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# Transverse Section and Powder Microscopy of Tulsi Stem

Experiment 8 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

## Aim

To examine a transverse section and powder of tulsi stem and record diagnostic features.

## Principle

Authentication combines the arrangement of tissues in a section with diagnostic fragments in powder. Ocimum tenuiflorum (syn. O. sanctum) belongs to Lamiaceae. Material age, organ and processing can change the appearance; the complete pattern is more useful than one isolated cell.

## Section Features

- Young stem has a quadrangular outline with supporting collenchyma prominent toward the corners.
- Epidermis with hairs, cortex and collateral vascular regions: phloem outward, xylem inward.
- Central pith; secondary growth changes the appearance of older stems.

## Powder Features

- Covering/glandular hair fragments where retained.
- Fibres, vessel fragments and cortical/pith parenchyma.
- Epidermal fragments matching the authentic stem material.

## Requirements

- Authenticated tulsi stem, labelled comparison slides and the prescribed microscope.
- Fresh razor used with a holder, slides, coverslips, water/glycerol mountant and instructor-prepared stains.

## Procedure

### 1. Prepare a section

Use the instructor's safe cutting method to obtain a thin transverse section through the assigned organ. Transfer to water and select an intact section.

### 2. Mount

Mount in the assigned water/glycerol medium without folds or air bubbles. If staining is required, use the prepared reagent and prescribed rinse.

### 3. Low-power map

Observe the outline and tissue arrangement at low power. Draw the complete section with orientation and a clear title.

### 4. Diagnostic structures

Move to higher power to label the structures listed below. Record objective magnification; use stage calibration for any dimensions.

### 5. Powder study

Mount a small amount of powder without a dense opaque layer. Scan several fields and draw at least three characteristic fragments.

### 6. Compare and conclude

Compare the section and powder with authenticated slides. Record stem age; a woody older stem need not look identical to a young four-angled section. Record what was actually visible rather than copying every expected feature.

## Observations and Record

| Record | Entry |
|---|---|
| Botanical name / family / part | Ocimum tenuiflorum (syn. O. sanctum) / Lamiaceae / tulsi stem |
| Section, objective and stain | _____ |
| Three powder fragments and magnification | _____ |
| Diagnostic agreement / limitations | _____ |

## Worked Example

The numbers below are illustrative; enter your own observations in the record.

- Magnification alone does not give a fragment length. If calibration is 4 µm per eyepiece division and a fragment spans 12 divisions, its length is 48 µm.

## Result

State whether the observed section and powder support the stated botanical material, naming the features seen and any unresolved difference.

## Precautions

- Use authenticated, labelled teaching material and instructor-prepared reagents. Wear the protection specified for the chemical method.
- Compare with a known control and record actual observations. A single colour, precipitate or odour description cannot authenticate a crude drug.
- Do not taste botanical material or directly inhale vapours; dispose of solvents and staining reagents in their assigned waste containers.
- Use teacher-prepared staining/clearing reagents. Do not make chloral-hydrate or corrosive staining mixtures independently.

## Viva Questions and Answers

### 1. Why study both section and powder?

The section preserves tissue arrangement, while powder reveals fragments retained after grinding.

### 2. Why examine several fields?

A single field may miss a diagnostic feature or overrepresent a contaminant.

### 3. How should an uncertain feature be recorded?

Describe it as uncertain and request comparison; do not force an identification.

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