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PHARMACOGNOSTICAL AND PRELIMINARY PHYTOCHEMICAL STUDIES ON *CORDIA SEBESTENA* L. ROOT

M. Himaja Trivedi*, K. Venkata Ramana

A.S.N. Pharmacy College, Burripalem Road, Tenali, Guntur (Dist), A.P, India

*Corresponding author E-mail: himajatrivedi1141@gmail.com

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ABSTRACT

The nature has provided a complete store house of remedies. Above 80% world population depends partially or wholly on traditional medicine for its primary health care needs. Herbal medicines as the major remedy in traditional medicinal system have been used in medical practice for thousands of years and have made a great contribution to maintain human health. Indian system of medicine utilize majority of the crude drugs which are plant origin. *Cordia sebestena* L is also known as Geiger – Tree. It is a rounded, evergreen tree belongs to Boraginaceae family. It grows up to 25 to 30 feet. It flowers throughout the year, but it at its best in June & July. The present study deals with the Pharmacognostical parameters of *Cordia sebestena* L. root which mainly consists of macromorphology, microscopy and preliminary phytochemical screening.

INTRODUCTION

After decades of serious obsession with the modern medicinal system, people have started looking at the ancient healing systems like Ayurveda, Siddha and Unani because the medicinal plants have a longstanding history in many indigenous communities and continue to provide useful tools for treating various diseases [1]. Today, we are witnessing a great deal of public interest in the use of herbal remedies. Generally herbal formulations involve use of fresh or dried plant parts [2]. Medicinal plant are moving from fringe to main stream use with a greater number of people seeking remedies and health approaches free from side effects caused by synthetic chemicals. Correct knowledge of such crude drugs is very important aspect in preparation, safety and efficacy of the herbal product. Pharmacognosy is a simple and reliable tool, by which complete information of the crude drug can be obtained [3, 4]. World Health Organization currently encourages, recommends and promotes traditional herbal remedies as such drugs are easily available in low cost, are comparatively safe and the people have faith in such remedies [5]. It is no wonder that world's one-fourth population i.e. 1.42 billion people, are dependent on traditional medicines for the treatment of various ailments. Now-a-days medicinal plants found on earth have renowned medicinal significance and their usages are increasing day by day in our daily life. Different researches are going on to explore the beneficial, pharmacological and medicinal properties of herbal drugs. Sophisticated modern research tools for

evaluation of the plant drugs are available today but microscopic method is one of the simplest and cheapest methods to start with for establishing the correct identity of the source materials. There is a need for documentation of research work carried out on traditional medicines. With this backdrop, it becomes extremely important to make an effort towards standardization of the plant material to be used as a medicine [1]. These studies help in identification and standardization of the plan material. Correct identification and quality assurance of the starting materials is an essential perquisite to ensure reproducible quality of herbal medicine which will contribute to its safety and efficacy. *Cordia sebestena* L. is also known as Geiger –Tree. This is an evergreen tree belongs to the family Boraginaceae. It grows up to 25 feet in tropical as well as subtropical countries. Hawaiians refer to the plant as Kou Haole though, which means a "foreign plant" [6]. Recent archeological studies evidence indicates that the plant is actually indigenous to the islands [7]. Sebestenoids A-D (1-4) was isolated from Bioassay guided fractionation prepared from the *Cordia sebestena* fruit extract. The structures of these new phenylpronoid esters were elucidated by NMR and Mass spectroscopic measurements. Compounds 1-4 exhibited moderated inhibition of the aspartic protease BACE [8]. The leaves of the plant possess anti hyperglycemic property against streptozocin induced diabetes, and it is anti hypo lipidemic and antioxidant [9]. The present study deals with the Pharmacognostical parameters and preliminary phytochemical screening of *Cordia sebestena* L. root. Pharmacognostical studies which mainly consists of macromorphology, microscopy.

Materials and methods

Plant material: The roots of *Cordia sebestena* L. were collected from Talakona forest in Chittoor District of Andhra Pradesh in month of June, 2013. The plant was identified and authenticated by Dr. Madhava Chetty, Assistant Professor, Department of Botany, Sri Venkateswara University, Tirupati.

Preparation of extraction: The roots of *Cordia sebestena* L. roots were dried and powdered. The root powder was extracted in soxhelet apparatus with chloroform, ethyl acetate and methanol. The extract was concentrated under reduced pressure.

Macroscopical studies: Macroscopical examination was carried out to the freshly collected roots and stems and to the powder. In these tests colour, odour, taste and powder were observed and noted and photographs were taken in the original environment.

Microscopic Studies

Procedure: Care was taken to select healthy plants. The required sample of stem and root were cut and removed from the plant and fixed in FAA (Farmalin 5 ml + Acetic acid - 5 ml + 70% Ethyl alcohol 90 ml). After 24 hrs of fixing, the specimens were dehydrated with graded series of tertiarybutylalcohol. Infiltration of the specimens was carried by gradual addition of paraffin wax (melting point 580–600 ^{0}C) until TBA solution attained supersaturation. The specimens were cast into paraffin blocks [10].

Sectioning (sample preparation): The paraffin embedded specimens were sectioned with the help of rotary microtome. The thickness of the sections was 10–12 μm. The sections were stained with Toluidine blue as per the method published 9. Since Toluidine blue is a polychromatic stain, the staining results were remarkably good and some cytochemical reactions were also obtained. The dye rendered pink colour to the cellulose walls, blue to the lignified cells, dark green to suberin, violet to the mucilage and blue to the protein bodies. Glycerin mounted temporary preparations

were made for macerated/cleared materials. Powdered materials of different parts were cleared with NaOH and mounted in glycerin medium after staining. Different cell component were studied and measured. Photographs of different magnifications were taken. For normal observations, bright field was used. For the study of crystals, starch grains and lignified cells, polarized light was employed. Under the polarized light they appear bright against dark background. Magnifications of the figures are indicated by scale-bars [11].

Preliminary phytochemical screening : The extracts obtained by successive solvent extractions were subjected to the chemical test mentioned earlier [12]. The erxtracts were subjected to preliminary phytochemical investigation for the detection of the following compounds: carbohydrates, proteins, glycosides, alkaloids, tannins, flavnoids, fixed oils and fats, steroids and saponnins.

RESULTS AND DISCUSSION

Macroscopic Studies

Colour: Brown

Odour: Characteristic

Taste: Characteristic

Microscopic studies

Cork: 4-6 narrow layer of non-lignified parenchymatous cork is present. **Phellogen:** 8-12 layers of parenchymatous light brown cells are present, bigger than cork cells.

Phelloderm: They are wide, cellulosic parenchyma are arranged transversely.

Cortex: Narrow lignified Parenchymatous cells are followed with the cork portion.

Pericyclic fibre: Just above the phloem, consisting of 1-3 layer of parenchymatous cells. It divides the cortex portion and endodermis.

Cambium: In between phloem and secondary xylem the cambium of two colourless transverse paranchymatous layer observed.

Xylem: The cell wall may consist of primary wall with thin.

Sieve Tubes: Thin walled longitudinally arranged sieve tubes are seen like sieve plate in the secondary phloem portion.

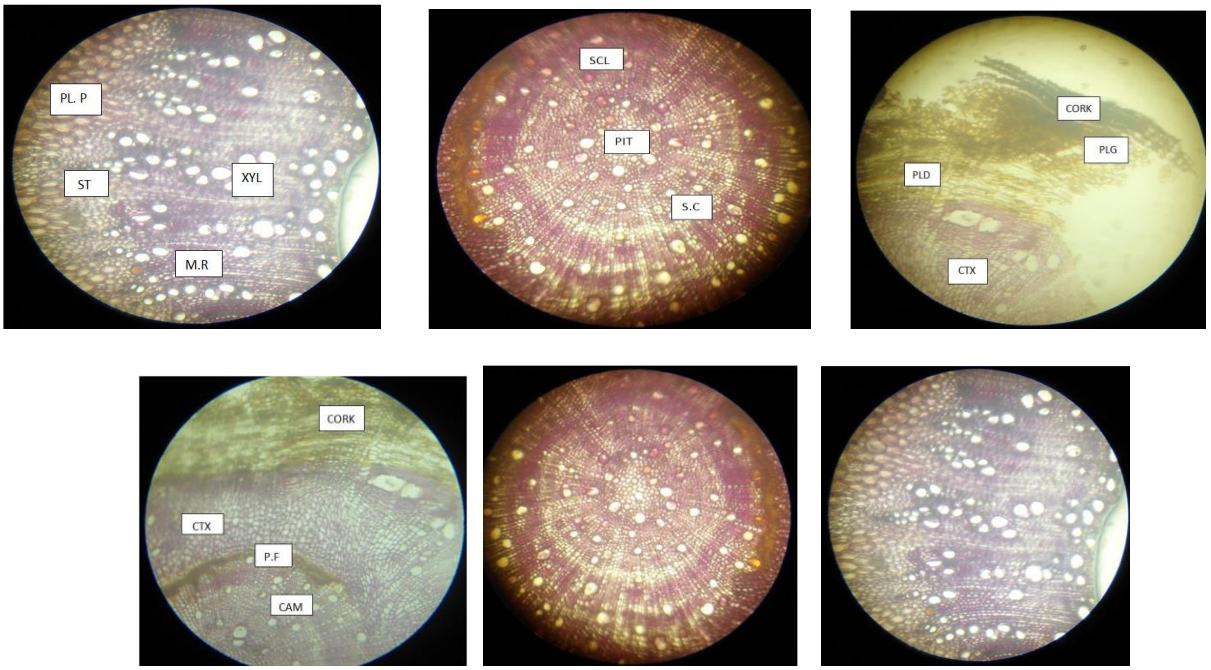
Phloem Parenchyma: Observed other than albuminious and companian cells, which are occurs in association with phloem.

Medullary rays: It is made up of cellulosic parenchyma and radially elongated cells. 2-4 celled medullary rays running towards the cortex portion.

Schlerenchyma: Schlerenchyma are seen in the secondary phloem portion.

Sclereids: Prismatic sclereids are seen on the secondary phloem portion.

Figure: Anatomical study report on *Cordia sebestena L.* root: The root system of *Cordia sebestena L.* consisted of thick, fleshy storage roots from which fibrous adventitious roots grew out. Root hairs were absent. The outer surface of root was covered by a single layer epidermis, which consisted of thin layered, crushed, and broke up isodiametric shaped cells. The cork is non lignified and phelloderm is transversely arranged. Cortex was multi-layered and lignified. There were sclerenchyma cells and bundles in the area of the contact point of adventitious roots. Pericycle was 1–3 layered. The central cylinder was composed of multi-layered cells, which had radial symmetry. Vascular bundles had a cambium with two layers of parenchyma. Sieve-tube elements were thin walled and longitudinally arranged. Pith is present at center and globular in nature.



PLP- Phloem Parenchyma, SY- Sieve Tubes, XYL- Xylem, MR- Medullary Rays, SCL- Sclereids, PI- Pith, S.C- Schleren Chyma, CORK- Cork Cells, PLG- Phellogen, PLD- Phelloderm, CTX- cortex, P.F- Pericyclic Fibre, CAM- Cambium

Table 1: Phytochemical screening results for *Cordia sebestena* L. root

Phytochemicals	***Cordia sebestena* L. Root**		
	Chlorofrom Extract	**Ethyl acetate Extract**	**Methanol Extract**
Alkaloids	+	+	+
Steroids	-	-	-
Protiens	+	+	-
Tannins	-	-	+
Carbohydrates	+	-	-
Flavonoids	+	+	+
Glycosides	-	-	+
Saponnins	-	-	+
Fixed oils fats	-	-	-

"+" represents **Presence, "-"** represents **Absence**

Yield of extracts: The yield of extracts of the *Cordia sebestena* L. roots, Ethyl acetate extract (6.2 gm), Chloroform extract (8 gm), Methanol extract (6 gm) The phytochemical analysis helps in formulating Pharmacopoeial standards. The chief phytochemicals present in the different extracts ***Cordia sebestena* L. root** was alkaloids, proteins, tannins, carbohydrates, Flavonoids, glycosides, saponnins

CONCLUSION:

During the past decade, the indigenous or traditional system of medicine has gained importance in the field of medicine. In most of the developing countries, a large number of populations depend on traditional practitioners, who in turn dependent on medicinal plants to meet their primary health care needs. Although modern medicines are available, herbal medicines have retained their image for historical and cultural reasons. As the usage of these herbal medicines has increased, issues and motto regarding their quality, safety and efficacy in industrialized and developing countries have cropped up. Increasing interest has forced the researcher to scientifically

screen various traditional claims. There is a need for screening the traditional claims because in this scientific era, everyone is interested in scientific support before using traditional drugs. Therefore, at present, both common users and healthcare professionals seek updated, alternative information toward te safety and efficacy of any recommended medicinal plants as a drug, prior to this use. The relevance of Pharmacognosy in standardization of herbal drug was long been stressed. The process of standardization can be achieved by stepwise pharmacognostic studies. These studies help in identification and authentication of plant material. Medicinal plant materials are categorized according to sensory, macroscopic and microscopic characteristics. An examination to determine these characteristics is the first step towards establishing the identity and degree of purity of such materials [13, 14. In present study various standardization parameters such as organoleptic, microscopical studies, extractive value and phytochemical screening. Alkaloids, proteins, tannins, carbohydrates, Flavonoids, glycosides, saponnins were carried out which could be helpful in authentication of *Cordia sebestena* L. The results of present study will also serve as reference material in preparation of monograph.

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