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Research Article Botany

PHARMACOGNOSTICAL PROFILE ON THE STEM OF *Ixora coccinea* LINN

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ABSTRACT

The present study was planned to conduct pharmacognostic study of *Ixora coccinea* stem. The following conclusion obtained from the study. A Pharmacognostical study ensures plant identity, lays down standardization parameters which help and prevents adulterations. Such studies would help in authentication of the plants and ensures reproducible quality of herbal products which will lead to safety and efficacy of natural products. In Physico-chemical evaluation, ash values and extract values were studied. The ash and extract values were helpful in determining the quality and purity of a crude drug in the powdered form and to evaluate the chemical constituents present in the crude drug and also help in estimation of specific constituents soluble in particular solvent. Histochemical studies further proved the presence of phytochemicals in *Ixora coccinea* stem. Fluorescence behavior of Ixora coccinea stem was examined. Overall, the *Ixora coccinea* stem are a rich source of phytochemicals that can be important in disease prevention..

Keywords: *Ixora coccinea* stem, pharmacognostic, Physico-chemical

INTRODUCTION

Plant anatomy or phytotomy is the general term for the study of the internal structure of plants. While originally it included plant morphology, which is the description of the physical form and external structure of plants, since the mid-20th century the investigations of plant anatomy are considered a separate, distinct field, and plant anatomy refers to just the internal plant structures. Plant anatomy is now frequently investigated at the cellular level, and often involves the sectioning of tissues and microscopy (Zhao et al., 2011).

Plants have basic nutritional importance by their content of protein, carbohydrate, fats and oils minerals, vitamins and water responsible for growth and development in man and animals. Phytochemical simply means plant chemicals. “Phyto” is the Greek word for plant. Phytochemicals are classified as primary or secondary constituents, depending on their role in plant metabolism. Primary metabolism is important for growth and development of plants include the common sugars, aminoacids, proteins, purines and pyrimidines of nucleic acids, chlrophyll’s etc. Secondary metabolism in a plant plays a major role in the survival of the plant in its environment (Dahanukar et al., 2000). Keeping in view, the present study toinvestigate the pharmacognostical profile on the stem of *Ixora coccinea*.

MATERIALS AND METHODS

Collection of plant materials

The *Ixora coccinea* stems were collected in January 2021 from Thanjavur, Thanjavur district, Tamil Nadu, India.

Pharmacognostical study

Anatomical studies on stem of *Ixora coccinea*

The fresh stem of *Ixora coccinea* was collected and free hand sections were taken to obtain a thin section. The thickness of the section was 10-12 micrometers. Anatomical study invariably slides were prepared. The transverse sections of stem was taken on a glass slide to which are added a few drops of chloral hydrate and was heated for 1-2 min, After placing a cover slip ,care should be taken to avoid air bubbles and to see that there

is sufficient chloral hydrate under the cover slip. Excess of chloral hydrate outside the cover slip is to be withdrawn using a blotting paper (Chloral hydrate is used to clear the tissues and to bring in clarity of the view) Lignified tissue is to be confirmed by staining. To the powder a few drops of mixture of 1:1 Phloroglucinol + Conc HCl was added and after 3 to 4 minutes observed under microscope. The well-known identifying characters were taken Photomicrographs by Sony digital camera under microscope (10 x & 40x) (Wallis, 1989; Dutta, 1971; Evan and Trease, 2009).

Preparation of plant powder

The collected *Ixora coccinea* stems were washed several times with distilled water to remove the traces of impurities from the stems. Then examined carefully, old infected and fungus damaged portion of the stems were removed. Healthy stems was dried in room temperature and grind using grinder mixture. The powder was stored for further analysis.

Determination of physicochemical parameters

Physicochemical parameters of the powdered *Ixora coccinea* stem such as ash value, extractive value and loss on drying content were performed according to the method described in WHO guidelines (WHO, 1998).

RESULTS AND DISCUSSION

Medicinal plants are assumes greater importance in the primary health care of individuals and communities in many developing countries. There has been an increase of demand in international trade because of very effective, cheaply available, supposedly have no side effects and used as alternative to allopathic medicines. Medicinal plants are believed to be much safer and proved elixir in the treatment of various ailments. Plants synthesize an array of chemical compounds that are not involved in their primary metabolism. These 'secondary compounds' instead serve a variety of ecological functions, ultimately to enhance the plants survival during stress. In addition these compounds may be responsible for the beneficial effects of fruits and vegetables on an array of health related measures (Liu, 2003).

Anatomical characteristics

Transversal section of the stem

Diagrammatic T.S. of stem was oval to wavy in outline. Outer epidermis was covered with thick cuticle and some of the epidermal cells lead into simple unicellular trichomes, followed by hypodermis, cortex, endodermis, pericycle, vascular bundle and central parenchymatous large pith with several groups of stone cells. Detailed T.S. showed the outer most layers compactly arranged some of the epidermal cells lead into simple unicellular trichomes. Epidermis covered with thick cuticle. Hypodermis 2-3 layered compactly arranged collenchymas cells. Some of the hypodermal cells filled with red colouringmatters followed by cortical cells made up of 6-9 layers of simple parenchyma cells without any intercellular spaces, mostly filled with chlorophyll pigments. Some of the cells loaded with rosette crystals and cluster crystals of calcium oxalate, oil globules and simple starch grains. Cortex is followed by single layer of endodermis. 2-3 layers of compactly, circulary arranged, pericyclic fibers which are lignified. vascular bundles are open and collateral, radially arranged. Metaxylem is facing towards cortical region and protoxylem to words central pith region with xylem parenchyma and fibres. Xylem is separated by uni-serrate medullary rays. Phloem is situated above the xylem with sieve elements and fibres. Larger region of the section is occupied by pith made up of parenchymatous cells. In the pith region 3-5 isolated groups of pitted stone cells. Pith cells are filled with oil globules, rarely simple starch grains and rosette and cluster crystals of calcium oxalate. (Figure 2).

Powder microscopy analysis

The fine powder was mounted and observed, features revealed that the stem contains calcium oxalate crystals and starch grains. The powder also showed the presence of well-arranged trichome with blunt tip and xylem parenchyma (Fig. 3).

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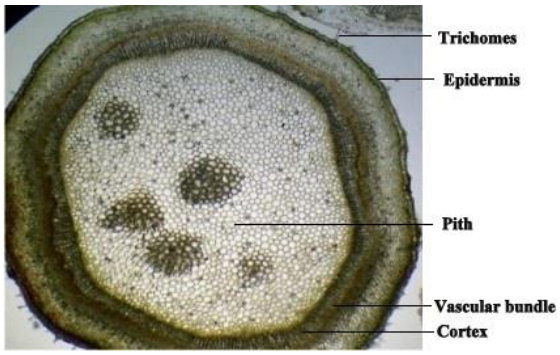
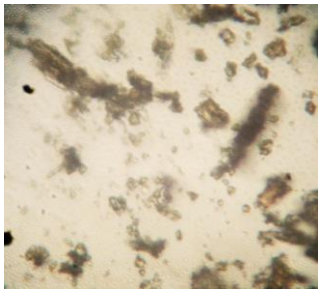
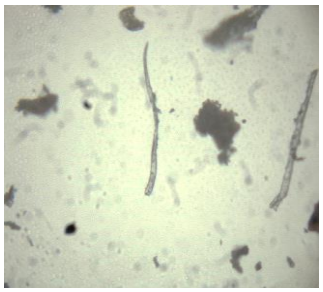


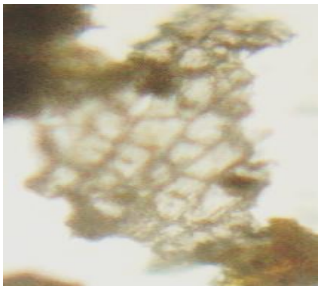
Fig. 1: Transverse section of *Ixora coccinea* stem



Calcium oxalate crystals



Trichomes



xylem parenchyma

Physicochemical analysis of *Ixora coccinea* stem

The results of physicochemical parameters such as loss on drying, total ash, acid insoluble ash, water soluble ash, alcohol soluble extractive and water soluble extractive values of stem of *Ixora coccinea* are shown in Table 1. Present study evaluated the physico chemical analysis of *Ixora coccinea* stem powder. Loss on drying at 105 ºC, moister content, total ash, acid insoluble ash, water soluble ash and alcohol soluble extractive of *Ixora coccinea* stem were found to be 6.23 %, 7.25 %, 1.32 %, 12.65 % and 10.20 % respectively (Table 1).

Table 1: Physicochemical parameters of *Ixora coccinea* stem

S. No	Tests	As Per Analysis
	Colour	**brown coloured fine powder**
1	Loss on Drying at 105˚C (Moister Content)	6.23%
2	Total Ash	7.25%
3	Acid insoluble Ash	1.32%
4	Alcohol Soluble Extractive	12.65%
5	Water Soluble Extractive	10.20%

Histochemical analysis of *Ixora coccinea* stem section

In the present study, *Ixora coccinea* stem section were treated with specific chemicals and reagents. The *Ixora coccinea* stem section treated with diluted ammonia and H_2SO_4 gave yellow colour indicates Flavonoids, treated with $FeCl_3$ reagent gave dark black colour indicates Tannin, treated with Few drops toluidine blue reagent gave Blue green colour indicates Polyphenol, treated with Few drops Mayer's reagent gave red colour indicates of alkaloids, treated with Few drops DNPH reagent gave Orange colour indicates Terpenoids was present (Table 2 and figure 4**)**. This results further confirmed the presence of phytochemicals.

Histochemistry is the branch of histology dealing with the identification of chemical components of cells and tissues, it is a powerful tool for localization of trace quantities of substances present in biological tissues. Histochemical techniques have been employed to characterize structure and

development, and to study time course of deposition and distribution of major phytocompounds (Krishnan *et al.*, 2001).

Table. 2: Histochemical analysis of *Ixora coccinea* stem

S. No	Phytochemicals	Results
1	Terpenoids	+
2	Flavonoids	+
3	Alkaloids	+
4	Polyphenol	+
5	Steroids	+
6	Saponins	+
7	Glycoside	+

Note: (+) Presence

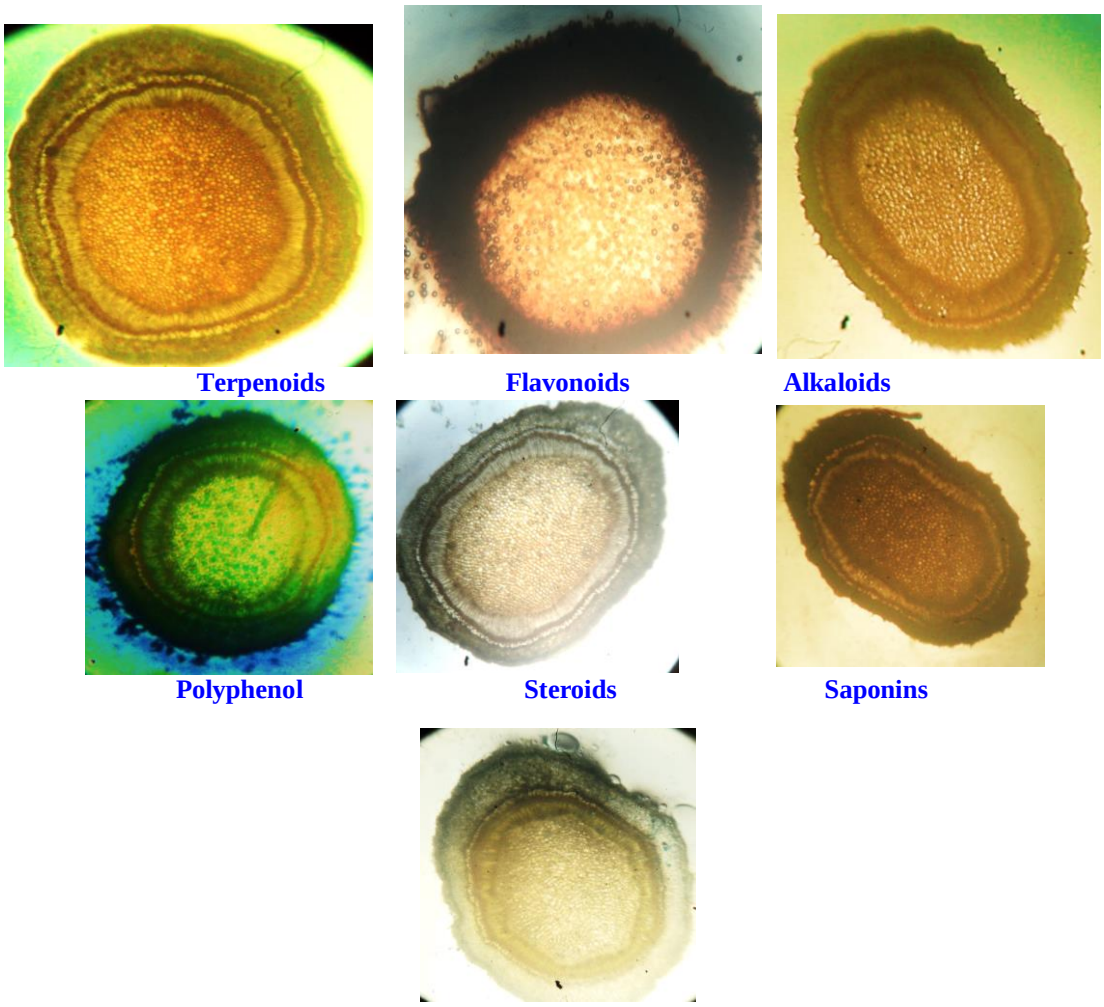


Fig. 4: Histochemical analysis of *Ixora coccinea* stem section

Conclusion

Overall, the Ixora coccinea stem are a rich source of phytochemicals that can be important in disease prevention. These studies help in identification and authentication of the plant material. Such information can act as reference information for correct identification of particular plant and also will be useful in making a monograph of the plant. Further, it will act as a tool to detect adulterants and substituent and will help in maintaining the quality, reproducibility and efficacy of natural drugs.

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