

Determination of Particle Size by Microscopy

Practical 02 | Physical Pharmaceutics II

Aim

To determine Particle Size by Microscopy, and interpret the recorded observations.

Principle

- Microscopy measures selected projected dimensions of individual particles. The resulting number-weighted distribution differs from a mass-weighted sieve distribution.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Prepared particle mounts, microscope and calibrated micrometer.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Calibrate the ocular scale against the stage micrometer for the selected objective.
2. Observe representative fields of the prepared particle mount.
3. Define the dimension being measured and measure particles without selecting only large or clear examples.
4. Convert ocular divisions to micrometres with the correct calibration.
5. Group sizes into the assigned intervals and calculate the number-weighted distribution.
6. Report the dimension definition, counting basis and distribution summary.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Calibration	_____
Particle dimension	_____
Count per size band	_____
Mean size	_____

Calculations and Interpretation

- $\text{Size} = \text{ocular divisions} \times \text{calibration (micrometres/division)}$.
- $\text{Number mean size} = \frac{\sum(n_i \times d_i)}{\sum(n_i)}$.

Worked Illustration

Illustration: calibration of 2.5 micrometres/division and an object length of 8 divisions give 20 micrometres.

The values in this illustration are for calculation practice.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Keep temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

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