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PHARMACOGNOSTIC AND PHYTOCHEMICAL EVALUATION OF *CLERODENDRUM INERME*

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ABSTRACT

Clerodendrum inerme is an evergreen mangrove plant, which has found a place in our gardens. A hardy, straggling shrub, it reaches a height of 3-4 meters with closely arranged, almost round, shiny, deep green leaves. It has well known reputation of anti malarial plant. It is used as substitute for quinine and chiretta. Decoction of leaves is used in intermittent and remittent fever. Juice of leaves is used for the treatment of skin diseases such as itches, leprosy, scabies, scrofulous. In present investigation, the detailed pharmacognostic study of *Clerodendrum inerme* leaf has been carried out to lay down the standards which could be useful in future studies. The study includes macroscopic, microscopic, preliminary phytochemical screening and physicochemical evaluation.

Keywords: C. inerme, Pharmacognostic, Phytochemical, Microscopy.

INTRODUCTION

Opinion of world population is showing a tilt from synthetic to herbal medicines. It is aptly called as' Return to Nature'. Medicinal plants have been known for millennia and are highly esteemed all over the world as a rich source of therapeutic agents for the prevention and cure of diseases. Nature has bestowed our country with an enormous wealth of medicinal plants; therefore India is referred to as the Medicinal Garden of the world. Countries with ancient civilizations such as China, Egypt and South America are still using several plant remedies for various conditions. In this regard India has a unique position in the world, where a number of recognized indigenous systems of medicine viz., Ayurveda, Yoga and Naturopathy are being practiced for the health care of people. The most common reason for the popularity and

acceptability being the belief that all natural products are safe. [1] But the key obstacle which has hindered the acceptance of herbal medicines is the lack of documentation of research work is carried out on traditional medicines. With this backdrop, it becomes extremely important to make an effort towards standardization of plant material to be used as medicine.

Clerodendrum is a very large and diverse genus and till now five hundred eighty species of the genus have been identified and are widely distributed in Asia, Australia, Africa and America. A high degree of morphological and cytological variation (from 2n=24 to 2n=184) amongst the species, suggesting the paraphyletic or polyphyletic origin of the genus.[3] These are classified based upon morphological variations like length of the corolla tube, size of leaves, and type of inflorescence. *Clerodendrum inerme* L. [Family Lamiaceae (Verbenaceae)] is very widely distributed in tropical and subtropical regions of the world and is comprised of small shrubs.

MATERIAL AND METHOD

Plant Material

The plant material (leaves of *clerodendrum inerme)* was collected from healthy plants in Sonepat (Haryana) and got authenticated from Dr. H. B. Singh (Scientist F and Head, Raw Materials Herbarium and Museum, NISCAIR, DELHI), Letter no. **NISCAIR/RHMD/Consult/-2009-10/1285/88** dt. oct.7, 2009. Specimen of same was submitted to Department of Pharmacognosy, Hindu College of Pharmacy, Sonipat.

Macroscopic Examinations

The following macroscopic characters for fresh leaves were noted: size & shape, color, surface, venation, presence or absence of petiole, apex, margin, base, lamina, texture, odor and taste.

Microscopic Examinations

Fresh and healthy leaves of *C. inerme* were chosen. Free hand transverse sections were cut with a razor blade. The uniform sections were selected, cleared with chloral hydrate, mounted with glycerin and observe under compound microscope. The presence or absence of following was observed: epidermal cells, stomata (type & distribution), epidermal hairs (type & distribution of trichomes).

Powder Microscopy

The raw material was powdered and passed through sieve no. 60 for examination of its microscopic characters**.** The powder was boiled with chloral hydrate to remove the coloring matter, mounted on the glass slide using glycerin, covered with a cover slip and viewed under microscope. The powder was also stained with Phloroglucinol and Hydrochloric acid and examined under microscope.

Physico Chemical Parameters

In physico chemical parameters Ash values, Extractable matter, Moisture content, Crude fiber content, Volatile oil content and Foaming index were measured.

Phytochemical Investigation

The extracts obtained by successive extraction were subjected to qualitative tests for the identification of various secondary metabolites such as Carbohydrates, Proteins, Tannins and Phenolic compounds, Glycosides, Alkaloids, Steroids, Flavonoids.

RESULTS AND DISCUSSION

Morphological examination showed the leaves of *C. inerme* are dark green in color, intense bitter taste & unpleasant odor. It has elliptical shape with acute apex. Margin is entire and veins are reticulate.

The microscopical features of transverse section & powdered sample were also evaluated. *Epidermis* is single layered covered with cuticle. Both Covering trichomes (unicellular and multicellular) and Glandular trichomes are present. Glandular trichomes consist of a single cell stock & multicellular head. There is a single large vascular bundle in the center; *Phloem* is more developed on the dorsal side. *Cholenchyma* is present in lower portion of midrib and the cells are multilayered and round in shape. *Palisade cells* are thin walled & multilayered and continuous on the midrib.

Powder of *C. inerme* leaves showed the presence of unicellular and multicellular covering trichomes, Stomata, palisade cells, epidermal cells and spiral vessels of xylem.

Table I: Physicochemical parameters

S. No.	Parameters	Results (% w/w)
1.	Total ash	11.7
2.	Water soluble ash	5.49
3.	Acid insoluble ash	4.68
4.	Crude fibre content	17.6
5.	Moisture content	5.5
6.	Foaming index	Up to 1000
7.	Volatile oil content	NIL
8.	Alcohol Extractive Value	26.7
9.	Water Extractive Value	10.8

Table II: Quantitative Phytochemical Analysis

S. No.	Chemical Constituents	Pet Ether Extract	Chloroform Extract	Ethyl acetate Extract	Ethanol Extract
1.	Proteins	-VE	-VE	-VE	-VE
2.	Alkaloids	-VE	+VE	-VE	+VE
3.	Carbohydrates	-VE	-VE	-VE	+VE
4.	Steroids	-VE	+VE	+VE	-VE
5.	Cardiac Glycosides	-VE	-VE	-VE	-VE
6.	Anthraquinones Glycosides	-VE	-VE	-VE	+VE
7.	Phenolic & Tannins	-VE	-VE	-VE	-VE
8.	Flavonoids	+VE	+VE	+VE	+VE
9.	Starch	-VE	-VE	-VE	-VE
10.	Saponins	-VE	-VE	-VE	+VE

+ve Present; -ve absent

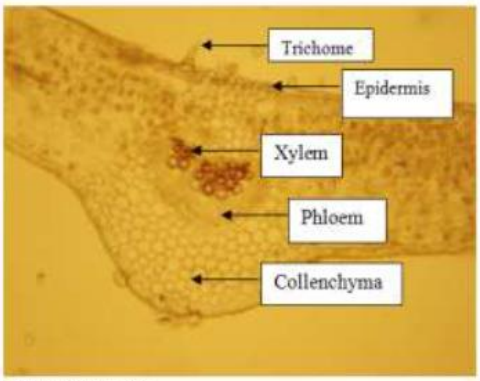

Fig. I whole section

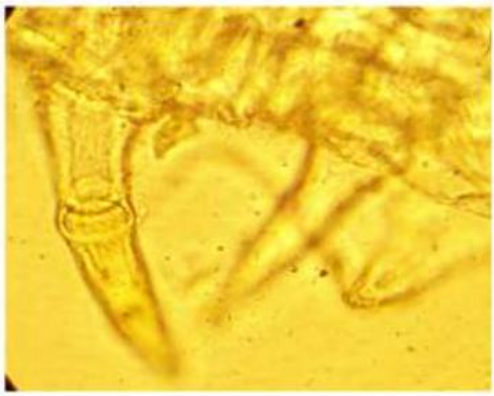

Fig III: Covering Trichome

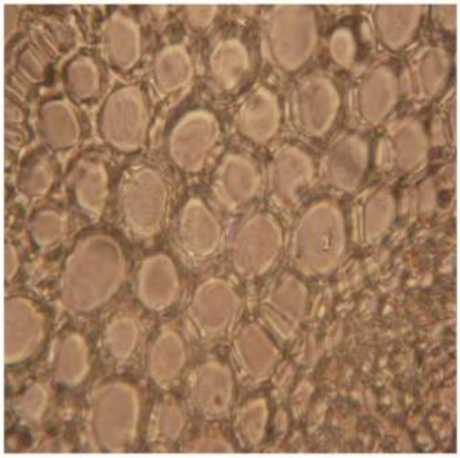

Fig. II Collenchyma

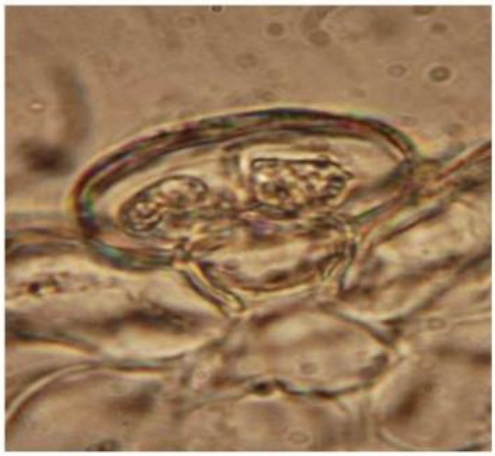

Fig IV: Glandular Trichome

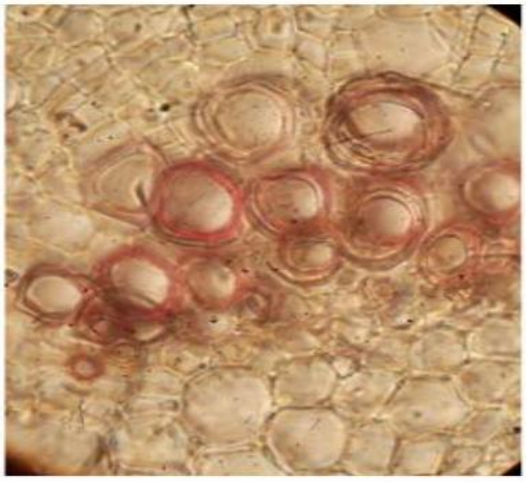

Fig V: Spiral xylem

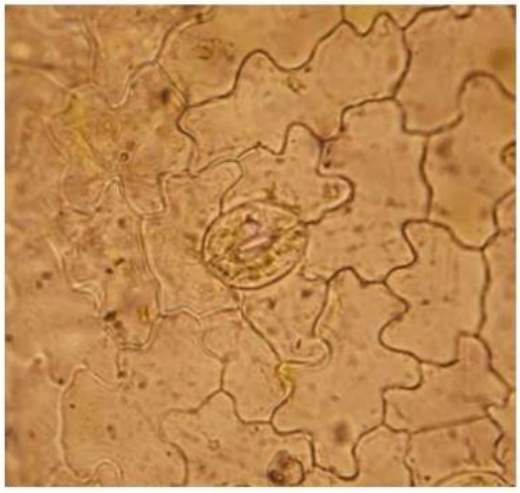

Fig VI: Stomata

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