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PHARMACOGNOSTIC STUDY AND PHYTOCHEMICAL SCREENING ON LEAVES OF *CHLOROXYLON SWIETENIA*

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ABSTRACT

Chloroxylon swietenia Linn. belongs to the family Rutaceae / Chloroxylaceae, is a medicinal and aromatic tree of dry deciduous forests. It is popularly known as yellow wood, East Indian satin wood and Ceylon satin wood. The leaves have credited for its effectiveness in the treatment of common cough and cold, it is also used as an astringent. Its pharmacognostic data for authentication of the crude drug is not available, hence, in the present study, macroscopical, microscopical, and preliminary phytochemical investigations of leaves is undertaken. Powder microscopy revealed that phloem fiber, covering trichome, mesophyll with oil glands. T.S of leaf shows cuticle, collenchymatous cells, oil glands, trichomes, xylem and epidermal cells. The qualitative chemical tests of petroleum ether, chloroform, acetone, ethanol and water extracts of leaves revealed the presence of carbohydrates, alkaloids, glycosides, flavonoids, phenolic compounds and tannins.

KEYWORDS: *Chloroxylon swietenia*, macroscopic, microscopy, preliminary phytochemical analysis.

INTRODUCTION

Chloroxylon swietenia Linn. belonging to the family Rutaceae / Chloroxylaceae, is a tropical aromatic tree of dry deciduous forests. It is a moderate sized and deciduous tree of about 9-15 m in height and 1.0-1.2 m in grows with a spreading crown and clean bole up to 3 m. The tree is native to India and Sri Lanka and popularly known as yellow wood, East Indian satin wood, Ceylon satin wood.

The whole part of this tree has long been used in the indigenous system of medicine such as the bark is used as an astringent, leaves are applied to worm infested wound of animals, fungal infection of skin and for the treatment of inflammation related disorders like pain and rheumatism.

MATERIALS AND METHODS

Collection and authentification

The plant was collected from the month of November from the forest region of Thalla Verappagudem region of Nalgonda district, Telangana. The plant material was identified and authenticated by F.Shankara chary, Professor, Department of Botony, Womens Government Degree College, Nalgonda.

Chemicals and reagent requirements

Petroleum ether, Chloroform, Ethylacetate, Iodine (Accord labs), Acetone (Universal labs), phloroglucinol (Sigma Aldrich), soxhlet apparatus, microscope and stage & eye piece micrometer (Edison).

Macroscopy

Colour, odour, taste, size, shape, fracture and texture were studied.

Microscopic

The microscopic sections of the leaf were cut by free hand sectioning and thinnest possible transverse sections were obtained. The selected sections were heated with chloral hydrated solution for 5 min, followed by staining with few drops phloroglucinol and con. HCl in the ratio of 1:1. The sections were mounted in glycerin and studied under the binocular research microscope fitted with canon photoshoot (A3200IS) camera. Photomicrographs were taken during observations from several fields.

Powder microscopy of leaves

A small quantity of leaves powder was heated for 10 min in chloral hydrate solution followed by staining with phloroglucinol and con. HCl. A pinch of the powder was taken on a slide observed under the microscope.

Physico-chemical constituents

Various physico-chemical parameters like moisture content, ash values and extractive values were evaluated in triplicate according to standard procedures mentioned in IP.

Fluorescence analysis

The fluorescence characteristics of the leaf powder was studied in both day light and UV light (254 nm & 365 nm) after treatment with different reagents.

Preliminary phytochemical studies

The leaf powder (50gm) was extracted successively with petroleum ether (40-60^0 C), chloroform, ethyl acetate, ethanol and distilled water using a soxhlet extractor. The extract was then subjected to qualitative chemical tests using standard procedures in order to identify the presence of different class of phytoconstituents in the leaves sample.

RESULTS

Macroscopic: The leaves are green in colour having characteristic odour with nauseas taste. The size of leaf 10-20 cm long, shape-oblong and blunt leaflets.

Microscopic

T.S of leaf shows cuticle, collenchymatous cells, oil glands, trichomes, xylem, epidermal cells.

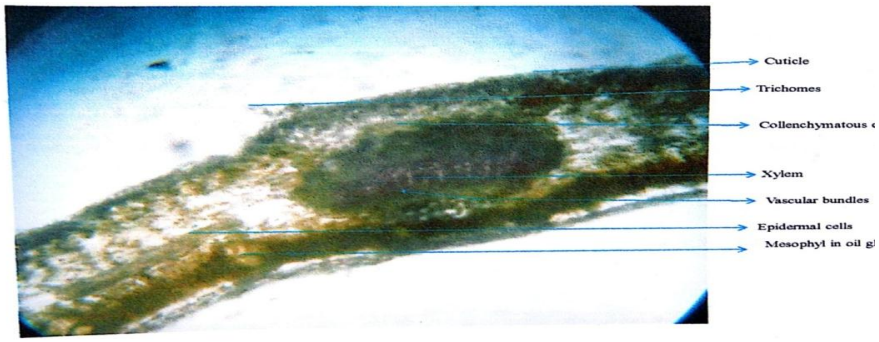
Cuticle: Waxy protective layer of epidermis that prevents water loss on leaves.

Collenchymatous cells: These are epidermal cells.

Vascularstrands: Xylem and phloem tissues, commonly known as leaf veins.

Oil glands: Secreted by gland.

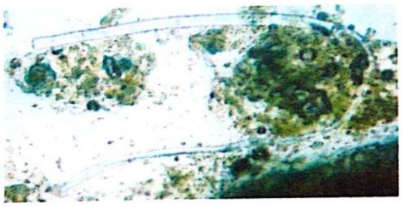
Covering trichomes: Unbranched lignified.



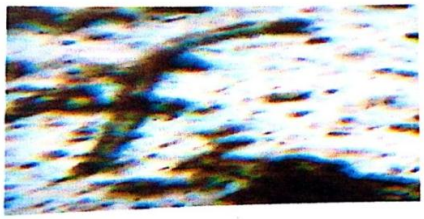
Powder microscopy

The powder microscopy revealed that the presence of phloem fiber, covering trichome, mesophyll with oil glands.

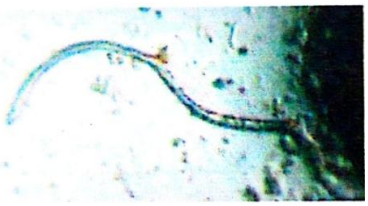
Mesophyll with Oil glands



Phloem fibre



Trichome



Trichome

Physico-chemical constituents

The percentage of total ash, acid-insoluble ash, water soluble ash, sulphated ash, loss on drying, alcohol soluble extractive value, water soluble extractive value are presented in given **table 1**.

Table 1.

Parameters	**Obtained values (% w/w)**
Total ash	6.5
Acid-insoluble ash	1
Water-soluble ash	1.5
Sulphated ash	2
Loss on drying	65.3
Alcohol soluble extractive value	29.2
Water soluble extractive value	30.8

Physicochemical analysis of leaves of *chloroxylon swietenia*

Fluorescence analysis

Powdered leaves were subjected to analysis under Ultra-violet light after treatment with various chemical and organic reagents. The result of fluorescence analysis of the drug powder is presented in Table-2.

Table 2.

Powder + Reagent	Long wavelength (365nm)	Short wavelength (256nm)	Day light
Powder + conc. HNO_3	Buff	Black	Light brown
Powder + conc. H_2SO_4	Bluish white	Dark black	Black
Powder + conc. HCL	Black	Gren	Brown
Powder + conc. HNO_3 +10% NAOH	Bluish green	Brown	Light brown
Powder + dragendorff reagent	Blakish brown	Brown	Pale green
Powder + benedict reagent	Blakish green	Dark green	Light green
Powder + hot water	Bluish black	Green	Pale green
Powder +5% $Fecl_3$	Dark black	Dark green	Pale green

Preliminary phytochemical studies

The results of the preliminary phytochemicl tests are depicted in Table-3. The different extract of the leaves were found to contain glycosides, steroids, saponins, flavanoids and tannins.

Table 3.

Test for	Petroleum extract	Chloroform extract	Ethyl acetate extract	Ethanol extract	Aqueous extract
Alkaloids	-	-	+	+	+
Carbohydrates	+	+	+	+	-
Protiens	-	-	-	-	-
Flavanoids	+	+	+	-	-
Tannins	-	-	+	+	-
Glycosides	+	+	+	+	-
Saponins	-	-	-	+	+
Steroids	+	+	+	+	-

+ = Present, - = Absent

RESULTS AND DISCUSSION

The quantitative determination of pharmacognostical parameters is useful for setting standards for crude drugs. According to the WHO reports, the macroscopic and microscopic description of a medicinal plant is the first step towards establishing the identity and degree of purity and should be carried out before any other tests are undertaken. Macroscopic study

plays an important role for primary identification of drugs by our sensory organs i.e., colour, odour and taste. Microscopic measurements of help for the identification of crude drugs belong to the same family and species. The transverse and longitudinal section of leaf showed cuticle, collenchymatous cells, xylem vessels, phloem fibers, mesophyll with oil glands and unicellular trichomes in the powder microscopy observed oil gland, phloem fibers and epidermal cells. The measurment of fibers helps to differentiate the species and adultrants. Ash values used to determine the quality and purity of drug. The total ash value, acid – insoluble ash value, water soluble ash and sulphated ash were found to be 6.5% W/W, 1% W/W, 1.5% W/W, & 2% W/W respectively. Fluorescence studies in the leaf with various reagents showed wide range of colour changes at day light, UV chamber (256nm and 365nm) this parameter is important technique for the proper identification. The extractive values play a vital role for the evaluation of the crude drugs which gives an idea about the nature of the chemical constituents present in crude drugs and estimation of specific constituents. The successful solvent extraction of leaf was done according to increase polarity of solvent. The ethanolic extract had shown the constituents like steroids, cardiac glycoside and tannins. The phytochemical screening is useful in finding out the genuity of the drug.

CONCLUSION

The phytochemical findings of the study confirmed the presence of plant phenolics, cardiac glycosides, tannins and other secondary metabolites which are currently of growing interest owing to their functional properties in promoting human health. The diagnostic features established here will help in quality control and authentication of the drug. Further, this investigation will be helpful to identify the plant and also provide valuable information to the researchers to establish the pharmacological activities supported with possible mode of action.

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