

Determination of Surface Tension by Drop Count and Drop Weight

Practical 06 | Physical Pharmaceutics I

Aim

To determine Surface Tension by Drop Count and Drop Weight, and interpret the recorded observations.

Principle

- Drop methods compare liquid behaviour at the same capillary tip; density, temperature and drop-shape corrections affect the result.
- 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

- Stalagmometer or drop apparatus, comparison liquid, balance and density readings.
- 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. Identify the measured property, units and controlled variables before setting up the apparatus.
2. Check the instrument, zero or calibration and record the relevant operating conditions.
3. Prepare a representative measured portion without changing its intended composition.
4. Obtain the readings specified for the property and repeat under the same conditions.
5. Calculate the required property, including corrections stated for the apparatus or method.
6. Summarize the replicate results and explain the effect of the variable studied.

Observation Record

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

Observation / parameter	Record / finding
Temperature	_____
Test/reference density	_____
Drop counts	_____
Mean drop masses	_____

Calculations and Interpretation

- Drop count: $\gamma_x/\gamma_r = (\rho_x \times n_r)/(\rho_r \times n_x)$ for the same counted volume.
- Drop weight: γ_x/γ_r approximately equals mean drop-mass ratio when the same tip and appropriate corrections apply.

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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