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**ANTOMICAL STUDIES OF STEM BARK AND ROOT OF *SCLEROPYRUM
PENTANDRUM* (DENNST) MABB**

T. K. Ajith Babu^{*1} and V. Ganesan²

^{1*}Malik Deenar College of Pharmacy, Kasargod, India.

²Erode College of Pharmacy, Erode, Tamilnadu, India.

ABSTRACT

Scleropyrum pentandrum (Dennst) Mabb is found in the evergreen divine forests of northern Kerala belonging to santalaceae family. It is distributed in various other region of the world. It is used for it's Anti inflammatory activity along with many other diseases by traditional house remedy. Various tribal people in different parts of the world it is using this plant. In this study, the aim was to investigate the anatomical characteristics of bark and roots of this medicinally important plant species. Much works on this medicinal plant is not reported till. Systematic and scientific further study is required to explore the complete identity of this plant.

KEYWORDS

Scleropyrum pentandrum, Anatomical studies, Bark and Roots.

Author for Correspondence:

Ajith Babu T K,
Malik Deenar College of Pharmacy,
Kasargod, India.

Email: ajithbabutk@gmail.com

INTRODUCTION

Scleropyrum pentandrum (Dennst) Mabb, synonym *Scleropyrum wallichianum* (Arn.) is distributed in Cambodia, China, Thailand, Sri Lanka, Laos and Peninsular India. This tree belongs to the Santalaceae family grows to a maximum height of 7 meters. Saundarya *et al*, reported that in India, it is distributed in, Western Ghats and South and Central Sahyadri hills¹. Ramasubbu R *et al*, found the plant is a habitat of sandy soil and also in evergreen forests. It is in open forest near stream and in lowland Dipterocarps forest. Flowering season of the plant is January to March, fruiting season is August to October². It is commonly called

malayammachi in kozhikkode and Naaikuli in Kasargod, Kerala and mulkirayan in Tirunelveli, Tamilnadu, is reported by Ayyanar M and Ignacimuthu S³. Galen C *et al*, reported that the whole plant parts are applied externally to treat skin irritation in Kani tribal settlement, Agasthiyamalai biosphere reserve, Tirunelveli, South India⁴. Rajith N P and Ramachandran V S published the usage of crushed roots of *Scleropyrum pentandrum* are given for curing stomach ailments in Kurichyas tribal community in Kannur district of Kerala⁵. Faisal Mohammed and Shetty P Shifa reported the use of seed oil of *Scleropyrum pentandrum* against eczema by folklore practitioners of Udupi district of Karnataka⁶. The roots are boiled and the decoction is taken as a contraceptive by semalai people. It is believed that women will become barren after consuming the decoction. Paste of stem bark and leaf is applied externally to treat skin diseases⁷ Stem is used as galactogogue⁸. Anticariogenic and cytotoxic activity of methanol extract of *S. pentandrum* leaves were carried out by Venugopal T M *et al*⁹ the extract was found to be having anticariogenic activity. Five unprecedented furan-2-carbonyl C-glycosides, and two phenolic diglycosides, were isolated from leaves and twigs of *Scleropyrum pentandrum* by Tripetch Kanchanapoom *et al*¹⁰. George A. Gale *et al*, presented the cyclo oxygenase inhibiting, anti malarial and anti TB activities of *Scleropyrum pentandrum*¹¹. Fruits and seeds of *Scleropyrum pentandrum* also called *kirinda* is consumed by *Paniya*, *Kattunaikka* and *Kuruma* tribes of Wynad District, Kerala, India reported by Sivadasan M *et al*¹². Prasad S K and Raveendran K published that it is also called irumulli and is used as a mechanical barrier (fencing) in dried or live condition¹³. Extensive literature reviews revealed that much of the bioactivities of this plant remain unexplored. A feasibility study on utilization of non edible oil of *Scleropyrum pentandrum* and it's use as a new source for biodiesel production is reported by Santhosh Poojary *et al*¹⁴. *International Journal of Green Energy*

EXPERIMENTAL

Plant Materials

The stem bark and root of *S. pentandrum* was collected from the divine forest of Poyilkavu Durga Temple, Calicut, Kerala in May 2012. The plant is identified at Centre for Medicinal Plants and Research, Kottakkal and Dr. A. K. Pradeep, Assistant Professor, Department of Botany (No: 107864), and the herbarium is deposited at Botany Department, Calicut University, Kerala.

Macro and Microscopic studies

Macroscopic characters

Various sensory parameters of the plant material (such as colour, odour, size, shape, and taste) were studied by organoleptic evaluation. Various macroscopic characters of stem barks and roots of *Scleropyrum pentandrum* were recorded.

Qualitative microscopy

Free hand sections were cut for anatomical and histochemical studies. The sections were stained with safaranin and iodine. Various identifying character were recorded. Photographs were taken using Canon digital camera connected to the Zeiss Axiostar plus microscope.

RESULTS AND DISCUSSION

Macroscopic characters

Stem Bark

The fresh stem bark is thin, smooth and grayish green externally. Internally and pale yellow internally; external surface is smooth; taste slight bitter; odour characteristic.

Root

Tap roots, stought, reddish brown, with many strong and wiry lateral roots.

Microscopic characters

Stem bark

TS of bark shows a narrow zone of cork composed of 10 to 12 rows of oval or irregularly shaped, thin walled cells. Some of the cells contain reddish brown granular depositions. The cork is followed by 2 to 3 layers of cork cambium which in turn followed by a broad zone of cortex composed of thin walled rectangular cells. Many of the cells in the outer cortical region contain prismatic crystals

of calcium oxalate. Large and small groups of stone of varying sizes, shapes and numbers found scattered in the cortical region and phloem region. The stone cells are highly lignified with thick walls and narrow lumen. Phloem composed of sieve tubes companion cells and phloem parenchyma.

Root

Transverse section of root shows, 2 to 3 layers of thin-walled, rectangular cork cells followed by wide cortex composed of 10-15 thin walled rectangular or oval cells. Almost all the cells of the cortex contain starch grains and oil globules. Small groups of stone are embedded in the cortex at certain places.

The major part towards the centre of the root is occupied vascular strands as 8-10 radiating strips of xylem and phloem. The radiating strips reaches up to the centre, phloem consists of small patches of sieve elements and parenchyma just above the xylem strand. Xylem consists of vessels, tracheids, fibres and xylem parenchyma, xylem parenchyma usually thick-walled and lignified. The xylem and phloem strands alternates with wide medullary rays. Medullary rays are 5 to 7 seriate. The xylem strands appear to be bifurcated towards the outer periphery due to the addition of more medullary rays. Ray cells thick walled and lignified with plenty of starch grains.

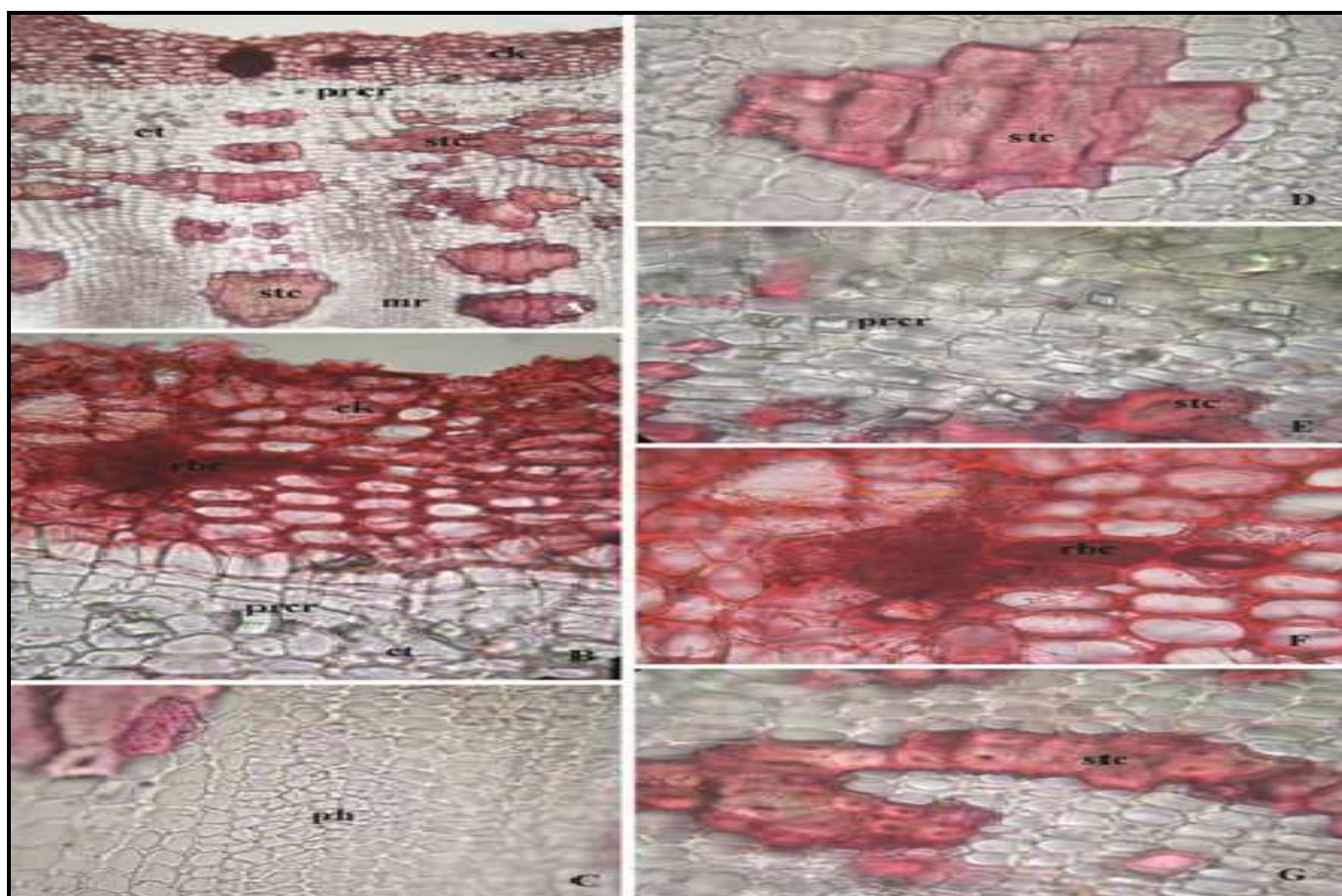


Plate 2. Microscopy of *Scleropyrum pentandrum* (Dennst.)Mabb. **A.** TS of stem bark - a portion enlarged, **B.** Cork and outer cortical region enlarged, **C.** Phloem region enlarged, **D.** Group of stone cells present in the cortical region, **E.** Inner cortical region enlarged, **F.** Reddish brown deposition in the cortex, **G.** group of stone cells present in the phloem region. ck, cork, ct, cortex; mr, medullary ray; ph, phloem; prcr, prismatic crystals of calcium oxalate; rbc, reddish brown content; stc, stone cells.

Figure No.1: Microscopy of *Scleropyrum pentandrum* bark

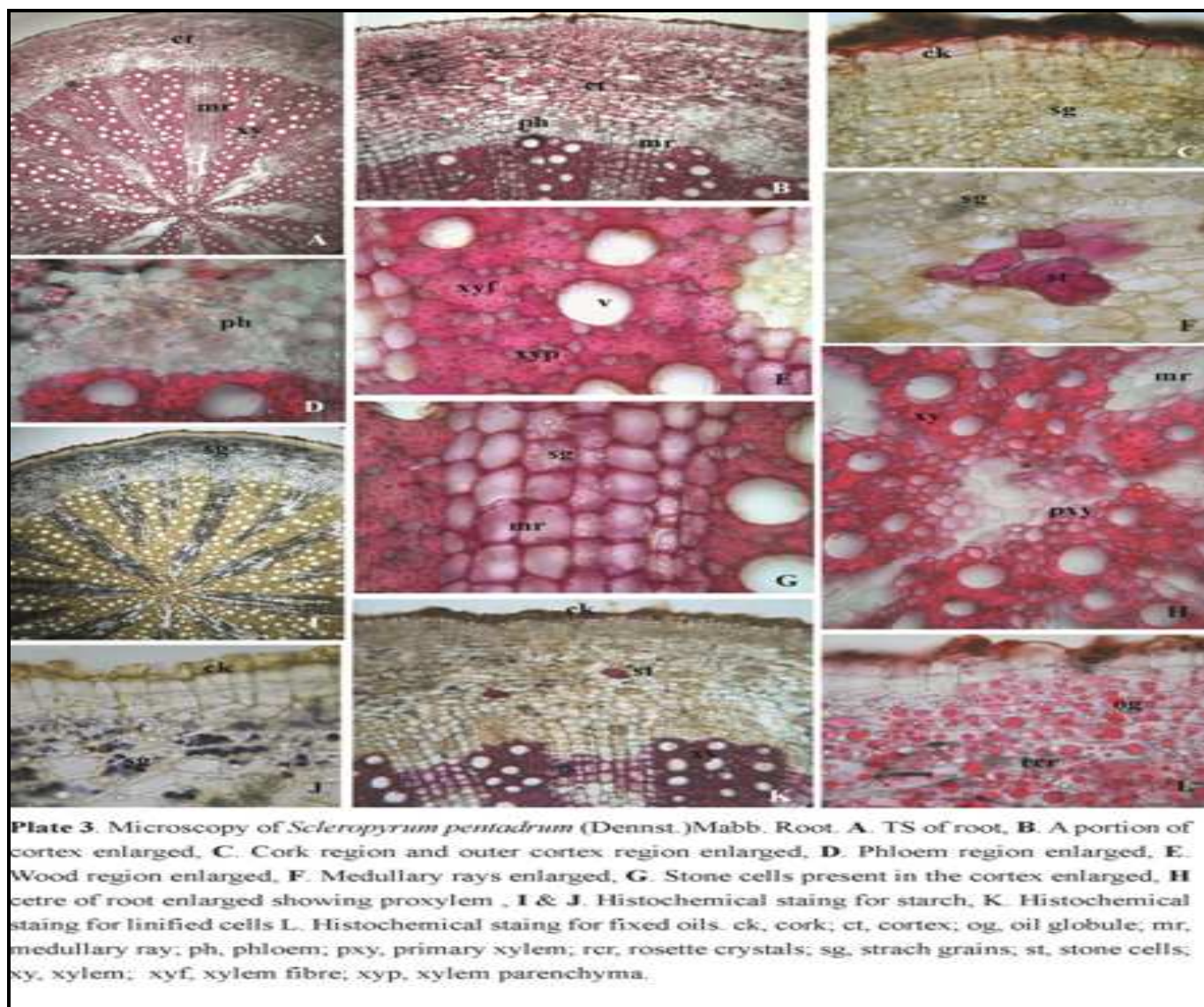


Figure No.2: Microscopy of *Scleropyrum pentandrum* root

CONCLUSION

On the basis of the present study the anatomical features of roots and bark obtained are useful for the identification and standardization of scleropyrum pentandrum.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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