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Pharmacognostic Standardisation And Physico-Chemical Evaluations Of Stems Of Hemiparasite Dendrophthoe Falcata Linn.

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ABSTRACT

Pharmacognostic standardisation of the fresh, powdered and anatomical sections of the stems of *Dendrophthoe falcata* Linn. Was carried out to determine its macro- and microscopical characters and also some of its quantitative standards. Externally, the stems are circular in shape, woody, yellowish green in colour when fresh and become greenish black on drying. Fresh material is having characteristic and slightly astringent in taste. When transversely cut surface of stems shows yellowish brown circles of woody matter with pith. The yellowish brown circle of wood is major part and covered by dark brownish black cork. Dried stem when cut longitudinally, faint brownish, solid pith is clearly visualized. Surface of young stem part is glabrous when fresh. The chemo-microscopy revealed the presences of lignin, starch, proteins and calcium oxalate crystals. Physico-chemical evaluation includes ash values, extractive values, moisture content and fluorescence analysis. These findings will be useful towards establishing pharmacognostic standards on identification, purity, quality and classification of the plant, which is gaining relevance in plant drug research.

Key words: *Dendrophthoe falcata* Linn., Loranthaceae, Pharmacognostic standardization, Physicochemical evaluations.

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INTRODUCTION

A genus of evergreen, shrubby, partial parasites, distributed in the tropical and sub-tropical regions of the old world. The whole plant is used in indigenous system of medicine as. cooling, bitter, astringent, aphrodisiac, narcotic and diuretic, and is useful in pulmonary tuberculosis, asthma, menstrual disorders, swelling wounds, ulcers, renal and vesical calculi and vitiated conditions of kapha and pitta. Also decoction of plant is used by women as an antifertility agent, also have anticancer activity [1]. *Dendrophthoe falcata* is branched hemiparasite. Barks are grey, leaves are thick, coriaceous, very variable in shape with stout flowers [2]. The genus *Dendrophthoe* comprises of 20 species and about 7 species are found in India. Members of genus *Dendrophthoe* are reported to have anti-oxidant, anti-microbial, anticancer, antidiabetic [3], anti-lithiatic, and antihypertensive [4].

Angiospermic parasitic plant *Dendrophthoe falcata*, reported to contain biologically active substances such as flavonoid, quercetin⁵, tannins, β -sitosterol, β -amyryn, oleanolic acid [6,7].

Therefore the study was undertaken to investigate pharmacognostic characters and physico-chemical parameters of stems of *Dendrophthoe falcata* parasitic on *Mangifera indica* (Anacardiaceae).

MATERIALS AND METHODS

Collection of Plant material and Authentication

The stems of *Dendrophthoe falcata* (Loranthaceae) a parasite on *Mangifera indica*, (Anacardiaceae) were collected in February 2005 from Western Ghat region of Maharashtra (India). The plant specimen was authenticated from Botanical Survey of India, Pune (Voucher specimen no. PSH-1).

Pharmacognostic standardization

Morphological studies were done by using Motic^R microscope. The shape, external surface, taste and odor of stems were determined. Microscopic studies were done by preparing thin hand section of stems of *Dendrophthoe falcata* Linn. The sections were cleared with chloral hydrate solution, stained with phloroglucinol -hydrochloric acid (1:1), Aniline Sulphate + Sulphuric acid, weak iodine solution, Sudan III solution, Aqueous Ferric chlorides solution, Dragendroff's reagent, Libermann-Burchardlt reagent, Million's reagent and mounted in glycerin. Powder (#60) of the dried stems was used for the observation of powder microscopical characters. The powdered drug was separately treated with phloroglucinol-hydrochloric acid (1:1) solution, acetic acid and Million's reagent to identify the presence of lignified vessels, cork cells, calcium oxalate crystals and proteins [8].

Physico-chemical evaluations

Total ash, water-soluble ash, acid-insoluble ash and sulphated ash were determined. Alcohol and water - soluble extractive values were determined to find out the amount of water and alcohol soluble components. The moisture content and fluorescence analysis of powdered drugs under ultra-violet light was also been determined [9].

RESULTS AND DISCUSSION

The stem of *Dendrophthoe falcata* is found to be woody, yellowish green in colour when fresh and become greenish black on drying. Fresh material is having characteristic and slightly astringent in taste. Stems are circular in shape. The drug powder was brown in colour with slightly astringent in taste. When transversely cut surface of stems shows yellowish brown circles of woody matter with pith. The yellowish brown circle of wood is major part and covered by dark brownish black cork. Dried stem when cut longitudinally, faint brownish, solid pith is clearly visualized. Surface of young stem part is glabrous when fresh. Dried stems float on water surface indicating appreciable amount of woody matters.

Microscopy of the stem [10]

Cuticle- Cortex of stem is covered with thick cuticle. It makes stem impermeable to water.

Cortex-Cortex is made up of outer epidermis which is made up of oval shaped parenchymatous cells. These are made up of 5-7 layers, closely arranged and contain chlorophyll. Bunch of lignified mucilaginous cells are also present called pericyclic cells. These are multilayered zone between vascular bundle and endodermis. Endodermis is made up of 2-3 layered parenchymatous cells.

Vascular bundles-Vascular bundle consists of phloem and xylem. Xylem consists of loosely arranged parenchymatous lignified cells. Phloem is arranged continuously like a ring. Vascular bundle contains abundantly starch grains.

Pith-Central pith is large, thin walled, 7-8 layered made up of oval parenchymatous lignified cells. Central pith contains proteins abundantly. It also contains irregular shaped sclerides (Astroscleride type).

Vessels-Xylem vessels are of scalariform type (ladder type). In which lignin or thickening matters are deposited transversely in the form of rods or rungs of ladder.

Powder characteristics

Powdered characteristic of *Dendrophthoe falcata* was performed which shows following cells/ tissue/ cell inductions were observed.

Epidermal cells: Oval in shape, Stone cells: Oval in shape

Xylem vessels: Xylem vessels are of scalariform type or it is also called ladder type

Calcium oxalate crystals: prism of calcium oxalate.

The physical constant evaluation of the drugs is an important parameter in detecting adulteration. The ash values, extractive values and moisture content of stems were determined. And Fluorescence analysis of powdered drugs under ultra-violet light was also carried out. The results are depicted in Table 1 and Table 2. This empirical knowledge on this hemiparasitic plant plays a vital role in the primary health care and has potential for the discovery of new herbal drugs. This information will be of much use to the pharmacologists and practitioners of herbal medicines for detection and isolation of bioactive compound. Its micromorphological features may serves as a reliable tool for the identification of the drugs from their substitutes and adulterants.

Table 1. Physico-chemical analysis of stems of *Dendrophthoe falcata* Linn

Sr. no	Physico-chemical constants	Percentage (%)
1	Total ash	8.0
2	Acid insoluble ash	5.5
3	Water soluble ash	5.0
4	Pet ether soluble extractive	0.9
5	Chloroform soluble extractive	1.2
6	Alcohol soluble extractive	13.3
7	Water soluble extractive	12.6
8	Moisture content	34.75

Table 2. Fluorescence analysis of powdered drugs under ultra-violet light

Powder and reagent	Color in ordinary light	Color in UV light.
Powder	Brown	Dark brown
Powder+ Nitrocellulose	Faint brown	Faint greenish.
Powder+ NaOH in Methanol	Brownish	Orange brown
Powder+ NaOH in Methanol + Nitrocellulose	Blackish brown	Dark green
Powder+ 1N NaOH in water	Dark reddish brown	Brown
Powder+ 1N NaOH in water+ Nitrocellulose	Dark reddish brown	Yellowish
Powder + HCl	Yellowish	Green
Powder + HCl + Nitrocellulose	Faint yellow	Faint brown
Powder+ HNO ₃	Faint brown	Brown
Powder+ H ₂ SO ₄	Faint yellowish	Dark yellow

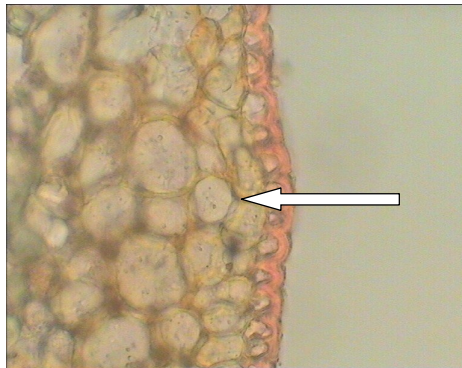


Fig. 1 Cuticle

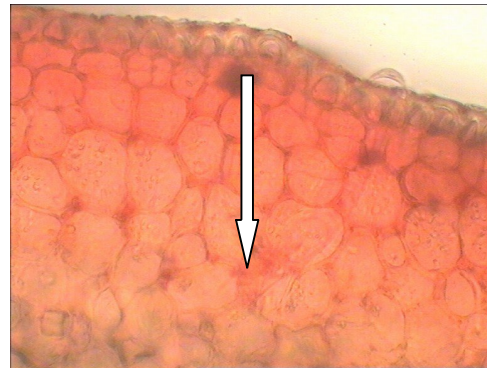


Fig. 2 Cortex region

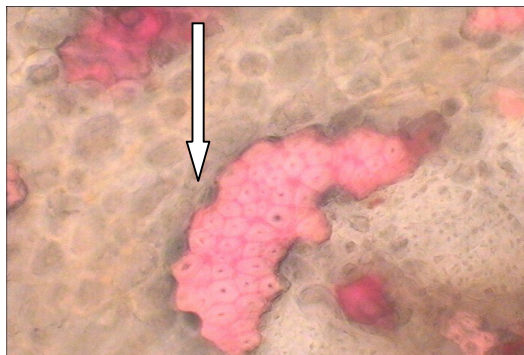


Fig. 3 Pericyclic fibers (cells)

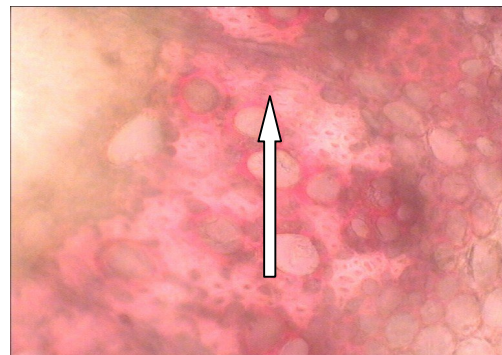


Fig. 4 Vascular bundles

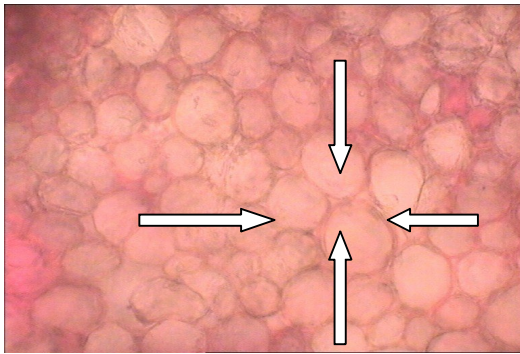


Fig. 5 Central pith

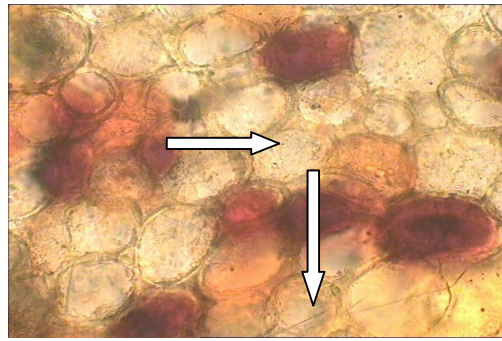


Fig. 6 Cells containing protein

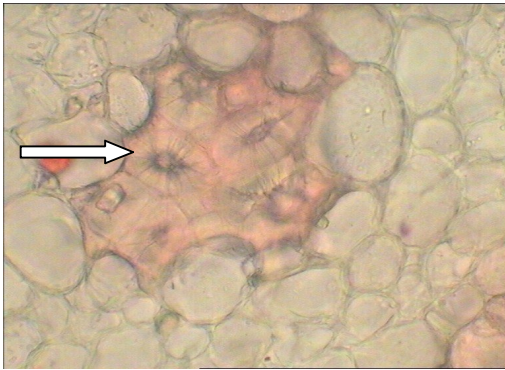


Fig. 7 Astroscleride

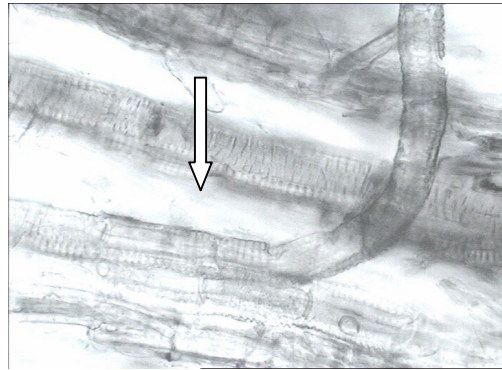


Fig. 8 Scalariform vessels



Fig. 9 Calcium oxalate crystals



REFERENCES

- [1] K.M. Nadkarni's Indian Materia Medica, vol-I, Popular Prakashan, p. 750, 1276,1277.
- [2] The Wealth Of India, Raw materials, Vol- III, 4th edition, Council of Scientific and Industrial Research New Delhi, Reprinted by the Publication of Information Directorate, New Delhi, 2002, pp 588.
- [3] Osadebe P. O., Okide G. B., Akabogu I. C. J. Ethnopharmacol 2004; 95: 133-138.
- [4] Balaram R., Raj K. P. S. and Panchal D. I. Ind. Drugs 1981; 2: 183.
- [5] Ramchandran A. G., Krishanakumary P. Ind. J. Chem. 1990 ; 29: 584-585.
- [6] Rastogi, R.P. and Mehotra, B.N., "Compendium of Indian Medicinal Plants", Vol. III, PID, New Delhi, 1993, p. 240.
- [7] Kacharu D.N., Krishnan P.S. Plant Sci. letters 1979; 16: 165-170.
- [8] Kokate, C.K., "Practical Pharmacognosy", 4th Edn, Vallabh Prakashan, Delhi, 1997, 107 - 111.
- [9] "The Ayurvedic Pharmacopoeia of India", Part I, Vol III, Government of India, Ministry of Health and Family Welfare., New Delhi., 1999, 235.
- [10] Datta A.C. Botany, 6th edition, Oxford University press, 2003, 177-185.