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Transverse Section and Powder Microscopy of Fennel Fruit

Experiment 6 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To examine a transverse section and powder of fennel fruit mericarp and record diagnostic features.

Principle

Authentication combines the arrangement of tissues in a section with diagnostic fragments in powder. Foeniculum vulgare belongs to Apiaceae. Material age, organ and processing can change the appearance; the complete pattern is more useful than one isolated cell.

Section Features

- Five primary ridges in a mericarp, with vascular tissue associated with the ridges.
- Secretory canals (vittae): commonly four dorsal and two commissural in the teaching transverse section.
- Inner seed/endosperm tissue with storage contents.

Powder Features

- Fragments of vittae and fruit-wall tissues.
- Endosperm cells with oil/protein storage contents.
- Vascular elements and other fragments matching the section.

Requirements

- Authenticated fennel fruit mericarp, 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. Orient the commissural surface before counting vittae; an oblique or incomplete section can mislead. Record what was actually visible rather than copying every expected feature.

Observations and Record

Record	Entry
Botanical name / family / part	Foeniculum vulgare / Apiaceae / fennel fruit mericarp
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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