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Research Article

PHARMACOGNOSTICAL AND PRELIMINARY PHYTOCHEMICAL STUDIES OF *CORDIA MONOICA* ROXB. ROOT

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ABSTRACT

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. Above 80% world population depends partially or wholly on traditional medicine for its primary health care needs. Cordia monoica Roxb belongs to Boraginaceae family. It is a small tree grows up to 6 m. bears white flowers and yellow fruit. The present study deals with the Pharmacognostical parameters of Cordia monoica Roxb root which mainly consists of macromorphology, microscopy and preliminary phytochemical screening.

KEYWORDS: *Cordia monoica, Root, Xylem, Phloem, Macroscopy, Microscopy, Phytochemicals etc.*

INTRODUCTION

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 [1]. Medicinal plants 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 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 [2, 3]. 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 [4]. World Health Organization encourages, recommends and promotes traditional herbal remedies as such drugs are easily availble 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 have renowned medicinal significance and their usages are increasing day by day in 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 [3]. These studies help in identification and standardization of the plan material. *Cordia monoica* Roxb belongs to Boraginaceae family. It is a small tree grows up to 6 m. bears white flowers and yellow fruit. The plant occurs in the Deccan Peninsula and Southern India, chiefly in hilly regions [6]. Leaves are ovate. Leaf size up to 4 inches long. Fruit measures up to 0.5 inches long. Flowering and fruiting process occur during the months of October to December [7-9]. The present study deals with the Pharmacognostical parameters and preliminary phytochemical screening of *Cordia monoica* Roxb root. Pharmacognostical studies which mainly consists of macromorphology, microscopy.

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DOI:

MATERIALS AND METHODS

Plant material:

The roots of *Cordia monoica* Roxb. 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 monoica* Roxb. roots were dried and powdered. The root powder was extracted in soxhelet

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apparatus with chloroform, ethyl acetate and methanol. The root 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. Root powder was cleared with sodium hydroxide and mounted in glycerin medium after staining. Different cell component were studied and measured. Photographs of different magnifications were taken. Bright field was used for normal observations. Polarized light was used for the study of crystals, starch grains and lignified cells. . 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 extracts 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: Dark Brown

Odour: Characteristic

Taste: Characteristic

Microscopy of *Cordia monoica* Roxb root:

Cork (Phellem): Several layered with tubular cells; outer layers are filled with brownish matter.

Phellogen: It is indistinct

Phelloderm: It is 3-5 layered immediately below cork, parenchymatous cells whose corners are thickened with cellulose; some cells with prism of calcium oxalate.

Cortex: Several layers of thin walled and tangentially elongated cells. Some of the cortical cells are having crystals of calcium oxalate (micro sphenoidal).

Seconadry phloem: This region comprises of phloem parenchyma and medullary rays. Xylem fibres are intermingled with phloem parenchymatous cells and they are lignified in nature. Secondary xylem is also making a equal interval and showing vertical column like appearance.

Medullary rays: Distinct, multiseriate, parenchymatous, in continuation with those of xylem. However the rows are narrower in the xylem region and become wider in the phloem region.

Vessels: The vessels are occasionally isolated but mostly in groups.Groups of vessels appear more towards the cambium.

The root system of *Cordia monoica* Roxb consists of thick, fleshy storage roots from which fibrous adventitious roots grew out. Root hairs were absent. The phellem (cork) is multilayered with tubular cells and the outer layers are filled with brownish matter. Phellogen is also present but indistinct but phelloderm is 3-5 layered just below the cork. The phelloderm is made up of cellulosic parenchymatous cells. It is also having calcium oxalate crystals which are prismatic in nature. Tangentially elongated cortex is also having sandy (microsphaenoidal) type calcium oxalate crystals. Phloem, xylem fibres and secondary xylem, which are lignifies are intermingled and grouped with medullary rays. The medullary rays are multiseriate which appears narroew in the xylem and wider in the phloem. Groups of vessels are present towards the cambium.

Yield of extracts:

The yield of extracts of the *Cordia monoica* Roxb. Roots

Ethyl acetate extract (5 gm)

Chloroform extract (4.8 gm)

Methanol extract (7 gm)

The phytochemical analysis helps in formulating Pharmacopoeial standards. The chief phytochemicals present in the different extracts *Cordia monoica* Roxb. root was alkaloids, proteins, tannins, carbohydrates, Flavonoids, glycosides, saponnins.

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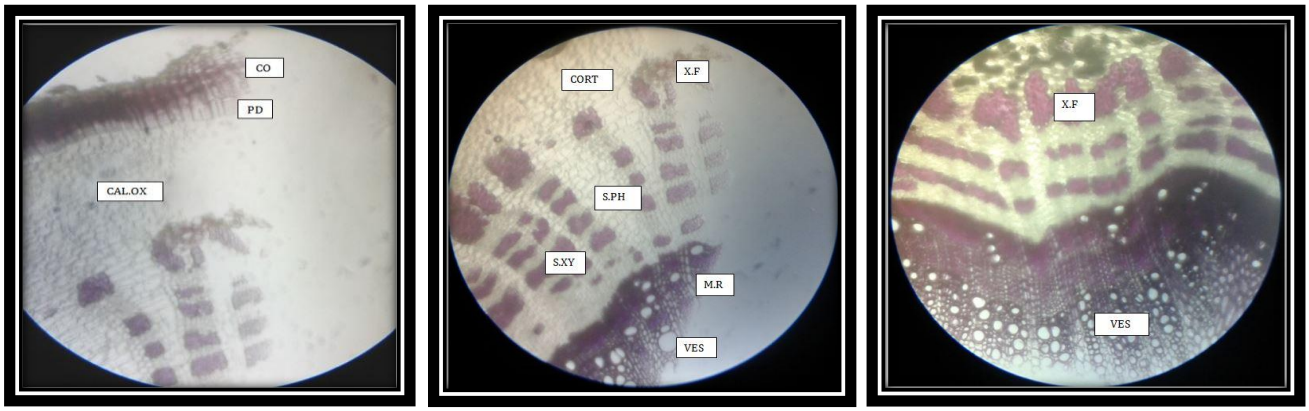


Fig. 1 to 3: Anatomical study report on *Cordia monoica* Roxb root
(CO – Cork, P.D – Phelloderm, Cal.Ox – Calcium Oxalate, Cort- Cortex, X.F- Xylem Fiber, S.Ph- Secondary Phloem, SX- Secondary Xylem, M.R – Medullary Rays)

Table No. 1: Phytochemical screening results for *Cordia monoica* Roxb. root

Phytochemicals	*Cordia monoica* Roxb Root		
	Chlorofrom Extract	Ethyl acetate Extract	Methanol Extract
Alkaloids	+	+	+
Steroids	+	-	-
Protiens	+	+	-
Tannins	-	-	+
Carbohydrates	+	-	-
Glycosides	-	+	+
Saponnins	-	-	+
Flavonoids	+	-	+
Fixed oils&fats	-	-	-

"+" represents Presence, "-" represents Absence

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. The relevance of Pharmacognosy in standardization of herbal drug was long been stressed. 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 the safety and efficacy of any recommended medicinal plants as a drug, prior to this use. 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 monoica* Roxb. The results of present study will also serve as reference material in preparation of monograph.

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