in a creamy, top- shaped fleshy thalamus (torus) 3 to 5 cm. long and 2.5 to 3 cm. wide; fruit an etaerio of achenes, becoming loose in their sockets when ripe; seed hard, black, starchy and large.

b) Microscopic

Petal - Shows single layered epidermis on both surfaces, consisting of rectangular cells covered with striated cuticle; ground tissue consisting of polygonal, parenchymatous cells with wide air sacs.

Stamen:

Filament- Filament appears circular in outline, consisting of single layered epidermis covered with striated cuticle; followed by ground tissue of oval, angular, parenchymatous cell; vascular bundle single, present in centre consisting of usual elements of xylem and phloem tissues.

Anther - Shows four chambered anther, two on either sides, connected by parenchymatous cells containing vascular bundle; anther consists of a single layer of epidermis, composed of thin walled, rectangular, parenchymatous cells followed by single layer of endothecium consisting of thin-walled, columnar, parenchymatous cells; spore sac contains yellow, spherical pollen grains with smooth exine and intine walls, measuring 50 to 61 mm in diameter.

Powder:

Dusty -brown; shows fragments of vessels with spiral thickening; spherical, yellow pollen grains, measuring 50 to 61 mm in diameter having smooth exine and intine.

IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than 2 per cent, Appendix	2.2.2.
Total Ash	Not more than 12 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 6 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than 14 per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Methanolic extract of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Toluene: Ehtyl acetate: Formic acid (5:5:1) shows under UV light (254 nm.) four spots at Rf. 0.14, 0.34,0.46 and 0.55 (gallic acid marker). Under UV light (366 nm.) shows two spots at Rf. 0.46 (light black), 0.55 (black, gallic acid marker). After derivatization with Anisaldehyde -Sulphuric acid reagent and heating the plate at 100ºC until the colour develops, the plate shows four spots at Rf. 0.46 (light brown), 0.55 (light brown, gallic acid marker), 0.83 (violet) and 0.96 (light brown).

CONSTITUENTS

Nelumbine, 1,4-dimethoxy benzene, 1, 8-cineole terpinen-4-ol and linalool.

PROPERTIES AND ACTIONS

Cuvai : I**ṉ**ippu (இனிப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Taḍpam (தட்பம்)

Pirivu : Inippu (இனிப்பு)

Ceykai : Kōzaiyakaṟṟi (கோழையகற்றி), Kuḷircciyuṇḍākki (குளிர்ச்சியுண்டாக்கி), Tuvarppi (துவர்ப்பி), Veppakaṟṟi (வெப்பகற்றி)

IMPORTANT FORMULATIONS

Makāvacanta Kucumākaram (மகாவசந்த குசுமாகரம்)

THERAPEUTIC USES

Curam/Kāyccal (சுரம்/காய்ச்சல்), Kaṇ Ericcal (கண் எரிச்சல்), Nīrvēḍkai (நீர்வேட்கை)

DOSE - Decoction 30- 50 ml twice daily.

25 - 50 g coarse powder in 200 ml of water for preparing decoction.

TĀMARAI KIZAṄKU (Rhizome) - தாமரை கிழங்கு

Tāmarai Kizaṅku is the dried rhizome with roots attached at nodes of *Nelumbo nucifera* Gaertn. Syn. *Nelumbium speciosum Willd.* (Fam. Nymphaeaceae), an aquatic herb, with stout creeping rhizome found in lakes and ponds throughout the warmer parts of the country, ascending upto 1000 m.This grows in Marutham thiṇai (ponds and tanks).

SYNONYMS

Tamil : Aravintam (அரவிந்தம்), Cūriyanaḍpu (சூரியநட்பு), Kamalam (கமலம்), Muṇḍakam (முண்டகம்), Naḷiṉam (நளினம்), Tāmarai Vaḷaiyam (தாமரை வளையம்)

Assamese : Kamal Kakdi

English : Lotus

Gujrati : Loda

Hindi : Kamal Kand, Kamal Kakdi

Kannada : Tavare Kanda

Malayalam : Tamara Kizangu

Marathi : Kamal Kand

Oriya : Padma

Punjabi : Kaul, Bhein

Sanskrit : Kamala, Padnakanda, Saluka, Ambhoruha

Telugu : Tamara Gadda

Urdu : Kanwal Kakdi

DESCRIPTION

a) Macroscopic

Drug occurs as cut pieces of rhizome with distinct nodes and internodes, cylindrical, 0.5 to 2.5 cm. in dia., longitudinally marked with brown patches, smooth, yellowish-white to yellowish-brown; root adventitious, less developed, 0.5 to 1 mm. thick, attached to node of rhizome; dark brown.

b) Microscopic

Rhizome - Shows a single layered epidermis followed internally by 2 to 4 layered lignified cells; cortex differentiated into three regions; outer cortex consisting of a wide zone of isodiametric thin-walled cells of which outer 5 or 6 layers collenchymatous and rest parenchymatous, having intercellular spaces and groups of fibres; middle cortex mostly composed of air cavities traversed by trabeculae of thin-walled small and nearly isodiametric cells; inner cortex forming central core,

consists of spherical cells enclosing large intercellular spaces; vascular strands consists of scattered closed vascular bundles surrounded by thin-walled, lignified sclerenchymatous fibres, resembling a monocotyledonous structure; vessels having spiral and spiro-reticulate thickening; phloem composed of sieve tubes and companion cells; air cavities large, elliptic or rounded, largest at middle cortex and smaller towards inner cortex; air cavities lined by thin-walled, elongated, parenchymatous epithelial cells; starch grains abundant, rounded to oval, mostly simple, rarely compound measuring 8 to 27 µm in dia., loaded in cells.

Root - Appears more or less circular in outline, epidermis consists of oval, thin-walled parenchymatous cells; cortex composed of 5 to 8 layers of oval to polygonal, thin-walled parenchymatous cells, vascular elements surrounded by slightly lignified endodermis; phloem cells, xylem fibres aseptate with blunt ends; vessels with spiral thickening, rounded to oval, poorly developed and consisting of usual elements; xylem composed of vessels, tracheids and parenchyma; vessels and tracheids have simple pits.

Powder:

Light brown; shows groups of oval to elongated, parenchyma cells; xylem fibres aseptate with blunt ends; vessels with spiral thickening, rounded to oval simple starch grains measuring 8 to 27 µm in dia.

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	3.5	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	1.5	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	6.5	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Alcoholic extract on silica gel 'G' plate using Chloroform: Methanol (4:1) shows in visible light one spot at Rf. 0.97 (light yellow). Under UV (366 nm.) seven fluorescent zones are visible at Rf. 0.06 (blue), 0.13 (blue) 0.43 (blue) 0.55 (blue), 0.78 (blue) 0.91 (blue) and 0.98 (reddish). On exposure to iodine vapours eight spots appear at Rf. 0.13, 0.31, 0.45, 0.64, 0.76, 0.86, 0.93 and 0.96 (all yellow). On spraying with 5% Methanolic- Sulphuric acid and heating the plate at 105ºC until the colour develops, four spots appear at Rf. 0.10 (grey), 0.64 (brown), 0.76 (brown) and 0.96 (brown).

CONSTITUENTS

Linalool, nonadecane, phytol and raffinose.

PROPERTIES AND ACTIONS

Cuvai : I**ṉ**ippu (இனிப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Tiṇmai (திண்மை), Va**ṟ**aḍci (வறட்சி)

Vīrium : Taḍpam (தட்பம்)

Pirivu : In̲ippu (இனிப்பு)

Ceykai : Uḷḷaẕalār̲r̲i (உள்ளழலாற்றி)

IMPORTANT FORMULATIONS

Ilaku Cantan̲āthi Tailam (இலகு சந்தனாதி தைலம்), Makā Ēlāthi Kuḷikai (மகா ஏலாதி குளிகை), Nācirōka Nācattailam (நாசிரோக நாசத்தைலம்), Par̲aṅkippaḍḍai Iracāyan̲am (பறங்கிப்பட்டை இரசாயனம்), Tirāḍcāticcūraṇam (திராட்சாதிச்சூரணம்)

THERAPEUTIC USES

Irumal (இருமல்), Pārvai Maṅkal (பார்வை மங்கல்), Tavaḷai Cor̲i (தவளை சொறி), Vayir̲r̲ukkaḍuppu (வயிற்றுக்கடுப்பு), Veppu Nōy (வெப்பு நோய்)

DOSE - Powder 3 - 5 g

TĀṈṚIKKĀY (Fruit) - தான்றிக்காய்

Tāṉṟikkāy is the pericarp of dried ripe fruit devoid of seeds, of ***Terminalia belerica*** (Gaertn.) Roxb. Syn.***T.puneta*** Roxb., ***Myrobalanus belerica*** B.Gaertn. (Fam. Combretaceae), a handsome tree, upto 40 m high, commonly found in plains and deciduous forests upto 900 m elevation; fruits ripen during November -February.It grows in Kuṟiñciand Marutham thiṇai.

SYNONYMS

Tamil : Akkantam (அக்கந்தம்), Amutam (அமுதம்), Erikaḍpalam (எரிகட்பலம்), Tāṉikkāy (தானிக்காய்)

Assamese : Bhomora, Bhomra, Bhaira

Bengali : Bayda, Baheda

English : Beleric myrobalan

Gujrati : Bahedan

Hindi : Bahera

Kannada : Tare kai, Shanti Kayi

Kashmiri : Babelo, Balali

Malayalam : Tannikka

Marathi : Baheda

Oriya : Baheda

Punjabi : Bahera

Sanskrit : Bibhitaka, Vibhita, Aksa, Aksaka

Telugu : Thanikkaya

Urdu : Bahera

DESCRIPTION

a) Macroscopic

Fruit nearly spherical to ovoid, 2.5 to 4.0 cm. in diameter. Ripe fruits slightly silvery or with whitish shiny pubescent surface; mature fruits grey or greyish-brown with slightly wrinkled appearance; rind of fruit shows variation in thickness from 3 to 5 mm.; taste astringent.

b) Microscopic

Transverse section of fruit shows an outer epicarp consisting of a layer of epidermis, most of epidermal cells elongate to form hair like protuberance with swollen base; composed of a zone of parenchymatous cells, slightly tangentially elongated and irregularly arranged, intermingled with

stone cells of varying shape and size; elongated stone cells found towards periphery and spherical in the inner zone of mesocarp in groups of 3 to 10; mesocarp traversed in various directions by numerous vascular strands; bundles collateral, endarch; simple starch grains and some stone cells found in most of mesocarp cells; a few peripheral layers devoid of starch grains; rosettes of calcium oxalate and stone cells present in parenchymatous cells; endosperm composed of stone cells running longitudinally as well as transversely.

Powder:

Yellowish-brown; shows fragments of epidermal cells of epicarp having hair-like projection; large, lignified pitted stone cells with wide lumen; cluster crystals of calcium oxalate; parenchyma cells with oil globules; numerous simple, oval to rounded starch grains, measuring 6 to 11 µm in diameter having 2 to 4 components.

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	8	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	35	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of Diethyl ether extract of the drug on silica gel 'G' plate using Toluene: Ethyl acetate: Formic Acid (5:4:1) v/v, shows under UV light (254 nm.) five fluorescent zones at Rf. 0.20 (blue), 0.23 (blue), 0.33 (dark blackish blue), 0.39 (blue) and 0.60 (blue). On spraying with 5% Methanolic ferric chloride reagent four spots appear at Rf. 0.20 (blackish blue), 0.23 (blackish blue) and 0.33 (dark blackish blue).

CONSTITUENTS

Gallic acid, ellagic acid, ethyl gallate, galloyl glucose and chebullagic acid, belleric acid, belericoside, arjungenin and its glycoside, arjunglucoside, cannogenol - 3- 0- ß- D- galactopyranosyl- (1→4) -0 -á- L- rhamnopyranoside, bellericanin, phyllemblin, termilignan, thaninilignan, 7- hydroxy-3', 4' (methylenedioxy) flavan and anolignan B and ß- sitosterol.

PROPERTIES AND ACTIONS

Cuvai : Tuvarppu (துவர்ப்பு)

Guṇam : Ilaku (இலகு), Va̲ṛaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : I̲nippu (இனிப்பு)

Ceykai : Kō̲zaiyaka̲r̲ri (கோழையகற்றி), Malamiḷakki (மலமிளக்கி), Tuvarppi (துவர்ப்பி), Uramākki (உரமாக்கி)

IMPORTANT FORMULATIONS

Civataic Cūraṇam (சிவதைச் சூரணம்), Kantaka Iracāyaṉam (கந்தக இரசாயனம்), Tēṟṟāṉkoḍḍai Iḷakam (தேற்றான்கொட்டை இளகம்), Tippili Irācāyaṉam (திப்பிலி இராசாயனம்), Tiripalaic Cūraṇam (திரிபலைச் சூரணம்)

THERAPEUTIC USES

Āṇkuṟippuṇ (ஆண்குறிப்புண்), Cilantiñcu (சிலந்திநஞ்சு), Kuruti Aẕal (குருதி அழல்)

DOSE - Powder 2 - 4 g

THIPPILI (Fruit) - திப்பிலி

Thippili is the dried, immature, catkin-like fruits with bracts of ***Piper longum*** L. (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 evergreen forests of Western ghats as wild, and also cultivated in North East and many parts of the South. It grows in Kuṟiñcithiṇai.

SYNONYMS

Tamil	:	Ampu (அம்பு), Aricittippili (அரிசித்திப்பிலி), Ātimaruntu (ஆதிமருந்து), Kaṇai (கணை), Kōzaiyaṟukki (கோழையறுக்கி), Kuḍāri (குடாரி)
Assamese	:	Pipali
Bengali	:	Pipul
English	:	Long pepper
Gujrati	:	Lindi Peeper, Pipali
Hindi	:	Pipar
Kannada	:	Hippali
Malayalam	:	Pippali
Marathi	:	Pimpali, Lendi pimpali
Oriya	:	Pipali, Pippali
Punjabi	:	Magh, Magh Pipali
Sanskrit	:	Pippali, Kana, Magadhi, Magadha, Krsna, Saundi.
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 the endocarp cells filled with starch grains, round to oval measuring 3 to 8 μm in dia.

Powder:

Deep moss green; shows fragments of parenchyma cells, oval to elongated stone cells; oil globules and round to oval starch grains, measuring 3 to 8 μm in diameter.

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.

ASSAY

High performance thin layer chromatographic (HPTLC) assay of piperine.

Solvent system

Toluene: Diethyl ether: Dioxane (62.5 : 21.5 : 16).

TLC Plates

Aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness.

Standard Solution

10 mg of piperine is dissolved in 10 ml of Methanol in a volumetric flask. From this stock solution standard solutions of 100 -1000 μg/ml are prepared by taking aliquots (0.1 to 1.0 ml) of stock solution and adjusting the volume to 1.0 ml with Methanol.

Sample preparation

20 g of powdered drug is extracted with 150 ml of n-Hexane in a Soxhlet apparatus to defat the material. Further the drug is extracted with Methanol for 8 to 10 hr. The solvent is removed under reduced pressure. 20 mg of Methanolic extract is dissolved in 1 ml of Methanol.

Calibration curve

10 μl of each of the standard solutions is applied on a TLC plate. The plate is developed in twin trough chamber to a distance of 8 cm. and scanned densitometrically at 366 nm. The peak areas are recorded and the calibration curve is obtained by plotting peak area vs concentration of piperine applied.

Estimation of piperine in the drug

10 µl of the sample solution in triplicate is applied on a TLC plate. The plate is developed in the solvent system and the peak area of piperine is recorded as described above for calibration curve. The amount of piperine present in the sample is calculated from the calibration curve of piperine.

The percentage of piperine ranges from 0.29 to 0.38.

T.L.C.

T.L.C. of the Alcoholic extract of the drug on silica gel 'G' plate using Toluene: Ethyl acetate (9:1) as mobile phase, under UV (366 nm.) shows six fluorescent zones at Rf.. 0.15, 0.26, 0.34, 0.39, 0.50 and 0.80. On exposure to iodine vapours, 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 105ºC for five minutes five spots appear at Rf. 0.04, 0.22, 0.35, 0.43 and 0.82. On spraying with Dragendorff reagent three red orange spots appear at Rf. 0.15, 0.26 and 0.34 (all orange).

CONSTITUENTS

β-caryophyllene; piperine, pipernonaline, piperundecalidine, piperlatine, sesamine, dihydriostifransterol, piplasterol and futoamide.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு), Tuvarppu (துவர்ப்பு)

Guṇam : Ilaku (இலகு), Noymai (நொய்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Iṉippu (இனிப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Aśḍāthic Cūraṇam (அஷ்டாதிச் சூரணம்), Civaṉār Amirtam (சிவனார் அமிர்தம்), Kakkuvāṉ Iḷakam (கக்குவான் இளகம்), Kuṉmakuḍōri Meẕuku (குன்மகுடோரி மெழுகு), Pālacañcīvi Māttirai (பாலசஞ்சீவி மாத்திரை), Tippili Irācāyaṉam (திப்பிலி இராசாயனம்)

THERAPEUTIC USES

Cuvaiyiṉmai (சுவையின்மை), Iraippu (இரைப்பு), Irumal (இருமல்), Aiyappiṇi (ஐயப்பிணி), Kaṇ Kātu Mūkku Nōykaḷ (கண் காது மூக்கு நோய்கள்), Kuṉmam (குன்மம்)

DOSE - Powder 500 mg - 1g

VĀYVIḌAṄKAM (Fruit) - வாய்விடங்கம்

Vāyviḍaṅkam is the dried mature fruit of ***Embelia ribes*** Burm. f. (Fam. Myrsinaceae), large scandent shrub with long, slender, flexible branches, distributed throughout hilly parts of India upto 1600 m.It grows in Kuṟiñci , Mullai Marutham thiṇai.

SYNONYMS

Tamil	:	Kēraḷam (கேரளம்), Varaṉai (வரனை), Varṉaṉai (வர்னனை), Vāyuviḷaṅkam (வாயுவிளங்கம்)
Assamese	:	Vidang
Bengali	:	Vidang
Gujrati	:	Vavading, Vavding, Vayavadang
Hindi	:	Baberang, Bhabhiranga, Vayavidanga
Kannada	:	Vayuvidanga, Vayuvilanga
Kashmiri	:	Babading
Malayalam	:	Vizhalari, Vizalari
Marathi	:	Vavading, Vavding
Oriya	:	Bidanga, Vidanga
Punjabi	:	Babrung, Vavaring
Sanskrit	:	Vidanga, Jantughna, Krmighna, Vella, Krmihara, Krmiripu
Telugu	:	Vayuvidangalu
Urdu	:	Baobarang, Babrang

DESCRIPTION

a) Macroscopic

Fruit brownish-black, globular, 2 to 4 mm. in diameter, warty surface with a beak like projection at apex, often short, thin pedicel and persistant calyx with usually 3 or 5 sepals present; pericarp brittle enclosing a single seed covered by a thin membrane; entire seed reddish and covered with yellowish spots, odour slightly aromatic; taste astringent.

b) Microscopic

Transverse section of fruit shows epicarp consisting of single row of tabular cells of epidermis, usually obliterated; in surface view cells rounded with wrinkled cuticle; mesocarp consists of a number of layers of reddish-brown coloured cells and numerous fibrovascular bundles and rarely a few prismatic crystals of calcium oxalate; inner part of mesocarp and endocarp composed of stone cells; endocarp consisting of single layered, thick-walled, large, palisade-like

stone cells; seed coat composed of 2 or 3 layered reddish-brown coloured cells; endosperm cells irregular in shape, thick-walled, containing fixed oil and proteinous masses; embryo small when present otherwise most of the seeds sterile.

Powder:

Reddish; shows reddish parenchyma cells and stone cells.

Identification:-

(1) 1 g of the powdered seeds is shaken with 20 ml of solvent Ether for five minutes and filtered. To a portion of the filtrate 5 per cent v/v solution of Sodium Hydroxide is added and a deep violet colour is developed in the aqueous layer. To the other portion 2 drops of dilute Ammonia solution is added and a bluish violet precipitate is obtained.

(2) 5 g of the powdered seeds is boiled with 25 ml Alcohol and filtered. The deep red coloured filtrate is divided into two portions. To one portion, solution of Lead Acetate is added, a dirty green precipitate is produced. To the other portion, solution of Ferric Chloride is added a reddish-brown precipitate is produced.

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 10 per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than 9 per cent, Appendix	2.2.7.

ASSAY

Contains not less than 2 per cent w/w of embelin (limits 1.85 to 2.15) when assayed as follows:-

About 10 g of powder (40 mesh) is accurately weighed and transfered to a 500 ml glass stoppered flask. It is shaken occasionally for thirty minutes with 150 ml of solvent Diethyl ether. The whole mass is packed in a percolator and macerated for thirty minutes and extracted with solvent Diethyl ether, till the ethereal solution ceases to give a pink colour with a drop of Ammonia Solution. The Ether is distilled off, and the residue is treated with small quantity of light Petroleum (b.p. 40º to 60º) and cooled in ice. The precipitate is filtered under suction and the filtrate is rejected. The residue is washed with further small quantities of cooled light Petroleum. The residue is transfered to a tared beaker with sufficient quantity of the solvent light Petroleum and dried, to constant weight at 80º. The melting range of embelin is 142º to 144º.

T.L.C.

T.L.C. of Alcoholic extract on silica gel 'G' plate using Toluene: Ethyl acetate (7:3) v/v, on exposure to iodine vapours shows eight spots at Rf. 0.06, 0.14, 0.51, 0.58, 0.76, 0.82, 0.86 and 0.95 (all yellow). On spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate

for five minutes at 105°C six spots appear at Rf. 0.06,0.14,0.51, 0.58, 0.76 (all grey), and 0.95 (violet).

CONSTITUENTS

Embelin, quercitol, tannin, christembine, embelic acid and vilangin.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை), Vaṟaḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Pacittīṭūṇḍi (பசித்தீதூண்டி), Tūkkuṇippuzukkolli (தூக்குணிப்புழுக்கொல்லி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Karuḍaṉkizaṅku Eṇṇey (கருடன்கிழங்கு எண்ணெய்), Makāvallāti Iḷakam (மகாவல்லாதி இளகம்), Nākkuppūcci(Kolli) Kuḍinīr (நாக்குப்பூச்சி(கொல்லி) குடிநீர்), Nilavākaic Cūraṇam (நிலவாகைச் சூரணம்), Piraṇḍai Vaḍakam (பிரண்டை வடகம்)

THERAPEUTIC USES

Kuṉmam (குன்மம்), Nañcu (நஞ்சு), Nuṇpuzukkaḷ (நுண்புழுக்கள்), Vāyvu (வாய்வு), Veḷuppu Nōy/Pāṇḍu (வெளுப்பு நோய்/பாண்டு)

DOSE - Powder 5 - 10 g

VĀLMIḶAKU (Fruit) - வால்மிளகு

Vālmiḷaku is the mature, dried fruit of ***Piper cubeba*** L. f. (Fam. Piperaceae), woody, climbing, dioeceous perennial; female spike with small flowers, often curved; cultivated to a small extent in India, specially in the Karnataka state; fruits collected when mature but still unripe and carefully dried.It grows in Kuṟiñcithiṇai.

SYNONYMS

Tamil	:	Kaṇḍamiḷaku (கண்டமிளகு), Laṅkēcam (லங்கேசம்)
Assamese	:	Kakkol, Kababcheni
Bengali	:	Kababchini, Sugandhamaricha
English	:	Cubebs, Tailed pepper
Gujrati	:	Chanakabab, Chinikabab
Hindi	:	Seetalchini, Kababchini
Kannada	:	Gandhamenasu, Balamenasu
Kashmiri	:	Kushfal, Kababchini
Malayalam	:	Cheenamulaku, Takkolam, Valmulaku
Marathi	:	Kankol
Oriya	:	Kababchini
Punjabi	:	Kababchini, Sardchini
Sanskrit	:	Kankola, Lankesa, Cinatiksna, Kakkola, Kankolika
Telugu	:	Chalavamiriyalu, Tokamiriyalu
Urdu	:	Kababchini

DESCRIPTION

a) Macroscopic

Fruit wrinkled, rounded, 5 to 7 mm. in diameter, light brown to dark brown, about 7 mm. long stalk attached; pericarp red to slightly brown, testa fused with pericarp; fruit hard and stony; albumin white and oily; odour aromatic and characteristic; taste pungent and slightly bitter.

b) Microscopic

Transverse section of fruit shows an outer layer of epidermis, externally covered with thick cuticle, a row of 2 to 5 small, crushed, brown and thick-walled cells below; mesocarp composed of large, thin-walled parenchymatous cells, oil cells and vascular bundles; endocarp of multi-layered sclereids heavily lignified with narrow lumen; testa and tegmen composed of elongated cells, tegmen cells hyaline and kernel cells greyish in colour.

Powder:

Dark brown, oily; shows fragments of parenchyma cells, elongated testa cells, sclereids; starch grains numerous, rounded with centric hilum measuring 3 to 15 µm in diameter 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	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	14	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 Petroleum ether (40- 60°) extract of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using Toluene: Ethyl acetate (7:3), on exposure to iodine vapours six spots appear at Rf. 0.53, 0.66, 0.75, 0.82, 0.92 and 0.96 (all yellow). With Anisaldehyde- Sulphuric acid reagent and heating the plate, for five minutes at 105°C six spots appear at Rf. 0.53, 0.66, 0.75 (all violet),0.82, 0.92 (both pink) and 0.96 (red).

CONSTITUENTS

Sesqirterpenehydrocarbons-quiphellandrane,1-epibicyclosequiphellandrene, cyclohexane, piperenol A & B and zeylenol.

PROPERTIES AND ACTIONS

Cuvai : Kārppu (கார்ப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Ciṟunīrperukki (சிறுநீர்பெருக்கி), Kōzaiyakaṟṟi (கோழையகற்றி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Cāmpirāṇippū Paṭaṅkam (சாம்பிராணிப்பூ பதங்கம்), Impūṟal Iḷakam (இம்பூறல் இளகம்), Kaẓaṟcit Tailam (கழற்சித் தைலம்), Kuṅkumappū Māttirai (குங்குமப்பூ மாத்திரை), Makā Ēlāthi Kuḷikai (மகா ஏலாதி குளிகை), Nārathtai Iḷakam (நாரத்தை இளகம்), Tūtuvēḷai Ney (தூதுவேளை நெய்)

THERAPEUTIC USES

Aẕal Nōykaḷ (அழல் நோய்கள்), Aiya Nōykaḷ (ஐய நோய்கள்), Kuṉmam (குன்மம்), Nīrvēḍkai (நீர்வேட்கை), Vaḷi Nōykaḷ (வளி நோய்கள்), Veḷḷai (வெள்ளை)

DOSE - Powder 1 - 2 g

VĀLUZUVAI (Seed) - வாலுழுவை

Vāluzuvai is the dried, brownish-orange, ripe seeds, deviod of capsule wall of ***Celastrus paniculatus*** Willd. (Fam. Celastraceae), a large climbing shrub, mostly found all over the hilly parts of the country upto an altitude of 1200 m.It grows in Kuriñciand Mullai thiṇai.

SYNONYMS

Tamil	:	Atipariccam (அதிபரிச்சம்)
Assamese	:	Kapalphotla
English	:	Staff tree
Gujrati	:	Malkangani
Hindi	:	Malkangani
Kannada	:	Dodaganugae, Gangunge Beeja, Kangondiballi
Malayalam	:	Ceruppunnari, Uzhinja
Marathi	:	Malkangoni
Oriya	:	Malkanguni, Jyotishmati
Punjabi	:	Malkangoni
Sanskrit	:	Jyotismati
Telugu	:	Malkangani, Peddamaveru
Urdu	:	Malkangani.

DESCRIPTION

a) Macroscopic

Dried ripe seeds more or less covered by orange-red crusty aril, seed without aril also present, measuring 5 to 6 mm. in length and 2.5 to 3.35 mm. in breadth, a few roughly three sided being convex on the sides, and a few two sided with one convex and other more or less flat side; one edge of many seeds show a faint ridge or raphe on the entire margin; surface generally smooth and hard; colour light to dark brown; odour unpleasant; taste bitter.

b) Microscopic

Seed - Shows single layered epidermis covered externally with thick cuticle and filled with tannin, followed by 4 to 6 layers of thin-walled, collapsed, parenchymatous cells and layer of radially elongated stone cells; parenchyma of top one or two layers longer than of the below with triangular intercellular spaces; inner most layer of parenchyma containing prismatic crystals of calcium oxalate; beneath stone cells layer quadrangular to octagonal, tangentially elongated cells filled with brownish contents; endosperm composed of polygonal, thin-walled, parenchymatous cells having

oil globules and aleurone grians; embryo spathulate in fleshy endosperm containing oil globules and aleurone grains.

Powder:

Oily, dark brown; shows groups of endospermic parenchyma, stone cells; oil globules and aleurone grains.

IDENTITY, PURITY AND STRENGTH

Oil contents	Not less than	45 per cent, Appendix	2.2.8.
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	20 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 of the drug on silica gel 'G' plate using Toluene : Ethyl acetate (9:1) shows two spots at Rf. 0.82 (pink) & 0.94 (yellow) in visible light. Under UV (366 nm.) four fluorescent zones visible at Rf. 0.54, 0.82 0.89, (all blue) and 0.94 (yellow). On exposure to iodine vapours eight spots appear at Rf. 0.04, 0.15, 0.20, 0.35, 0.54, 0.63, 0.82 and 0.89 (all yellow). On spraying with Vanillin- Sulphuric acid reagent and heating the plate at 105° C for five minutes four spots appear at Rf. 0.35, 0.54 (both blue), 0.82, 0.89 (both greenish blue).

CONSTITUENTS

Malkangunin, celapanin, celapanigin, celapagin, pristimerin, zeylasterone & zeylasteral, fatty oil with palmitic, oleic, linoleic and linolenic acids.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Kūrmai (கூர்மை), Vemmai (வெம்மை)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Kāmamperukki (காமம்பெருக்கி), Narampu Uramākki (நரம்பு உரமாக்கி), Uḍalveppakaṟṟi (உடல்வெப்பகற்றி), Veppamuṇḍākki (வெப்பமுண்டாக்கி), Viyarvaiyuṇḍākki (வியர்வையுண்டாக்கி)

IMPORTANT FORMULATIONS

Civaṉār Vēmpu Kuḷittailam (சிவனார் வேம்பு குளித்தைலம்), Iḍivallāthi Meẕuku (இடிவல்லாதி மெழுகு), Karuḍaṉkiẕaṅku Eṇṇey (கருடன்கிழங்கு எண்ணெய்)

THERAPEUTIC USES

Cūtakanōykaḷ (சூதகநோய்கள்), Irumal (இருமல்), Aiya Nōykaḷ (ஐய நோய்கள்), Kīḻvāyu (கீல்வாயு), Kurutikkaẓiccal (குருதிக்கழிச்சல்), Puṇ (புண்), Perumpāḍu (பெரும்பாடு)

DOSE - Powder 1 - 2 g

VENTHAYAM (Seed) - வெந்தயம்

Venthayam is the seed of *Trigonella foenum-graecum* L. (Fam. Fabaceae), an aromatic, 30 to 60 cm. tall, annual herb, cultivated throughout the country.

SYNONYMS

Tamil	:	Mentiyam (மெந்தியம்), Mēti (மேதி)
English	:	Fenugreek
Gujrati	:	Methi
Hindi	:	Methi
Kannada	:	Mente, Menthe
Malayalam	:	Uluva
Marathi	:	Methi
Punjabi	:	Methi
Sanskrit	:	Methi, Methini
Telugu	:	Mentulu
Urdu	:	Methi

DESCRIPTION

a) Macroscopic

Seed oblong, rhomboidal with a deep furrow running obliquely from one side dividing seed into a larger and smaller part, 0.2 to 0.5 cm. long, 0.15 to 0.35 cm. broad, smooth, very hard; dull yellow; seed becomes mucilaginous when soaked in water; odour pleasant; taste bitter.

b) Microscopic

Seed - Seed shows a layer of thick-walled, columnar palisade, covered externally with thick cuticle; cells flat at base, mostly pointed but a few flattened at apex, supported internally by a tangentially wide bearer cells having radial rib-like thickenings; followed by 4 or 5 layers of tangentially elongated, thin-walled parenchymatous cells; endosperm consists of a layer of thick-walled cells containing aleurone grains, several layers of thin-walled, mucilaginous cells, varying in size, long axis radially elongated in outer region and tangentially elongated in inner region present; cotyledons consists of 3 or 4 layers of palisade cells varying in size with long axis and a few layers of rudimentary spongy tissue; rudimentary vascular tissue situated in spongy mesophyll; cells of cotyledon contain aleurone grains and oil globules.

Powder:

Yellow; shows groups of palisade parenchyma cells; aleurone grains, oil globules; endosperm and epidermal cells of testa.

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.
Alcohol-soluble extractive	Not less than	5	per cent, Appendix	2.2.6.

T.L.C.

T.L.C. of the Methanolic extract of the drug on aluminium plate precoated with silica gel 60 F_{254} (E. Merck) 0.2 mm. thickness using n-Hexane: Ethyl acetate (4:1) shows four spots at Rf. 0.36 (greenish brown, diosgenin marker), 0.41(blue), 0.58(blue) and 0.91 (dark blue) after spraying with Anisaldehyde- Sulphuric acid reagent and heating the plate at 100 - 105ºC until the colour develops.

CONSTITUENTS

Diosgenin, tigogenin, neotigogenin, yamogenin, gitogenin, neogitogenin, sonilagenin, sarsasaposanin, vitexin, isovitexin, vicenin 1 and 2, trigonellin, kaempferol, luteolin, quercetin, ß-sitosterol, furostanol glycosides, tetrosides B and C, fenugini B, trigoneosides - Xa, Xb, XIb, XIIa, XIIb, XIIIa , methyl protodioscin, methyl protodeltonin and 4- hydroxy- isoleucine.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Noymai (நொய்மை)

Vīrium : Taḍpam (தட்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Akaḍḍuvāyvakaṟṟi (அகட்டுவாய்வகற்றி), Ciṟunīrperukki (சிறுநீர்பெருக்கி), Kāmamperukki (காமம்பெருக்கி), Tuvarppi (துவர்ப்பி), Uḷḷaẕalāṟṟi (உள்ளழலாற்றி), Uramākki (உரமாக்கி), Vaṟaḍciyakaṟṟi (வறட்சியகற்றி)

IMPORTANT FORMULATIONS

Cuṇḍaivaṟṟal Cūraṇam (சுண்டைவற்றல் சூரணம்), Kaṇattailam (கணத்தைலம்), Kapāḍa Māṭthirai (கபாட மாத்திரை), Kōrōcaṉaittukaḷ (கோரோசனைத்துகள்)

THERAPEUTIC USES

Iḷaippu Nōy (இளைப்பு நோய்), Cītakkaẕiccal (சீதக்கழிச்சல்), Kuruti Aẕal (குருதி அழல்), Nīriẕivu (நீரிழிவு), Nīrvēḍkai (நீர்வேட்கை), Uḍal Ericcal (உடல் எரிச்சல்), Veḷḷai (வெள்ளை)

DOSE - Powder 3 - 6 g

VĒPPAMPAZ̲AM (Fruit) - வேப்பம்பழம்

Vēppampaz̲am is the whole dried fruit including seeds of *Azadirachta indica* A. Juss. Syn. *Melia azadirachta* L. (Fam. Meliaceae), a medium to large evergreen tree attaining a height of 15 to 20 m. or more under favourable conditions and found throughout the plains of India upto an altitude of 900 m. and also cultivated as avenue trees.

SYNONYMS

Tamil	:	Ariṭṭam (அரிட்டம்), Nimpam (நிம்பம்), Tuṭṭai (துட்டை), Vātāri (வாதாரி), Vēmpu (வேம்பு)
Bengali	:	Nim, Nimgach
English	:	Margosa tree, Neem tree, Indian lilac
Gujrati	:	Leemade
Hindi	:	Neem
Kannada	:	Turakbevu, Huchchabevu, Chikkabevu
Malayalam	:	Veppu, Ariveppu
Marathi	:	Kaduninba, Nimb
Oriya	:	Neemo, Nimba
Punjabi	:	Nimb, Nim
Sanskrit	:	Nimba, Picumaradah, Aristah, Picumandah, Prabhadrah
Telugu	:	Vemu, Vepa
Urdu	:	Neem

DESCRIPTION

a) Macroscopic

Fruit - Glabrous, dark reddish-brown, ovoid to ellipsoid drupes. 0.5 to 2 cm. long, over one cm wide; indehiscent, deeply wrinkled, enclosing a single seed in a brownish leathery pulp; odour strong; taste bitter.

Seed - Brownish, dorsally convex; upto 1.5 cm. long and 0.6 cm. wide; seed coat thin, brownish, shell-like, cracks to touch, inside of cracked pieces golden yellow; seed kernel, light brown, oily; odour strong; taste bitter.

b) Microscopic

Fruit - Pericarp well differentiated into epicarp, mesocarp and endocarp; epidermis more than one layered; squarish to rectangular cells containing yellowish-brown contents and oil droplets; mesocarp, many layered of loosely packed cells with large elongated sclereids scattered in outer

layers; endocarp of two distinct layers, outer of closely packed lignified stone cells, inner fibrous, loosely packed, lignified.

Seed - Seed kernel shows a thin brown testa of isodiametric stone cells overlying integument of loosely packed parenchymatous cells; cotyledon consisting of parenchymatous cells containing abundant oil droplets.

Powder:

Dark brown; shows abundant brachysclereids, columnar sclereids and pitted stone cells with wide lumen and distinct wall striations; groups of lignified fibres, thin-walled, arranged in network of loose strands; parenchymatous cells of cotyledon containing aleurone grains and oil globules; fragments of testa showing distinctly striated isodiametric stone cells; a few scattered rosette 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	2	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than	16	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than	19	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Alcoholic extract on silica gel 'G'plate using Chloroform: Acetone (18.5:1.5) on spraying with 1% Vanillin- Sulphuric acid reagent and heating the plate at 105ºC for about five minutes shows ten spots at Rf. 0.11 (greyish violet), 0.16 (yellow), 0.19 (green), 0.24 (violet), 0.29 (grey), 0.33 (mustard yellow), 0.42 (pink), 0.49 (greyish black), 0.57 (violet) and 0.76 (light purple).

CONSTITUENTS

Nimbin, gedunin, azadirachtin; nimbidin, salanin. 6-0- acetylnimbandiol, 3-dasacetylsalannin, azadirachtol, nimolinone, nimolicinol, azadirachtin-A, 11α- H azadirachtin, H, 11 β- H azadirachtin H, salimuzzalin, azadirolic acid, azadiradionol, azadironol nimbochalcin and nimbocetin.

PROPERTIES AND ACTIONS

Cuvai : Ciṟuiṉippu (சிறுஇனிப்பு), Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Kūrmai (கூர்மை), Noymai (நொய்மை)

Vīrium : Taḍpam (தட்பம்)

Pirivu : Iṉippu (இனிப்பு)

Ceykai : Muṟaiveppakaṟṟi (முறைவெப்பகற்றி), Uramākki (உரமாக்கி)

IMPORTANT FORMULATIONS

Viṣṇucakkara Māttirai (விஷ்ணுசக்கர மாத்திரை)

THERAPEUTIC USES

Tōl Nōykaḷ (தோல் நோய்கள்)

DOSE - Powder 1 - 2 g , Oil 5 - 10 drops.

VĒPPAM PAḌṬAI (Stem bark) - வேப்பம் பட்டை

Vēppam Paḍṭai is the stem bark of *Azadirachta indica* A. Juss. Syn. *Melia azadirachta* L. (Fam. Meliaceae), a medium to large evergreen tree attaining a height of 15 to 20 m. or more under favourable conditions and found throughout the plains of India upto an altitude of 900 m., and also cultivated as avenue trees.

SYNONYMS

Tamil	:	Ariḍḍam (அரிட்டம்), Nimpam (நிம்பம்), Tuḍḍai (துட்டை), Vātāri (வாதாரி), Vēmpu (வேம்பு)
Bengali	:	Nim, Nimgacha
English	:	Indian lilac, Margosa tree, Neem tree
Gujrati	:	Kadvo Limbdo
Hindi	:	Nim, Nimb
Kannada	:	Nimba, Bevu, Oilevevu, Kahibevu
Malayalam	:	Ariveppu, Veppu
Marathi	:	Balantanimba, Limba, Kadunimb
Oriya	:	Nimba
Punjabi	:	Nim, Nimba
Sanskrit	:	Nimba, Arista, Picumarda
Telugu	:	Vemu, Vepa
Urdu	:	Neem

DESCRIPTION

a) Macroscopic

Bark varies much in thickness according to age and parts of tree from where it is taken; external surface rough, fissured and rusty-grey; laminated inner surface yellowish and foliaceous; fracture fibrous; odour characteristic; taste bitter.

b) Microscopic

Stem Bark - Shows outer exfoliating pieces hard, woody, considerably thick in older barks; almost entirely dead elements of secondary phloem, alternating with discontinuous tangential bands of compressed cork tissue, former composed of several layers of stone cells occurring in regularly arranged groups together with collapsed phloem elements filled with brown contents; in between the successive zones of cork tissue 3 to 5 layers of fibre groups with intervening thin-walled and often collapsed phloem elements present; each zone of cork tissue consists of several layers of

regular, thin-walled cells occasionally with a few compressed rows of thick-walled cells towards outer surface; within exfoliating portion a number of layers of newly formed cork composed of thin-walled, rectangular cells and one or two layers of cork cambium, below which a wide zone of secondary phloem present; secondary cortex absent in most cases; secondary phloem commonly composed of well-developed fibre bundles traversed by 2 to 4 seriate phloem rays and transversely separated by bands of parenchymatous tissue of phloem; phloem elements of outer bark mostly collapsed; a few fairly large secretory cavities also occur in phloem; most of phloem parenchyma contain starch grains and prismatic crystals of calcium oxalate; starch grains, simple, round with central hilum, measuring 2.75 to 5 µm; structure of bark varies considerably according to gradual formation of secondary cork bands.

Powder :

Reddish-brown; shows numerous prismatic crystals of calcium oxalate; phloem fibres with narrow lumen and pointed ends; cork cells, stone cells mostly in groups, lignified rectangular to polygonal, having wide lumen and distinct striations; simple starch grains, measuring 2.75 to 5 µm in diameter.

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	1.5	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	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 Chloroform: Ethyl acetate; Formic acid (5:4:1) shows under UV (366 nm.) three fluorescent zones at Rf. 0.72 (blue), 0.86 (blue), and 0.90 (green). On spraying with 5% Methanolic- Phosphomolybdic acid reagent and heating the plate until the colour develops , the plate shows four spots at Rf. 0.20, 0.45, 0.63 and 0.90 (all blue).

CONSTITUENTS

Nimbin, nimbinin, nimbidin, sugiol, essential oil, β-sitosterol and tannin.

PROPERTIES AND ACTIONS

Cuvai : Cir̲utuvarppu (சிறுதுவர்ப்பு), Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு), Var̲aḍci (வறட்சி)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Mur̲aiveppakar̲̲ri (முறைவெப்பகற்றி), Uramākki (உரமாக்கி), Tuvarppi (துவர்ப்பி)

IMPORTANT FORMULATIONS

Cīnthil Ney (சீந்தில் நெய்), Cīrakac Cūraṇam (சீரகச் சூரணம்), Maṇḍūrāti Aḍaikkuḍinīr (மண்டூராதி அடைக்குடிநீர்)

THERAPEUTIC USES

Curam/Kāyccal (சுரம்/காய்ச்சல்), Curattāl Uṇḍākum Uḍal Thaḷarcci (சுரத்தால் உண்டாகும் உடல் தளர்ச்சி), Kuṉmam (குன்மம்), Māntam (மாந்தம்), Mūlam (மூலம்), Tōl Nōykaḷ (தோல் நோய்கள்), Vaḷi Nōykaḷ (வளி நோய்கள்)

DOSE - Powder 2 - 4 g

VĒPPAM PŪ (Flower) - வேப்பம் பூ

Vēppam Pū is the dried flower and flower bud of *Azadirachta indica* A. Juss. Syn. *Melia azadirachta* L. (Fam. Meliaceae), a medium to large evergreen tree attaining a height of 15 to 20 m. or more under favourable conditions and found throughout the plains of India upto an altitude of 900 m. and also cultivated as avenue trees.

SYNONYMS

Tamil	:	Ariṭṭam (அரிட்டம்), Nimpam (நிம்பம்), Tuṭṭai (துட்டை), Vātāri (வாதாரி), Vēmpu (வேம்பு)
Bengali	:	Nim, Nimgach
English	:	Indian lilac, Margosa tree, Neem tree
Gujrati	:	Kohumba, Limba, Limbado, Limado
Hindi	:	Nim, Nimba
Kannada	:	Bevu, Nimba, Oilevevu, Kahibevu, Bevinama
Malayalam	:	Ariveppu, Veppu
Marathi	:	Balantanimba, Limba, Kadunimb, Nim
Oriya	:	Nimba
Punjabi	:	Nim, Nimb
Sanskrit	:	Nimba, Picumarda, Arista
Telugu	:	Vemu, Vepa
Urdu	:	Neem

DESCRIPTION

a) Macroscopic

Dried flowers are brown to deep brown; individual flower 5 to 6 mm. long and 6 to 11 mm. wide, pentamerous, bisexual, regular and hypogynous; calyx 5, short, united at base; corolla 5, free, spathulate, spreading, 4.5 to 5.5 mm. long 2 mm. wide; stamens 10, monoadelphous, staminal tube inserted at base of corolla; gynoecium tricarpellary, syncarpous, superior, trilocular, two ovules in each locule, style 1, stigma 3-lobed; taste mildly bitter: odour indistinct.

b) Microscopic

Calyx - Sepal shows thin walled polygonal papillose epidermis; elongated thin walled unicellular conical trichomes of varying lengths; rosette crystals in cells of epidermis.

Petals - Petal shows epidermis of rectangular cells papillose at margins, non-glandular unicellular trichomes, over 150 µm long, tubular and hyaline; glandular trichomes of about 20 µm, numerous rosette crystals in epidermal cells.

Androecium - Epidermis of staminal tube composed of thick walled rectangular parenchymatous cells and the endothecium of the anther walls.

Gynoecium - Stigma sticky, parenchymatous epidermal cells, elongated into extensive papillae, style thin walled, rectangular, ovary superior, trilocular.

Pollen Grain - Porous, 4-colporate, spherical 105 to 161 µm in dia., with a smooth exine.

Powder:

Yellowish-brown; fragments of parenchymatous papillose epidermal cells; trichomes; numerous vessels; rosette calcium oxalate crystals and yellowish-brown pollen grains.

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	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	12	per cent, Appendix	2.2.7.

T.L.C.

T.L.C. of the Alcoholic extract on silica gel 'G' plate using Chloroform: Acetone (20:1) on spraying with 1% Vanillin- Sulphuric acid reagent followed by heating the plate at 105ºC for about five minutes shows eight spots at Rf. 0.12 (violet), 0.17 (light pink), 0.33 (violet), 0.51 (purple), 0.64 (dark purple), 0.80 (light purple), 0.85 (light purple), 0.92 (purple).

CONSTITUENTS

Nonacosane, neeflone, azharone.

PROPERTIES AND ACTIONS

Cuvai : Kaippu (கைப்பு)

Guṇam : Ilaku (இலகு)

Vīrium : Veppam (வெப்பம்)

Pirivu : Kārppu (கார்ப்பு)

Ceykai : Nīrizivu Pōkki (நீரிழிவு போக்கி), Pacittītūṇḍi (பசித்தீதூண்டி), Uramākki (உரமாக்கி), Veppamuṇḍākki (வெப்பமுண்டாக்கி)

IMPORTANT FORMULATIONS

Tāmpiraccentūram (தாம்பிரச்செந்தூரம்)

THERAPEUTIC USES

Aẕal Nōykaḷ (அழல் நோய்கள்), Cuvaiyiṉmai (சுவையின்மை), Kuḍaṟpuẕu (குடற்புழு), Mūrccai (மூர்ச்சை), Nāvaṟaḍci (நாவறட்சி), Nīḍitta Vaḷinōy (நீடித்த வளிநோய்), Vānti (வாந்தி)

DOSE - Powder 1 - 2 g

VILVA VĒR (Root) - வில்வ வேர்

Vilva Vēr is the dried root of ***Aegle marmelos*** (L.) 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 grooves. It grows in Marutham thiṇai.

SYNONYMS

Tamil	:	Civatturumam (சிவத்துருமம்), Kūviḷam (கூவிளம்), Māluram (மாலுரம்), Niṉmali (நின்மலி)
Assamese	:	Bael, Vael
Bengali	:	Bela, Bilva
English	:	Bael root, Bengal quince
Gujrati	:	Bilivaphal, Bill, Bilum
Hindi	:	Bel, Bela, Sriphal
Kannada	:	Bilva
Malayalam	:	Koovalam
Marathi	:	Baela, Bel
Oriya	:	Bela
Punjabi	:	Bil
Sanskrit	:	Bilva, Sriphala
Telugu	:	Maredu
Urdu	:	Bel

DESCRIPTION

a) Macroscopic

Root cream yellow or pale yellowish-brown, thin, irregularly and shallowly ridged due to formation of longitudinal and transverse lenticels, surface ruptured, peeling off in layers, internal surface cream to light yellow; fracture short; taste sweet.

b) Microscopic

Root - Shows lignified and stratified cork consisting of 3 or 4 alternating bands of 4 to 14 layers of smaller cells and a few layers of larger cells having golden yellow contents; secondary cortex, a wide zone, consisting of large, polyhedral, parenchymatous cells and stone cells of varying shapes and sizes, thick-walled, lignified, scattered throughout region; secondary phloem consists of sieve

elements, fibres, parenchyma and crystals fibres traversed by phloem rays; some sieve elements compressed, forming tangential bands of ceratenchyma alternating with bands of lignified phloem fibres in outer phloem region, but intact in inner phloem region; phloem parenchyma radially and transversely elongated; phloem fibre groups arranged in concentric rings, fibre groups in inner phloem region extend tangentially from one meduallary ray to another, each group consisting of 2 to 35 or more cells; fibres long, lignified generally with tapering ends but occasionally forked; some have wavy walls; crystal fibres numerous, long, about 9 to 30 chambered, each containing a prismatic crystal of calcium oxalate; medullary rays uni to triseriate in inner region while bi to pentaseriate in outer region of phloem; cambium consists of 3 to 7 rows of tangentially elongated to squarish cells; secondary xylem consists of vessels tracheids, fibres and xylem parenchyma; vessels scattered throughout xylem region, in groups of 2 to 5; single vessels also found, varying in shape and size, mostly drum-shaped, with bordered pits some having a pointed, tail-like process at one end; fibres thick-walled with blunt or pointed tips; xylem parenchyma rectangular in shape; medullary rays uni to triseriate, bi and triseriate rays more common, triseriate rays 12 to 40 cells high, uniseriate rays 4 to 10 cells high; prismatic crystals of calcium oxalate present; starch grains simple, 5 to 19 μm in dia., mostly round to oval with centric hilum; compound starch grains having 2 to 3 components present in inner few layers of cork cells, secondary cortex, phloem and xylem rays.

Powder:

Grey to greyish-brown; shows thick-walled, angular cells of cork; numerous prismatic crystal of calcium oxalate, crystal fibres; starch grains simple, 5 to 19 μm in dia., mostly round to oval with centric hilum; compound starch grains having 2 or 3 components; fragments of xylem vessels with bordered pits and thick-walled xylem fibres.

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 7 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 the Alcoholic extract on silica gel 'G' plate using n- Butanol: Acetic acid: Water (4:1:5) shows under UV (366 nm.) three fluorescent zones at Rf. 0.54 (bright sky blue). 0.84 (light sky blue) and 0.93 (bright sky blue). On exposure to iodine vapours seven spots appear of Rf. 0.15, 0.27, 0.54, 0.67, 0.78 and 0.93 (all yellow). On spraying with 5% Methanolic- Sulphuric acid reagent and heating the plate until the colour develops, the plate shows eight spots at Rf.0.15, 0.27, 0.32, 0.38 (all grey), 0.54 (yellow) 0.67, 0.84 (light grey) and 0.93 (brown).

CONSTITUENTS

Lupeol, 1-phenyl-7-hydroxy-tetrahydro-quinazolin-4-one, skimmianine, marmin and marmelide.

PROPERTIES AND ACTIONS

Cuvai	:	Kaippu (கைப்பு), Tuvarppu (துவர்ப்பு)
Guṇam	:	Ilaku (இலகு)
Vīrium	:	Taḍpam (தட்பம்)
Pirivu	:	Kārppu (கார்ப்பு)
Ceykai	:	Kāmamperukki (காமம்பெருக்கி)

IMPORTANT FORMULATIONS

Carapuṅka Vilvāti Iḷakam (சரபுங்க வில்வாதி இளகம்), Pittacurak Kuḍinīr (பித்தசுரக் குடிநீர்), Vilvāti Iḷakam (வில்வாதி இளகம்)

THERAPEUTIC USES

Curam/Kāyccal (சுரம்/காய்ச்சல்), Kuṉmam (குன்மம்), Mayakkam (மயக்கம்), Mukkuṟṟakēḍu (முக்குற்றகேடு), Nīrvēḍkai (நீர்வேட்கை), Uḍal Kaḍuppu (உடல் கடுப்பு)

DOSE - Decoction 30- 50 ml twice daily.

10 - 15 g coarse powder in 200 ml of water for preparing decoction.