Macroscopic and Histological studies of Leucas biflora Stem

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Abstract - Leucas biflora **(Vahl) R. Br. commonly known as Jodi burumbi belongs to family Lamiaceae is a perennial procumbent herb. Traditionally the leaves of the herb are used for treatment of conjunctivitis, nose bleeding and leucorrhoea. The present work was designed to study the morphology and microscopic characters of young stem of the plant. The stem is green in colour and quadrangular in shape. The microscopic studies of T.S. of stem showed the presence of epidermis, unicellular, multicellular and glandular trichomes, cortex containing collenchyma, parenchyma cells and few patches of sclerenchyma, endodermis, pericycle, vascular bundles, non- lignified phloem, lignified xylem vessels and pith. The microscopy of powdered stem showed presence of starch grains, calcium oxalate crystals, lignified xylem vessels (spiral and pitted), parenchymatous pith cells, multicellular and glandular trichomes.**

Index Terms **- Leucas biflora, Multicellular covering trichomes, Pith, Lignified Xylem.**

1.INTRODUCTION

Plants of genus *Leucas* (Lamiaceae) are collectively known as "Dhronpushpi" and are widely distributed throughout India, Asia and Africa. The genus comprises about 80 species, of which 43 species are available in India as annual or perennial herbs.[1] These species have been largely utilized to treat numerous diseased conditions by the traditional healers, which shows that this family has enormous potential for the disclosure of new medications or lead particles.[2]

One of such plant is *Leucas biflora* (Vahl) R.Br. which is found to be widely distributed in many states of India It is also called as two-flowered Leucas. It is a perennial herb with nodal roots. Many branches arise from a woody root stock. The stems are often procumbent, much branched with long internodes. It is square in shape and much velvety with the deflexed hairs at the rib. The leaves are broadly ovate, acute, base obtuse, margin crenate and velvety on both the surfaces especially on the veins. Flowers are white in axillary whorls and fruits are nutlets.

Traditionally, the mature leaf decoction as an eye drop is used in treatment of conjunctivitis. Similarly the mature leaves are ground with the leaves of *Centella asiatica* (2:1) and the juice is extracted from it is applied directly to stop nose bleeding. Four to five leaves of *L.biflora* are prescribed to chew with leaves of Piper betel for women suffering from white discharge. [3, 4,5,6,7]

The paste of whole plant along with coconut oil is used for treatment of skin diseases. [8, 9]

The herb *Leucas biflora* has profuse stem system and literature survey revealed that till now no work has been reported on anatomical studies of stems. Hence this plant was selected to study morphological and microscopic characters of stem.

2. MATERIAL & METHODS

2.1. Collection of plant material

Leucas biflora plants were collected from campus of Smt. Kishoritai Bhoyar College of Pharmacy, Kamptee and authenticated from Botany Department of RTMNU, Nagpur University, Nagpur (Specimen Voucher no. 10301).

The young green stems were separated and few stems were dried in shade and pulverised into coarse powder. The young fresh stems were used to study the morphology and microscopy characters and powder was evaluated for microscopic characters.

Morphological studies: The following morphological characters for the fresh young stem were noted: color, size, shape, odor, taste, texture, presence or absence of hairs.

Microscopic studies:
Whole stem: Microscopic studies were done by taking thin transverse sections of stem. The sections of stems were cleared with chloral hydrate solution and then stained with phloroglucinol and conc. hydrochloric acid and mounted in glycerin.

Stem powder: The powdered drug was separately treated with phloroglucinol-HCl solution and iodine solution to determine the presence of lignified cells and starch grains respectively.[10, 11, 12, 13, 14]

3.RESULTS AND DISCUSSION

Macroscopic examinations: The young stems were found to be dark green in color, square in shape, odorless with bitter taste. The outer surface was rough and showed [presence of very small hairs.

Microscopic examinations: T.S. of stem was quadrangular with square outline and ridge was present in outline.

Epidermis: This forms the outermost layer. It is composed of single layer of oval to rectangular cells and covered with thick cuticle. Cells thin walled containing prismatic crystal of calcium oxalate and number of uni and tricellular trichomes and few sessile glandular trichomes with broad base and 3 to 4 celled head.

Cortex: Cortex is collenchymatous with 3 to 7 layered with thick walled cells and 2 to 4 layers of thin walled tangentially elongated parenchymatous cells. Few patches of sclerenchyma also present.

Endodermis: Endodermis distinct, single layered, consists of barrel shaped thin walled cells.

Pericycle: Pericycle consists of single layered thin walled cells smaller than the cells of endodermis. Few pericyclic cells are converted into pericyclic fibres.

Vasular Bundles: Vascular bundles are bicollateral, a large vascular bundle found underneath the ridge and 3 to 4 small vascular bundles are present in between the ridges. Stellar region consisting of a ring of vascular bundles connected with inter-fascicular sclerenchymatous band.

Phloem: Narrow, encircling the xylem ring. Cambium is not distinct.

Xylem: Xylem well developed, radially arranged and consists of vessels, tracheids, fibres and xylem parenchyma. Vessels mostly cylindrical with simple pits and spiral thickening; tracheids and xylem parenchyma have simple pits on their walls;

Pith: Wide, parenchymatous and embedded with acicular crystals of calcium oxalate.

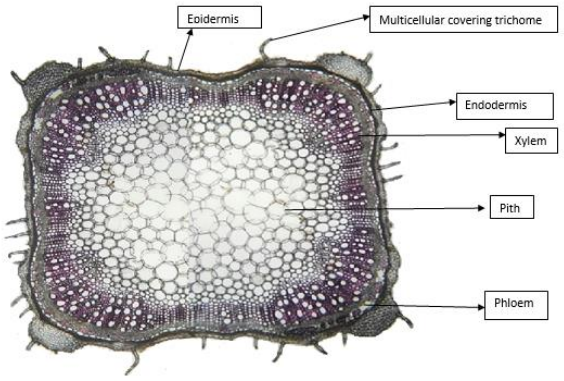

Fig.1. Transverse section of stem of *Leucas biflora* leaf

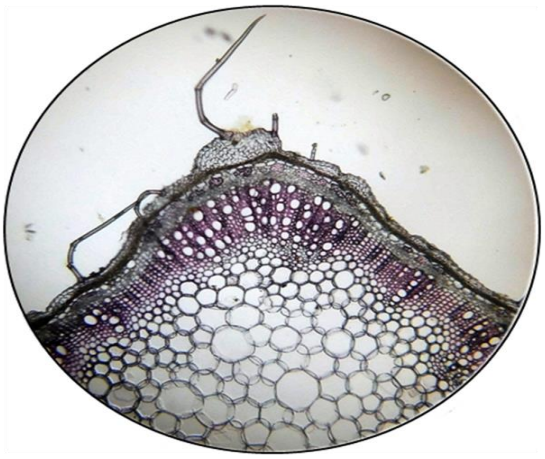

Fig.2 T.S. of part of stem of *L.biflora* showing trichomes, collenchymas, pericyclic fibers and vascular elements and central pith

Powder microscopy: The stem powder analysis showed the presence of parenchymatous pith cells, pericyclic fibers, glandular trichomes, multicellular covering trichomes, lignified xylem vessels (spiral and pitted), calcium oxalate crystals.
On treatment of powder with iodine solution starch grains were also observed which acquired blue colour.

Powder Characteristics

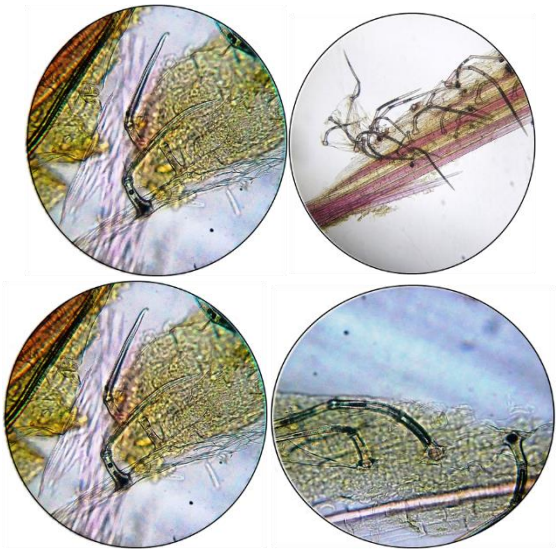

Fig.3.Muticellular trichomes

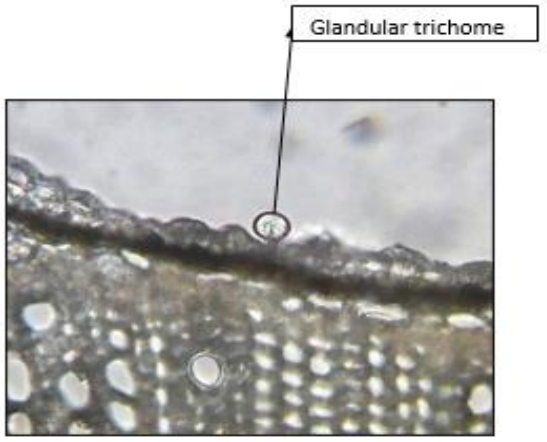

Fig.4. Glandular trichome

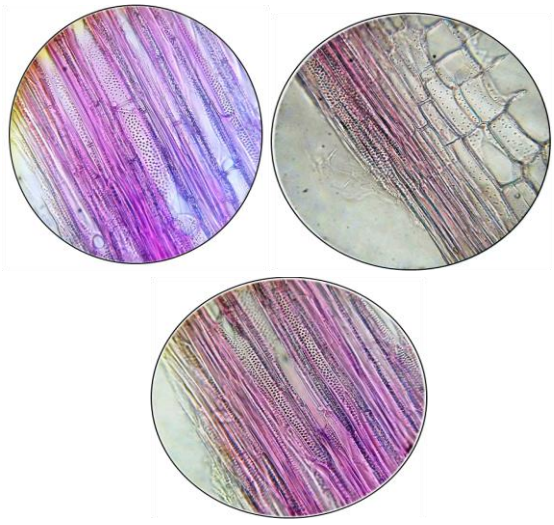

Fig.5. Pitted xylem vessels

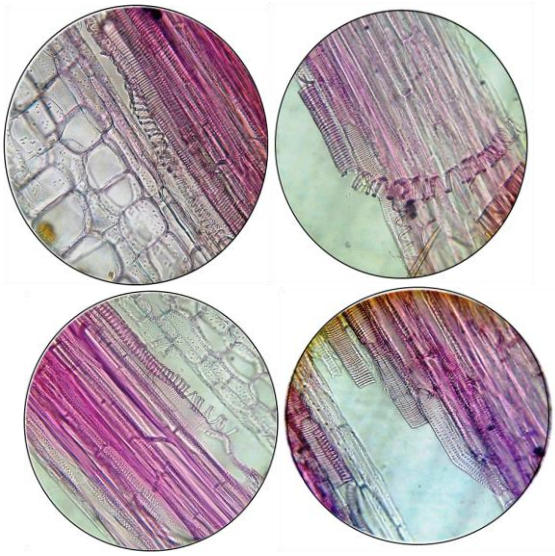

Fig.6. Spiral Xylem vessels

4.CONCLUSION

It can be concluded that the morphological and microscopic analysis of stem of *Leucas biflora* plant can serve as tool for developing standards for proper authentication of L.biflora herb.

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