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PHARMACOGNOSTICAL EVALUATION OF THE LEAVES OF *SAPINDUS EMARGINATUS*

G. Devdass [1,2]* & A.Saravanakumar[3]

[1]Assistant Professor, Saastra College of Pharmaceutical Education & Research, Nellore, Andhra Pradesh, India.
[2]Research Scholar, Himalayan University, Ital Nagar, Arunachala Pradesh, India.
[3]Sri Venkateswara College of Pharmacy, Chittoor, Andhra Pradesh, India.

ABSTRACT

Various traditional systems of medicine enlightened the importance of the plant having a great medicinal value. One of such a plant is *Sapindus emarginatus* which is rich in saponins and tannins. The leaf of the plant has yet been researched to full extent and in our present study we aimed at determining its microscopical structure and characters which may be useful in the future to identify and to standardize the plant. These findings will be useful towards establishing its Pharmacognostical standards on its purity, quality and classification of the plant which is gaining relevance in plant drug research.

Keywords: *Sapindus emarginatus*, Pharmacognosy, Microscopy.

INTRODUCTION

Herbal Medicines are of great choice over synthetic medicines in curing various diseases with minimal or no side effects. The correct knowledge about these herbal medicines is of great importance during its use in which identification of that crude drug is the preliminary step [1]. One of such herbal medicine is *Sapindus emarginatus* which is used for many pharmacological purposes has not been pharmacognostically evaluated. Hence in our study, we are going to identify the Pharmacognostical structure of the leaves of the plant (transversely & longitudinally) and to analyze its powder characters which will be useful for the identification & standardization of the plant in the future.

MATERIALS AND METHODS

Anatomical Studies

The Plant specimen for the proposed study was collected from Villivakkam, chennai, Tamil Nadu. It was identified and authenticated by Dr. P. Jayaraman, Director, Plant Anatomy Research Center, (PARC) Tambaram, Chennai.

Staining

The leaf of the plant *Sapindus emarginatus* was cut and fixed in FAE (Formalin - 5 ml+ Acetic acid – 5 ml + 70 % Ethyl alcohol – 90 ml). After 24 hrs of fixing, the specimens were dehydrated with graded series of tertiary – butyl alcohol.

Infiltration of the specimens was carried by gradual addition of paraffin wax (melting point 58-60 ^{o} c) until TBA solution attained super saturation. The specimens were cast into paraffin blocks [2].

Sectioning

The paraffin embedded specimens were sectioned with the help of Rotary Microtome. The thickness of the section was 10-12 µm. De waxing of the sections was by customary procedure [3]. The sections were stained with toluidine blue, since toluidine blue is a polychromatic stain [4].The staining results were remarkably good and some phytochemical reactions were also obtained. The dye rendered pink color to the cellulose walls, blue to the lignified cells, dark green to suberin, violet to the mucilage, blue to the protein bodies etc. Wherever necessary, sections were also stained with Safranin and fast green and IKI (for starch). Powdered materials were

Corresponding Author:-**G. Devdass** Email:devdasspharma@gmail.com

cleared with NaOH and mounted in glycerin medium after staining. Different cell component were studied and measured.

Photomicrographs

Microscopic descriptions of tissues are supplemented with micrographs wherever necessary. Photographs of different magnifications were taken with Nikon Lab photo 2 Microscopic Unit. For normal observation, bright field was used. For the study of crystals, starch grains and lignified cells, polarized light was employed. Since these structures have birefringent property, under polarized light they appear bright against dark background. Magnifications of the figures are indicated by the scale-bars. Descriptive terms of the anatomical features are as given in the standard anatomy books [5].

RESULTS AND DISCUSSION

Microscopical Study

The leaf consists of thick and bowled midrib and their lamina. The midrib includes thick and wide adaxial cone and thick semicircular abaxial midrib (figure 1). The midrib is 1.1mm thick and the adaxial cone is 350µm wide and the abaxial cone is 850µm wide.

The epidermal layer of the midrib consists of small, slightly papillate thick walled cells. The ground tissue both in the adaxial and abaxial part is made up of parenchymatous and compact. The vascular system consists of thick prominent vascular strands which occupy the entire area of the midrib.

There are 2 vascular segments one is on the adaxial part and other on the abaxial side. The vascular segments are collateral and they have inner short lines of circular xylem elements and outer arc of phloem elements. The space between the two vascular segments consists of parenchyma cells densely filled with tannins. The adaxial and abaxial vascular strands are ensheated entirely by thick sclerenchyma cells (figure 2).

Lateral Vein:

The lateral veins are also thick and prominent. The lateral veins are biconvex in sectional view with adaxial raised part and abaxial semicircular part. It is 420µm thick. The epidermal cells of the lateral veins are semicircular and slightly papillate with thick outer tangential walls. The vascular system consist of single, arc shaped xylem strand and thick arc of phloem strand. The xylem and phloem strand are enveloped by thick sclerenchymatous cells (figure 3).

Powder microscopy

The powder preparation of the leaf exhibits the following inclusions, abundant epidermal trichomes which are of varying size and shape. Generally the trichome is thick at the base and gradually becomes tapering at the tip. The trichome may be straight or curved. The trichomes are unicellular, unbranched, heavily thick walled and lignified. The cell lumen is very narrow. The stomata are of Paracytic type. (figure 4 & 5)

1. Crystals:

Calcium oxalate prisamatic crystals are abundant in the powder. The crystals vary from rhomboidal, cuboidal and double pyramidal type. Some crystals are bent along the middle resembling a open book. The crystals may be very small or fairly large (figure 6 & 7).

Figure 1. T.S of leaf through midrib

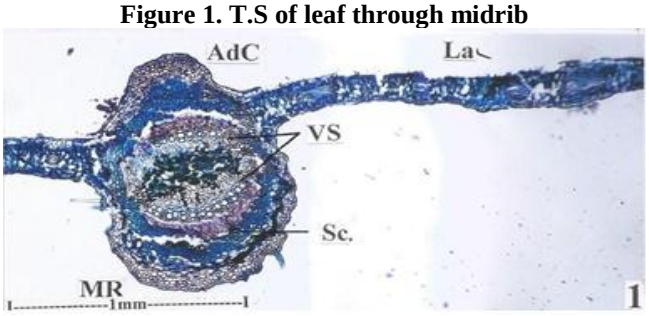


Figure 2. T.S of midrib enlarged

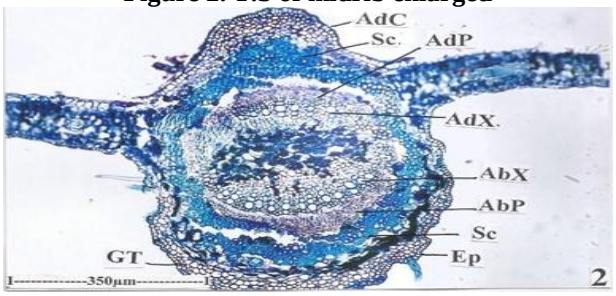


Figure 3. T.S of lateral vein

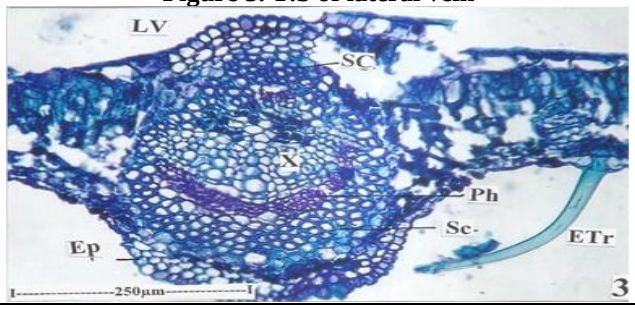


Figure 4. Epidermal cell with trichome and stomata

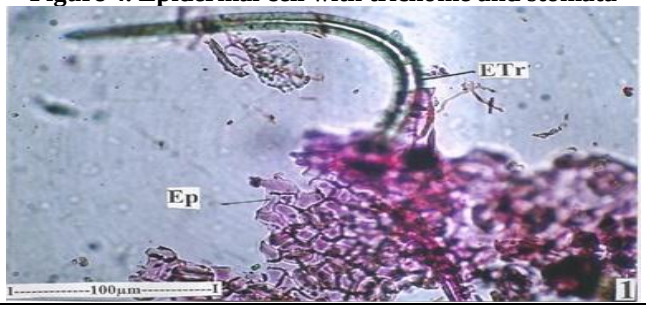


Figure 5. Epidermal trichome enlarged

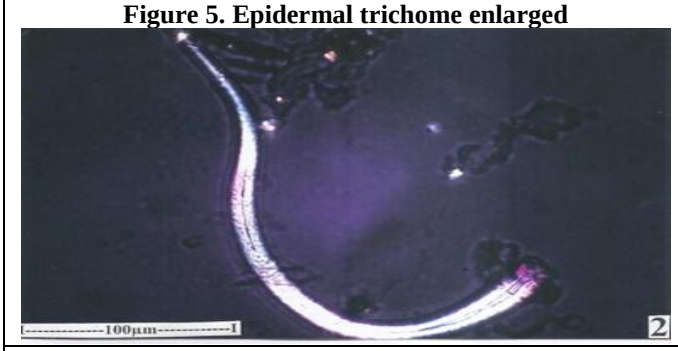


Figure 6. Calcium oxalate crystal

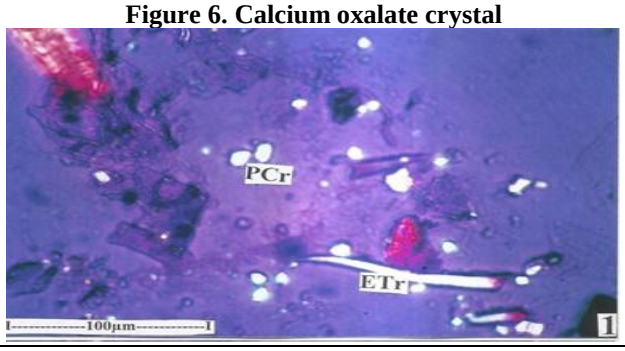
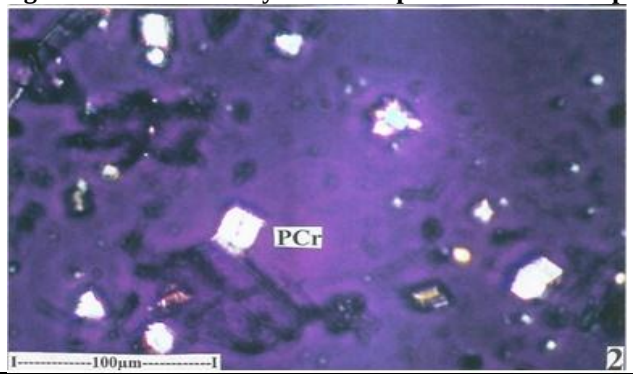


Figure 7. Prisamatic crystal under polarized microscope



CONCLUSION

An attempt was made to identify the microscopical structure and powder characters of the leaves of *Sapindus emarginatus.* These parameters could serve in the identification, preparation of a monograph and standardization.

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