

Detailed Microscopic Evaluation of *Blumea eriantha* DC. Roots: Anatomical Characterization

Ms. Naishadhi A. Rajput¹, Ms. Gayatri R. Gavit², Mr. Kunal S. Sonawane³,
Mr. Altaf L. Shaikh⁴, Ms. Trupti A. Nikwade⁵

Students, P G College of Pharmaceutical Science and Research, Chauaple, Nandurbar¹⁻³

Guide, P G College of Pharmaceutical Science and Research, Chauaple, Nandurbar⁴

Co-Guide, P G College of Pharmaceutical Science and Research, Chauaple, Nandurbar⁵

Abstract: This study presents a detailed microscopic examination and anatomical characterization of the roots of Indian *Blumea eriantha* DC. The research emphasizes the importance of microscopic validation in plant identification. Transverse sections (T.S.) and powder microscopy were extensively studied to reveal unique anatomical features. This paper serves as a reference for accurate botanical identification and supports the traditional medicinal relevance of *Blumea eriantha*.

Keywords: *Blumea eriantha*, Root Microscopy, Anatomical Study, Powder Microscopy, Pharmacognostic Evaluation

I. INTRODUCTION

Figure 1 *Blumea eriantha* PLans & Roots



Blumea eriantha DC., a species of the Asteraceae family, is traditionally used in the management of inflammation, wounds, and digestive disorders. Despite its ethnomedicinal importance, comprehensive microscopic studies specific to its roots are lacking. Root anatomy offers significant diagnostic features crucial for pharmacognostic standardization. The present study aims to explore the anatomical features of *Blumea eriantha* roots using both transverse section (T.S.) microscopy and powder microscopy. A detailed microscopic profile is essential for authentication, quality control, and to distinguish it from potential adulterants.



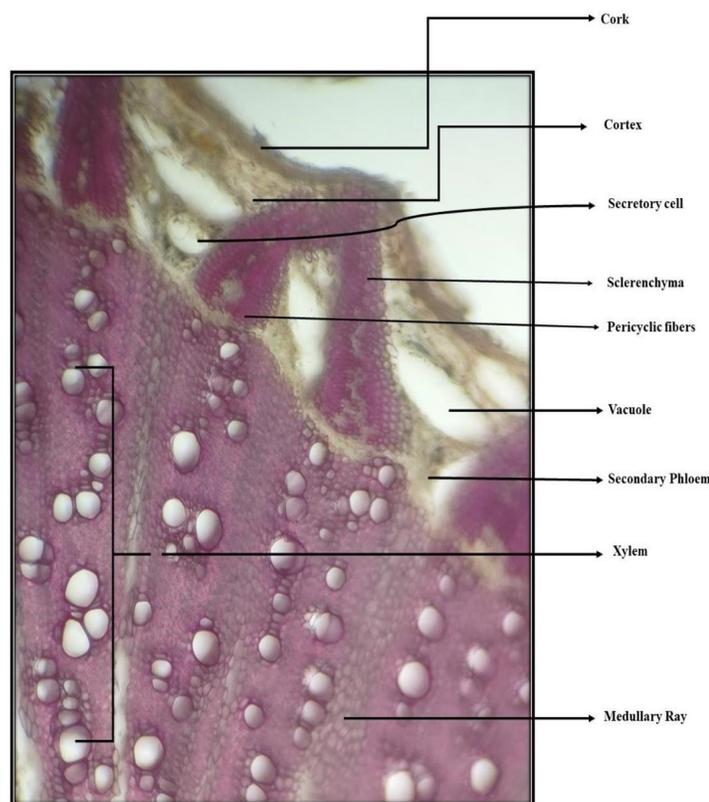
II. MATERIALS AND METHODS

Plant Material Collection and Authentication:

Blumea eriantha roots were collected from local regions of Maharashtra and authenticated by the Department of Botany, P.S.G.V.P. Mandals Arts, Science & Commerce College Shahada. Collected roots were washed, shade-dried, and sectioned for microscopic studies.

Microscopy:

Thin transverse sections (T.S.) of the roots were prepared using freehand sectioning. The sections were stained with phloroglucinol and hydrochloric acid to highlight lignified tissues. The slides were observed under a moticmicroscope, and the key anatomical structures were documented.



Microscopy of Root

The given sample of root shows the typical characteristics of mature dicot root. The presence of cork instead of epidermis, shows complete absence of cuticle. The phellogen region made up of two to three layers of flattened parenchymatous cells. The cortex region with the radial arrangement of triangular shaped sclerenchyma with prominent presence of pericyclic fibres in the descending region. The cortex also shows presence of secretory cells and large vacuoles. The secondary phloem present followed by cortex present radially made up of sieve tubes and companion cells. The xylem shows the presence of xylem vessels, xylem parenchyma, and xylem fibres. The medullary rays are made up of 3-4 celled thick, arranged radially and alternatively to the xylem. The small pith region is located at the centre and made up of thin walled parenchymal cells. The conjoint collateral closed type of vascular bundle is present, cambium not visible.



Powder Microscopy:

Dried roots were coarsely powdered and examined under the microscope. Diagnostic powder characteristics were identified and documented.

Powder characteristics of the root samples supports the anatomy claim in the transverse section of the root. It shows presence of the following characteristics.

Cork: Brownish cork three to four celled thick

Sclerenchymatous fibres: Packed and lignified bunch of sclerenchyma

Stone cells: The stone cells with thick wall and lignified

Xylem: Pitted xylem vessels in lateral view

Xylem: Xylem vessels in longitudinal view

Xylem: xylem vessel in surface view

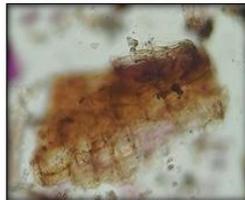
Fibres: Powder shows lignified and non-lignified fibres with blunt ends isolated and in bunch.

Medullary ray region with pitted xylem vessel I. Medullary ray in surface view

Phloem: Companion cell in the phloem region

Phloem: sieve tubes in the phloem region

Fibres: lignified fibres



A



B



C



D



E



F



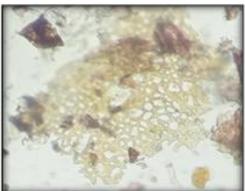
G



H



I



J



K



L



III. RESULTS AND DISCUSSION

Microscopy:

The given sample of root shows the typical characteristics of mature dicot root. The presence of cork instead of epidermis shows complete absence of cuticle. The phellogen region is made up of two to three layers of flattened parenchymatous cells. The cortex region exhibits a radial arrangement of triangular-shaped sclerenchyma with prominent pericyclic fibres in the descending region. The cortex also shows the presence of secretary cells and large vacuoles. The secondary phloem is present, followed by cortex present radially made up of sieve tubes and companion cells. The xylem shows the presence of xylem vessels, xylem parenchyma, and xylem fibres. The medullary rays are 3-4 cells thick, arranged radially and alternately to the xylem. A small pith region is located at the centre and is made up of thin-walled parenchymal cells. The conjoint collateral closed type of vascular bundle is present, cambium not visible.

Powder Microscopy:

Powder characteristics of the root samples support the anatomy observed in the transverse section of the root. The powder shows the following features:

- A. Cork: Brownish cork three to four cells thick.
- B. Sclerenchymatous fibres: Packed and lignified bunches of sclerenchyma.
- C. Stone cells: Thick-walled and lignified stone cells.
- D. Xylem: Pitted xylem vessels in lateral view.
- E. Xylem: Xylem vessels in longitudinal view.
- F. Xylem: Xylem vessels in surface view.
- G. Fibres: Lignified and non-lignified fibres with blunt ends, isolated and in bunches.
- H. Medullary ray region with pitted xylem vessel.
- I. Medullary ray in surface view.
- J. Phloem: Companion cells in the phloem region.
- K. Phloem: Sieve tubes in the phloem region.
- L. Fibres: Lignified fibres.

These diagnostic features provide reliable anatomical markers for the identification and standardization of *Blumea eriantha* roots in crude drug form.

IV. CONCLUSION

This study provides a comprehensive microscopic and powder microscopy profile of *Blumea eriantha* roots. The identified anatomical features offer critical diagnostic parameters for pharmacognostic authentication and quality control. Further studies focusing on pharmacological validation and chemical profiling are recommended.

REFERENCES

- [1]. Harborne JB. *Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis*. Springer; 1998.
- [2]. Kokate CK, Purohit AP, Gokhale SB. *Pharmacognosy*. Nirali Prakashan; 2015.
- [3]. Evans WC. *Trease and Evans Pharmacognosy*. Elsevier; 2009.
- [4]. Khandelwal KR. *Practical Pharmacognosy Techniques and Experiments*. Nirali Prakashan; 2007.
- [5]. Wallis TE. *Textbook of Pharmacognosy*. CBS Publishers; 1985.
- [6]. Anonymous. *The Ayurvedic Pharmacopoeia of India*. Govt. of India; 2001.

