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Research Article

Pharmacognostical Studies on *Clerodendrum Paniculatum* L. Roots

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ABSTRACT

Clerodendrum paniculatum Linn. (Krishnakireedam/ Pagoda flower) of Lamiaceae family is a semi-woody erect, annual or biennial shrub found growing naturally in shady places throughout India. Lamiaceae family is endowed with countless medicinal properties and *Clerodendrum paniculatum* Linn. is widely used in traditional medicines to treat ulcer, neuralgia, wounds, rheumatism, jaundice, wounds, snake bite, body pain and inflammation. *Clerodendrum paniculatum* Linn. roots are subjected to macroscopic, microscopic and phytochemical screening in order to set a standard. The microscopic detailing revealed the presence of important diagnostic characters of the roots such as stone cells, large rhombohedral calcium oxalate prisms, medullary rays, pitted xylem vessels. Information derived from current study can be utilized as markers for the purpose of identification and standardization of *Clerodendrum paniculatum* Linn. roots for the development of monograph.

INTRODUCTION

Clerodendrum paniculatum Linn. (Krishnakireedam/ Pagoda flower) of Lamiaceae family is a semi-woody erect, annual or biennial shrub that attains 1-2 m in height. Leaves are simple, opposite, broadly ovate 9-20 cm long, three to seven lobed (lower leaves), apex is acuminate, hairy and petiole up to 30cm long. The flower resembles a Japanese Pagoda, hence the flower got the name 'pagoda flower'. Flowers are bright red, odourless and seen in terminal panicles in the axil of leaves. Individual flowers

are funnel shaped having long tubes, arranged in massive terminal panicles up to 30 cm or more in height. When it ascends, the number of flowers in panicle reduces and thus changing into the shape of pagoda. Corolla tube is about 1 cm long and orange red to scarlet. Fruits are small globose, with bluish black berries of about 1cm diameter. Pagoda plant is distributed in Asian countries such as India, Sri Lanka, Japan, Bangladesh, Cambodia, China, Taiwan, Laos, Vietnam, Indonesia, Philippines and Malaysia. It is found growing naturally usually in shady places throughout India

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[1,2] In India, Japan and China, the plant is traditionally used to treat ulcer, neuralgia, wounds, rheumatism, and inflammation in traditional Thai medicine, this plant is utilized as antipyretic and anti-inflammatory drug [3]. In Andaman and Nicobar Islands, this plant is utilized for the treatment of jaundice, wounds, snake bite, body pain and giddiness [4]. The leaves are utilized to treat wounds in Kerala and the roots are used to treat typhoid in Tripura [5-7]. *Clerodendrum paniculatum* exhibited numerous pharmacological activities like *in vivo* and *in vitro* anti-inflammatory activities, antimicrobial activity, antimutagenic activity, antioxidant activity, anthelmintic activity, anticancer activity, hypolipidemic activity, anti-ageing activity and insecticidal activity [8,9]

MATERIALS AND METHODS:

Collection and authentication of plant materials

The fresh roots of *Clerodendrum paniculatum* Linn. was collected from Thiruvalla, Pathanamthitta District. The plant's identification and authentication were confirmed by the botanist Dr. Jacob Thomas, Herbarium Curator, PG and Research Department of Botany, Mar Thoma College, Tiruvalla. A voucher specimen was deposited in the Herbarium of PG and Research Department of Botany (No: MTCHT 1052).

Organoleptic and macroscopic studies

Organoleptic characters of fresh root like colour, odour, taste and shape were studied. Macroscopic characters of fresh roots were analyzed utilizing simple microscope [10].

Histological studies

Histological studies of the fresh roots were conducted by taking free hand transverse section.

Thin sections were selected, cleared, stained with phloroglucinol and HCl and mounted in glycerin on a glass slide which was utilized for cellular and anatomical studies [11-16].

Powder microscopic studies

Dried root powder was utilized for analyzing powder microscopic characters. Small amount of the powder sample was cleared and thereafter stained with phloroglucinol and HCl. Sample was evenly spread on a glass slide, mounted in glycerin and observed.[11-16].

Fluorescence analysis [11-16]

Fluorescence analysis of root powder was performed using standard methods. *Clerodendrum paniculatum* Linn. root powder was added with various neutral, acidic and basic reagent for 5 min and exposed to day light, short wavelength and long wavelength UV light.

Preliminary phytochemical screening

Ethanollic and aqueous extracts of *Clerodendrum infortunatum* L. stem were subjected to preliminary phytochemical screening. Various qualitative chemical tests were conducted to detect the presence of secondary metabolites such as carbohydrates, proteins, tannins, alkaloids, glycosides, phenolics, steroids, saponins and flavonoids [11-16]

RESULTS AND DISCUSSION:

Organoleptic and macroscopic studies

Colour: Earthy brown

Odour: None

Taste : Bitter

Shape : Conical, branched

Size : 1 to 2 cm (w)
20 cm to 25cm (h)



Fig 1: *Clerodendrum paniculatum* L. roots

Histological Studies

Transverse section of the root is irregularly circular in outline and showed the presence of cork, cortex with groups of stone cells, lignified

secondary xylem consisting of large xylem vessels, fibres and medullary rays.

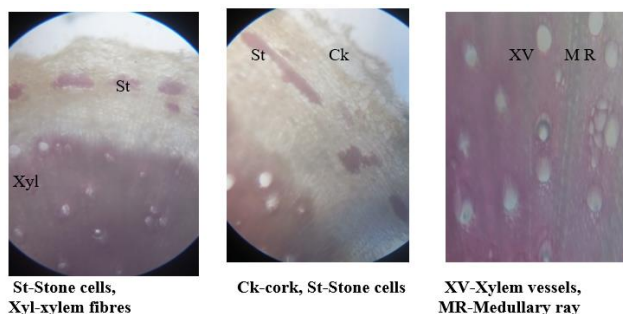
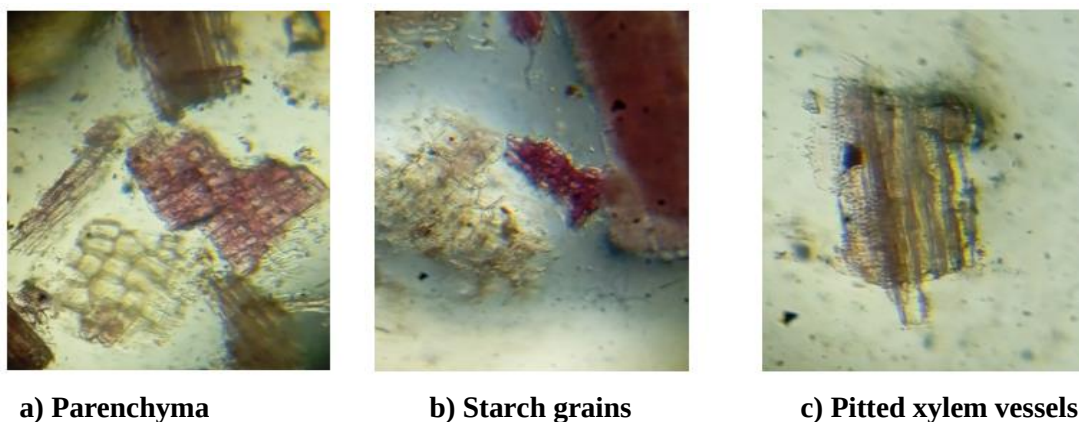


Fig 2: T.S of *Clerodendrum Paniculatum* L. Root

Powder microscopic studies

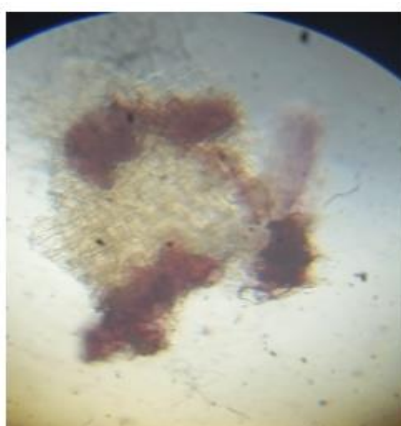
Powder microscopic studies showed the presence of stone cells, large parenchyma cells, pitted xylem vessels, thin elongated fibres,

rhomboidal calcium oxalate crystals, medullary rays, cork cells and wood elements.

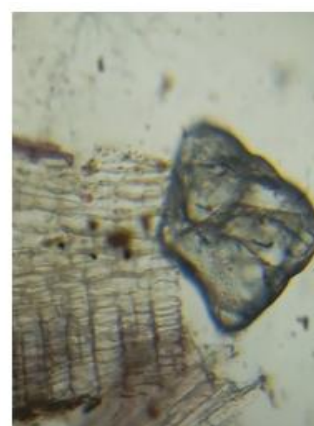




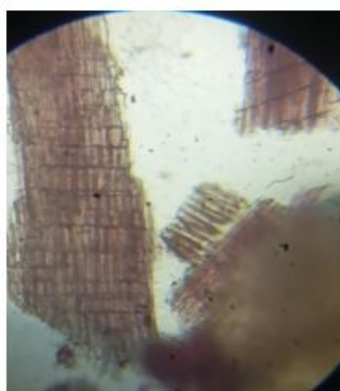
d) fibres



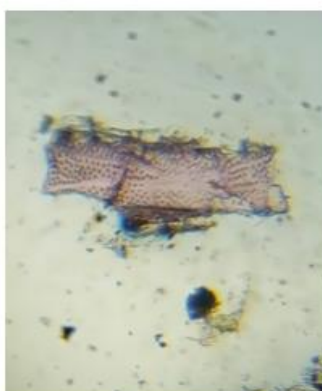
e) stone cells



f) calcium oxalate crystals



g) Medullary rays



h) wood elements



e) cork

Fig 3: Powder microscopy of *Clerodendrum paniculatum* L. root

Fluorescence analysis of *Clerodendrum paniculatum* L. root

Clerodendrum paniculatum L. root powder was added with acidic, neutral and basic solvents.

There after they were exposed to day light, short wavelength and long wavelength UV light. The results are depicted in table 1.

Table 1: Fluorescence analysis of *Clerodendrum paniculatum* L. root

Sl. No	Reagents	Visible light	UV 254nm	UV 366 nm
1.	Powder drug	Dull green	Greenish brown	Dark brown
2.	Powder drug+ ethanol	Light brown	Light green	Black
3.	Powder drug+ acetic acid	Brown	Light green	Black
4.	Powder drug+ diethyl ether	Brown	Light brown	Black
5.	Powder drug + 15% NaOH	Light brown	Light green	Black
6.	Powder drug + 5% KOH	Brown	Light green	Black
7.	Powder drug+ HNO ₃	Light orange	Brownish green	Black
8.	Powder drug+ FeCl ₃	Brown	Fluorescent green	Black
9.	Powder drug+ CHCl ₃	Light yellow	Yellowish green	Black
10.	Powder drug+ ethyl acetate	Brown	Fluorescent green	Black
11.	Powder drug+ petroleum ether	Yellowish brown	Light brown	Black
12.	Powder drug+ ammonia	Brown	Fluorescent green	Black

Preliminary phytochemical screening

Alcoholic and aqueous extracts of *Clerodendrum paniculatum* L. root were subjected to chemical

tests for the purpose of identification of various phytoconstituents. The results of the chemical tests were depicted and tabulated in table 2.

Table 2: Preliminary phytochemical screening of *Clerodendrum paniculatum* Linn. roots

Sl. No.	Phytoconstituents	CE	CA
1.	Tests for Alkaloids Mayer's test Hager's test Dragendorff's test	++ ++ ++	+ + +
2.	Tests for Terpenoids	+	—
3.	Tests for Sterols Liebermann burchard test Salkowski test	+ +	— —
4.	Tests for Flavonoids Aqueous sodium hydroxide test	++ ++	++ ++
5.	Tests for Phenolics and Tannins Ferric chloride test Lead acetate test	+ +	++ ++
6.	Tests for Carbohydrates Molisch's test Barfoed's test Fehling's test	++ ++ ++	+ + +
7.	Tests for Proteins and Aminoacids Millon's test Ninhydrin test	++ +	++ +
8.	Tests for Saponins Foam test/froth test	—	—

(++) High active constituents

(+) Presence of active constituents

(-) Absence of active constituents

CE- Ethanolic extract of *Clerodendrum paniculatum* L. root

CA- Aqueous extract of *Clerodendrum paniculatum* L. root

CONCLUSION

Information derived from current study can be utilized as markers for the purpose of identification and standardization of *Clerodendrum paniculatum* Linn. roots. Thus the results of present investigation can be used as promising tool to set up the pharmaceutical

standards for subsequent studies and researches which help in the quality control and availability of potent drugs in the market.

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