



Pharmacognostical Studies on Stems of *Clerodendrum Chinense*

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ABSTRACT

The genus *Clerodendrum* consist of flowering plants, which was once classified as a member of the Verbenaceae family, was recently classified as a member of the Lamiaceae family. Various species of this genus have been generally used for treating several ailments and disorders as well as ornamental plants. This plant is erect, soft, perennial shrub and able to grow 1 to 3 m in height. Stems of this plant are bearing fine hairs on stems that are generally sub-rectangular in cross section. Branches and stems are quadrangular. Branchlets are nearly four angled to round, velvety-hairy when young, becoming hairless. Systematic pharmacognostical evaluation of stems of the plant has been carried out with focus on its macroscopy, microscopy, physico-chemical and phytochemical characterization. Preliminary phytochemical investigations indicated the presence of carbohydrates, alkaloids, triterpenoid, steroid, flavonoids, phenolic compounds and glycosides. The result of the study could be useful for the identification and preparation of a monograph of the plant.

INTRODUCTION

The genus *Clerodendrum* consist of flowering plants, which was once classified as a member of the Verbenaceae family, was recently classified as a member of the Lamiaceae family. Various species of this genus have been generally used for treating several ailments and disorders as well as ornamental plants. Secondary metabolites found in abundance in these species include terpenoids, saponins, carbohydrates, glycosides, alkaloids, flavonoids and phenolic compounds. Studies conducted so far have shown that the extracts and compounds of the species in this genus exert diverse physiological activities, including anti-inflammatory, anti-diabetic, antihypertensive, anti-allergic, analgesic, hepatoprotective, antifertility, antimicrobial, anticholinesterase, membrane stabilizing, anthelmintic, hypolipidemic, antitumor and antimicrobial properties¹. *Clerodendrum chinense* is an evergreen shrub growing up to 3m tall, in the genus *Clerodendrum* (Family: Lamiaceae). It is not only a flowering plant grown for ornamental purposes, but it is also cultivated for medical uses. *C.chinense* have been used in preparation of folk and traditional medicine to treat various kinds of ailments, such as asthma, cold, hypertension, hyperpyrexia, rheumatism, dysentery, anorexia, leucoderma, inflammatory, leprosy and other disease². Therefore, the present work was planned to study the detailed macroscopical, microscopical, powder microscopical and physicochemical characteristics of the stem of this plant, which would serve as a standard reference for identification, authentication and for distinguishing the plant from its adulterants.

MATERIALS AND METHODS

• PLANT COLLECTION AND AUTHENTICATION

The stems of *Clerodendrum chinense* was collected from Payyannur. The plant material was authenticated by the botanist, Dr. Biju P, Dept. of Botany, Government College, Kasaragod. The plant materials were dried under shade for few days, powdered with mechanical grinder and stored in an air tight container.

• PHYSICO-CHEMICAL PARAMETERS

Physico-chemical parameters such as moisture content, water-soluble extractive value, alcohol soluble extractive value, total ash value, acid insoluble ash value, sulphated ash value and water soluble ash were performed as per Indian Pharmacopoeia³.

• MACROSCOPY AND MICROSCOPY

The macroscopic characters of stem were studied according to standard methods. Stem sections were cut by freehand sectioning and numerous sections were examined microscopically. The selected sections were stained with phloroglucinol and concentrated HCl, mounted on a clean glass micro slide, and observed under microscope^{4,5}.

• POWDER ANALYSIS

For powder analysis, the plant was collected and washed thoroughly with water to remove the unwanted matter. This was further dried in the shade. After complete drying, the plant was powdered and passed through sieve no. 60. A small quantity of the powder was treated with phloroglucinol and conc. HCl (1:1) solution for the detection of various microscopic characters proving the authenticity of the drug. Another sample was mounted in water to see whether it contained calcium oxalate and yet another sample in an iodine solution to detect the presence of starch grains⁵.

- **QUANTITATIVE MICROSCOPY**

FIBER LENGTH AND WIDTH

Using a stage micrometre, the eye piece's calibration factor was determined. A tiny quantity of powder was dyed using conc HCl and phloroglucinol. After mounting the treated powder in diluted glycerine, the slide was examined at low power. By focusing the stained fibre on the line of eye piece micrometre, the length and width of the fibre were measured. Calculating the volume of 20 fibres and multiplying the result by the calibration factor allowed for the determination of the average fibre width and length^{6,7}.

- **PRELIMINARY PHYTOCHEMICAL STUDIES**

Preliminary tests were carried out on petroleum ether, chloroform, ethyl acetate, methanol and water extract for the presence of alkaloids, glycosides, phenolic compounds, flavonoids, carbohydrates, triterpenoid and steroids^{8,9}.

RESULTS

- **PHYSICO-CHEMICAL PARAMETERS**

The Physicochemical parameters such as moisture content, water soluble extractive value, alcohol soluble extractive value, total ash value, acid insoluble ash value, sulphated ash value and water soluble ash are presented in Table no 1

Sl. no	Pharmacognostical parameters	Percentage yield (%w/w)
1	Moisture content	8.26±0.0909
2	Ash value	
	Total ash	5.43±0.083
	Acid insoluble ash	2.98±0.064
	Water soluble ash	2.70±0.0808
	Sulphated ash	2.83±0.0814
3	Extractive value	
	Alcohol soluble extractive value	7.2±0.0814
	Water soluble extractive value	11.26±0.0975
4	Foreign matter	1.84±0.075

Table no 1: physico-chemical parameters of *C.chinense*

- **MACROSCOPIC FEATURES OF *Clerodendrum chinense***

The macroscopic or organoleptic characters of stem were studied according to standard methods and are tabulated in Table 2 and shown in Fig. 1.

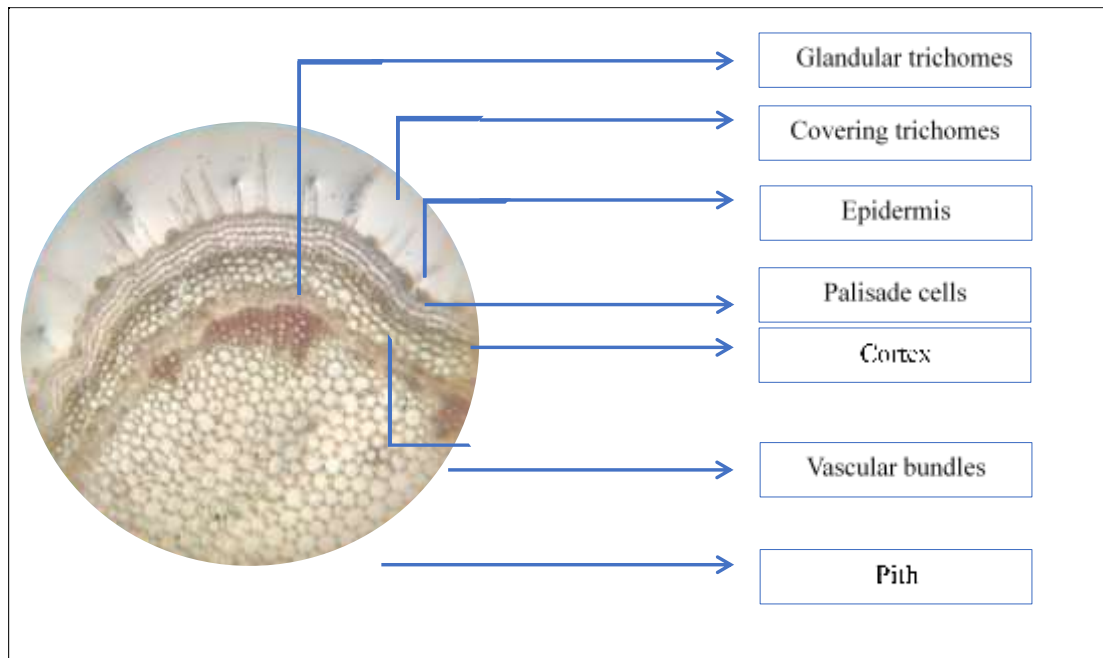
Macroscopic features of Stems	
Colour	Green when young Becoming Brown
Odour	Odourless
Taste	Bitter

Size	2.5 – 3m tall
Shape	Stems and branches are quadrangular Branchlets are nearly four angled to round Velvet hairy when young, becoming hairless

Table no 2: Result of macroscopic features of *c.chinense*Fig no 1: *Clerodendrum chinense*

- **MICROSCOPY OF STEM**

The transverse section of the stem is more or less circular. The outermost layer epidermis is single-layered and cuticularized. Cortex is found next to epidermis, and it is made of thin-walled parenchymatous cells arranged several layers with intercellular spaces. Vascular bundles are arranged in a ring. The central region of the stem is occupied by the pith, shown in Fig no: 2.

Fig no 2: TS of stems of *C. chinense***Powder analysis**

The powder when observed under microscope exhibit the following characters

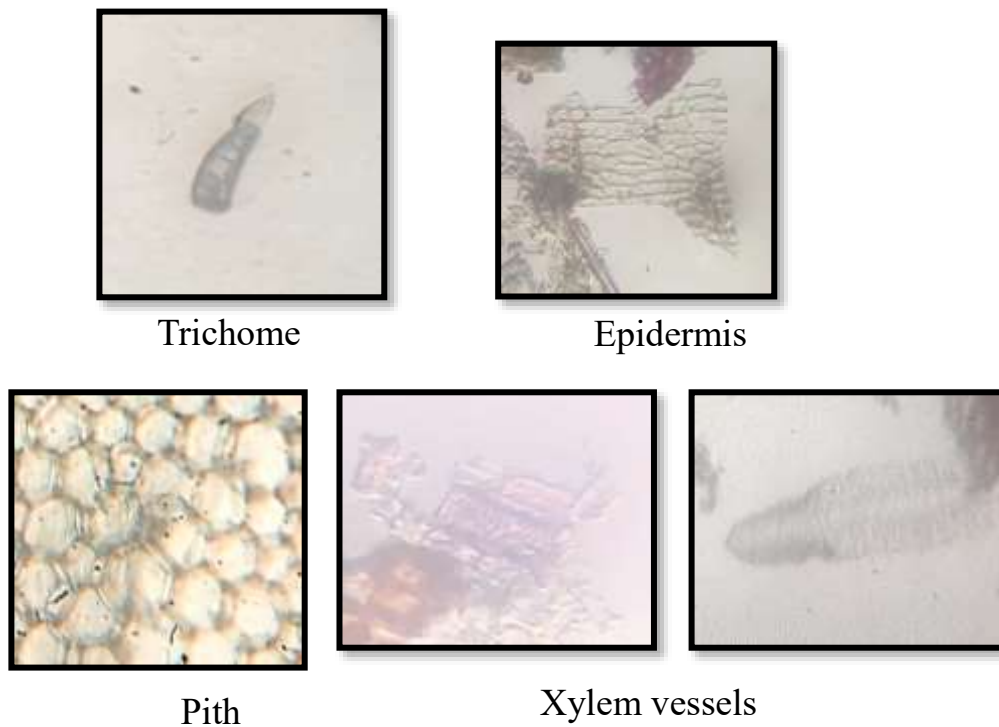


Fig no 3: Microscopic characters of stem powder

- **PRELIMINARY PHYTOCHEMICAL STUDIES**

The extracts were subjected to qualitative chemical analysis for the identification of various phytoconstituents like alkaloids, glycosides, phenolic compounds, flavonoids, carbohydrates, proteins and amino acids, terpenoids, sterols, and saponins. Shown in table no 3 .

Sl.No	Phytoconstituents	Petroleum ether	Chloroform	Ethyl acetate	Methanol	Water
1	Alkaloids	-	+	+	+	+
2	Glycosides	+	+	+	++	+
3	Phenolic compounds	-	++	+	++	++
4	Flavonoids	-	+	+	+	+
5	Carbohydrates	-	++	++	++	++
6	Proteins & Amino acids	-	-	+	-	+
7	Terpenoids	-	-	+	+	-
8	Sterols	-	-	+	+	-
9	Saponins	-	-	-	-	-
10	Gums & Mucilage	-	-	-	-	+

DISCUSSION

Pharmacognostical studies on the plant *C.chinense* have been studied. The macroscopical or morphological description helps in the identification of the plant. Microscopical study in entire and powdered form of the drug is one of the aspects of histological evaluation. Physico-chemical pharmacopoeial standards for this plant have been derived as per standard methods.

CONCLUSION

There results of the present investigation provide dependable diagnostic features of the vegetative organs of the plant for the identity of the drug in entire and in fragmentary condition.

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