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Eyepiece Micrometry of Crystals and Fibres

Experiment 12 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To calibrate an eyepiece scale and measure calcium oxalate crystals and phloem fibres in a prepared drug mount.

Principle

An eyepiece micrometer has an arbitrary scale. Calibration against a stage micrometer converts its divisions to actual length for a particular optical configuration. Changing the objective or another magnification factor changes the conversion.

Requirements

- Microscope with eyepiece scale and stage micrometer with known markings.
- Instructor-provided crystal and phloem-fibre mounts.
- Measurement sheet and drawing materials.

Procedure

1. Read the stage scale

Confirm the marked total length and number of divisions. If 1 mm has 100 divisions, one stage division is $0.01 \text{ mm} = 10 \text{ }\mu\text{m}$.

2. Align scales

Focus the stage micrometer with the objective to be used. Align zero points and identify a second coinciding mark over a suitable span.

3. Calculate calibration

$\mu\text{m per eyepiece division} = \text{stage span in }\mu\text{m} \div \text{corresponding eyepiece divisions}$. Record objective and eyepiece.

4. Measure crystals

Replace the stage scale with the prepared drug mount. Measure the stated crystal axis, distinguishing crystal dimensions from surrounding cell dimensions.

5. Measure fibres

Measure the specified fibre length and width for an intact fibre lying suitably in the field. For a length extending beyond the field, use the prescribed validated measurement method rather than guessing.

6. Summarise

Measure the assigned number of structures and report mean and range separately for crystals and fibres.

Introduction to Pharmacognosy

Observations and Record

Object / configuration	Eyepiece divisions	Calculated dimension
Calibration	Stage ____ μm = ____ divisions	____ $\mu\text{m}/\text{division}$
Crystal axis	____ divisions	____ μm
Fibre width / length	____ / ____ divisions	____ / ____ μm

Worked Example

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

- Calibration example: 20 stage divisions $\times$ 10 μm = 200 μm correspond to 50 eyepiece divisions. Factor = $200 \div 50 = 4 \mu\text{m}/\text{division}$.
- A crystal spans 8 divisions: dimension = $8 \times 4 = 32 \mu\text{m}$. A fibre width spans 5 divisions: width = 20 μm .
- If a lower-power calibrated factor is 10 $\mu\text{m}/\text{division}$ and an intact fibre spans 80 divisions, length = 800 μm . Use the factor for that objective, not 4 $\mu\text{m}/\text{division}$.

Result

Calibration at ____ objective: ____ $\mu\text{m}/\text{division}$. Crystal ____ dimension: mean ____ μm , range ____ . Fibre length / width: ____ / ____ μm .

Precautions

- Calibrate separately for each optical configuration used.
- Do not measure a broken fibre as if it were its full original length.
- Avoid selecting only unusually large structures; record representative measurements.

Viva Questions and Answers

1. Why is the eyepiece scale arbitrary?

Its divisions have no fixed specimen length until calibrated.

2. Does the factor remain unchanged at another objective?

No; recalibration is required.

3. Why state the measured axis?

Irregular or anisotropic objects can have different lengths and widths.

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