

**PHARMACOGNOSTICAL PROFILE OF *SCAEVOLA TACCADA*
(GAERTN.) ROXB. (LEAF AND STEM) - AN
EXTRAPHARMACOPOEIAL DRUG.**

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ABSTRACT

WHO has been promoting traditional medicines as a source of less expensive medical care, especially in developing countries. Eighty percent of the world's population relies on medicinal plants for their primary health care. Plants which are not codified in pharmacopoeia or any other classical text of Ayurveda, yet used traditionally are called as *Anukta Dravya* (extrapharmacopoeial plant). One such plant *Scaevola taccada* (Gaertn.) Roxb. also called *Safed modak* in hindi. It is an extrapharmacopoeial medicinal plant belonging to Goodeniaceae family is Asian traditional medicine. Leaves are given in indigestion. Poulitice applied on tumours and swollen legs. Juice of fruit used in eye troubles. Pharmacognostical characters have been not reported on leaf and stem till date. So, this work focused on leaf and stem sample of

plant to establish their Pharmacognostical standardization. The characteristic of microscopy of leaf sample shows dorsiventral more than 5 vascular bundle present passing through midrib with number of calcium oxalate crystal and oil globules. Powder shows anisocytic stomata, simple trichome. Stem T.S. shows that outer cork cortex, vascular bundle and central pith with extra vascular bundles. Powder shows lignified fibres, tannin content. The above findings which play major role to authenticate the species.

KEYWORDS: Pharmacognosy, *poulitice*, *Safed modak*, *Scaevola taccada*.

INTRODUCTION

Scaevola taccada (Gaertn.) Roxb. From Goodeniaceae family 'Safed modak' in Hindi, An erect spreading shrub or small tree up to 4(-7) m tall; branchlets terete. Leaves alternate, the majority crowded at the end of the branches, spatulate to obovate, 12-26 cm x 5-10cm, base attenuate, apex blunt to rounded, margin entire, sinuate to dentate, herbaceous to thin fleshy, glabrous to shortly tomentose, sessile; stipules absent. Inflorescence axillary, cymose, laxly branched, about 4 cm long, few-flowered, bracts persistent, peduncle 0.5-2 cm long. Flowers 5merous petals giving them the appearance of fan, zygomorphic, 2-2.5 cm long, scentless, white to pale yellow. Fruit a fleshy drupe.

It is a common beach shrub found from Madagascar Eastward to South East Asia, throughout Malesia, tropical Australiya, and the Pacific Islands and Hawaii.^[1]

It has also been proven to be "an excellent remedy as antidiabetic, antipyretic, anti-inflammatory, anticoagulant and as skeletal muscle relaxant without any adverse reactions" by the department of pharmacy of Annamalai University, India.^[2] Till date there is no scientific work on evaluation regarding leaves and stem, present work is to carry out pharmacognostical evaluation of *Scaevola taccada*. Present paper highlights macroscopic, microscopic including powder characters of leaf and stem.

MATERIAL AND METHODS

Fresh leaves and stem were collected from the natural habitat of Jabalpur Madhya Pradesh. Pharmacognostical evaluation of fresh drug was carried out by taking free hand sections.^[3] Both upper and lower epidermis was used to surface study through hand peeling method. Micrometric readings of both surface i.e. stomatal length, stomatal index etc. were scientifically studied and mean value taken in to consideration.^[4] Powder microscopy of shade dried both powders were carried out. Photomicrographs were taken using Carl zeiss-trinocular microscope attached with camera.

RESULTS AND DISCUSSION

Plant collected and identified through various flora and with help of pharmacognosist.^[5] The leaves were separated from the stem, leaves and stem washed with running fresh water and few pieces stored in solution of AAF (Alcohol: Acetic acid: Formalin) in the ratio of (90:5:5)^[6] to utilize them for microscopic studies. Remaining fresh leaves and stem pieces were shade dried, pulverized and sieved through 80 mesh and preserved in an airtight glass

container. Leaf simple to whorl measures 15cm×6cm, sessile ovate, tip obtuse, margin simple, parrot green in colour, shiny somewhat succulent, venation –reticulate, veins – 10 -12 pairs.



Fig 1: Natural habitat of plant.



Fig.2. Macromesurement of leaves



Fig.3. TS through midrib epidermis, central vascular bundles

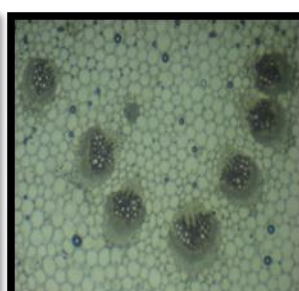


Fig.4. Vascular bundles with phloem and xylem

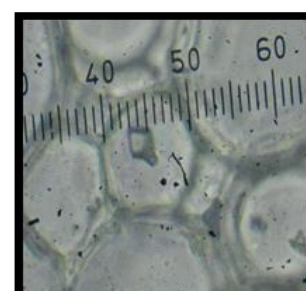


Fig.5. Parenchyma cells with prismatic crystal - micromesurement

Microscopic

Transverse section of leaf through midrib

The plant belongs to xerophyte. Mesophyll undifferentiated, upper and lower epidermis with cuticle, lower epidermis with sunken stomata, lamina undifferentiated. Parenchymal cells because plant somewhat xerophyte character mesophyll cells filled with oil globules and prismatic crystal of calcium oxalate through midrib shows 3 -4 layer of collenchyma cells followed by parenchymatous ground tissue. Near 7 – 8 vascular bundles crescently arranged in the center of ground tissue. Xylem towards the upper epidermis, phloem towards lower epidermis. More no. of vascular bundle shows xerophytic nature. Ground tissue consist of prismatic crystal of calcium oxalate. (Fig.2-5).

Surface preparation

Thin upper and lower surface prepared by simple peeling method. Epidermal cells hexagonal measures $0.8\text{mm} \times 0.6\text{ mm}$. along with no. of oil globules, stomata measures – $0.8 \times 0.7\text{ mm}$, Type of stomata – Anisocytic, Stomatal index – 25, epidermal cells, prismatic crystals of calcium oxalate and large quantities of oil globules distributed all over the surface. (Fig.6 A, B, C).

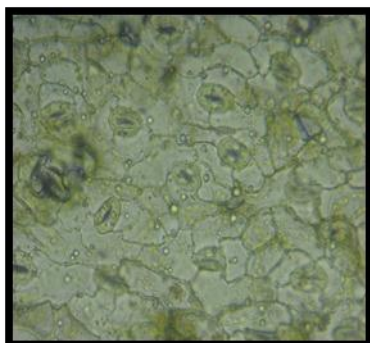


Fig.6.A lower epidermis with Anisocytic stomata.

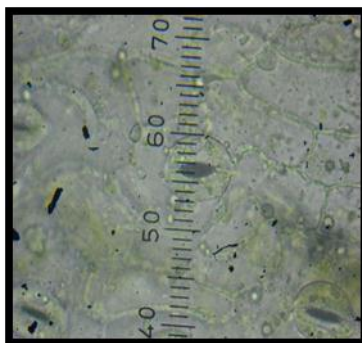


Fig.6.B Micro measurement of stomata.

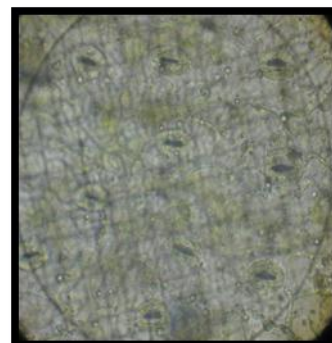


Fig.6.C Stomatal index.

Powder microscopy of leaf: Organoleptic characters shows leaf powder is light green in colour, astringent in taste, faint in odor and smooth in touch. Diagnostic powder microscopic characters were oil globules, prismatic crystals of calcium oxalate, anisocytic stomata. Epidermal cells, fragments of fibre, lignified fibres, simple trichome.(Fig.7-12).

Leaf powder character

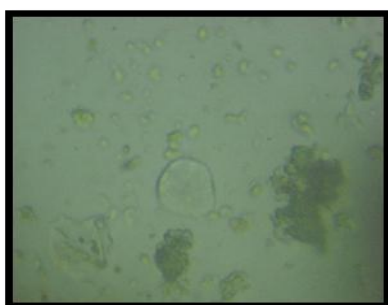


Fig.7.Oil globules

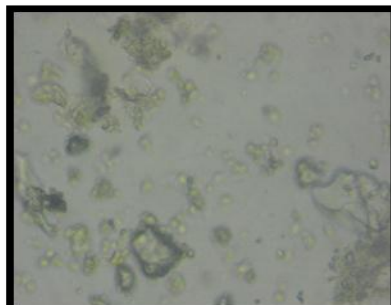


Fig.8. Prismatic crystal

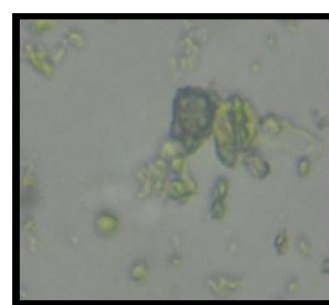


Fig.9.Cluster crystal

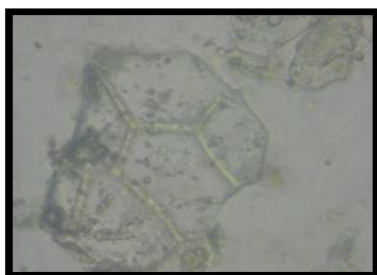


Fig.10. Epidermis cells

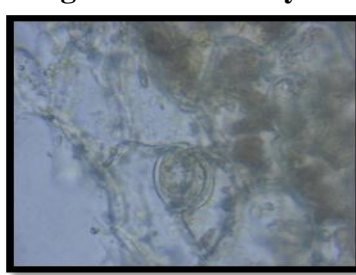


Fig.11. Fragments of stomata

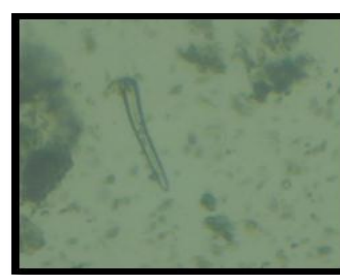


Fig.12. Simple trichome

S. of stem

Diagrammatic T.S. of stem shows outer cork followed by cortex vascular bundle and central pith. Detail TS shows – cork differentiated into outer cork and inner cork. Outer cork consist of dark brown content (tannin), inner cork consist elongated barrel shaped cells. Cortex consist 10 -12 compactly arranged parenchymal cells without any intercellular space. Parenchymal cells loaded with prismatic crystals and oil globules. A discontinuous cap like structure pericycle fibers followed by the cortex made up of 6 -7 layers. vascular bundles open and collateral. Phloem situated above the xylem. Xylem towards the pith and made up xylem parenchyma and fibres each vascular bundle separated by uni to biseriate medullary ray. Pith centrally located made up of pitted lignified parenchyma cells. An extended vascular bundle are situated in cortical region shows the xerophytic nature. (Fig.13-15).

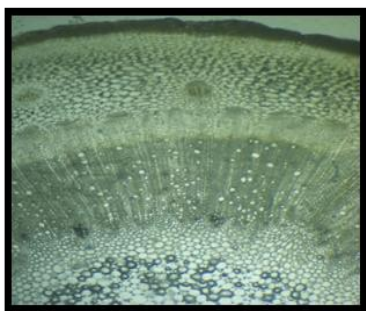


Fig.13.T.S. of stem with cork cortex and pith

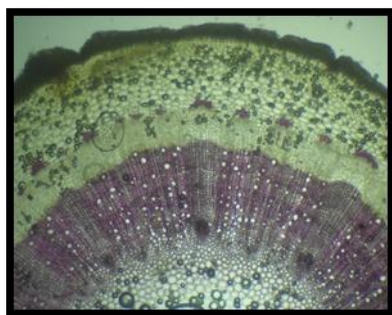


Fig.14.Lignified cork, cortex, phloem and xylem

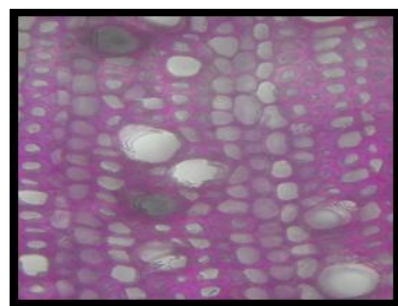


Fig.15.Xylem with parenchyma and fibres medullary rays

Powder microscopy of stem

Organoleptic characters shows stem powder is ash grey in colour, astringent in taste, characteristic in odor and course in touch. Diagnostic powder microscopic characters were simple fibres, scleriform vessels, oil globules, tannin content, prismatic crystals of calcium oxalate, pitted vessel.(Fig.16-21).

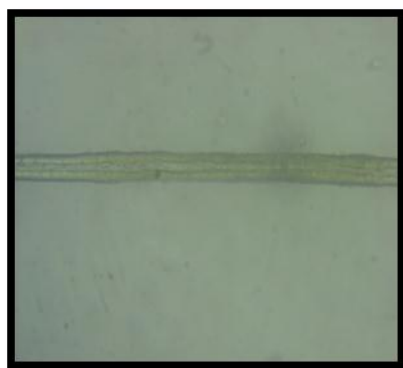


Fig.16. Simple fibres

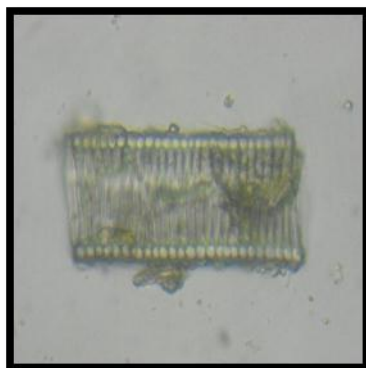
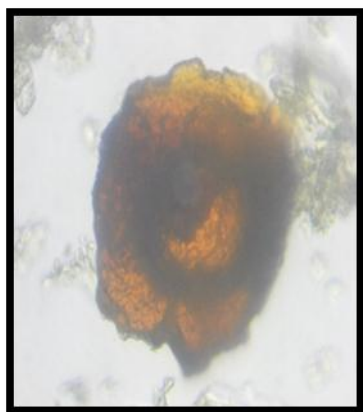
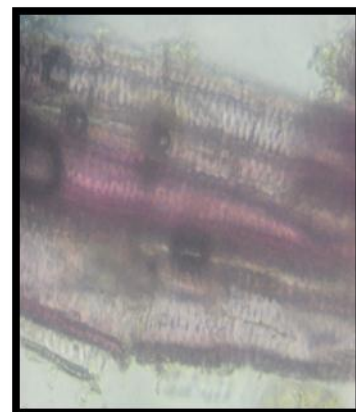


Fig.17. Scleriform vessels



Fig.18. Oil globules

**Fig.19. Tannin content****Fig.20. Prismatic crystal****Fig.21. Pitted vessels**

CONCLUSION

Plant identified as *S. taccada* the local name was identified on the bases of fruit looking like modak so the name suit for the Safed modak. Plant somewhat succulent, leaf obovate and sessile. Presence of more number of vascular bundle and sunken stomata shows xerophytic nature, Surface study shows anisocytic stomata, stomatal index 25 where the stem shows lignified cork extra vascular bundles in the cortex and prismatic crystal are the important microscopic observation in identification of plant. Pharmacognostic findings which help in the identification of plant and till date pharmacognosy not mention in pharmacopeia this result may consider in pharmacopeia in future.

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