

Determination of Swelling Index and Foaming Index

Practical 16 | Pharmacognosy and Phytochemistry I

Aim

To determine Swelling Index and Foaming Index, and interpret the recorded observations.

Principle

- Swelling index describes the occupied volume of swollen material per unit mass. Foaming index uses a specified dilution series and persistent-foam endpoint.
- 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

- Completed swelling-volume and foaming-dilution teaching 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
Material mass	_____
Swollen volume	_____
Dilution aliquot a	_____
Foam endpoint	_____
Replicates	_____

Calculations and Interpretation

- Swelling index = occupied swollen-material volume in mL/material mass in g.
- For the standard foaming-index dilution basis: foaming index = $1000/a$, where a is the qualifying decoction aliquot in mL.
- Use the prescribed endpoint and state when the result lies outside the dilution range.

Worked Illustration

Illustration: 1.00 g material occupying 12.0 mL after the assigned swelling test gives 12.0 mL/g. A qualifying foaming aliquot a = 5.0 mL gives a foaming index of 200 on the standard dilution basis.

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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