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Swelling Index and Foaming Index

Experiment 7 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To determine the swelling behaviour and foaming index of suitable crude drugs by the prescribed physical tests.

Principle

Swelling index describes the volume occupied by a stated mass of herbal material and its associated mucilage after a defined hydration procedure. Foaming index describes the dilution at which an aqueous preparation gives a defined persistent foam height. Neither result alone proves clinical efficacy or full chemical identity.

Requirements

- Suitable authenticated crude drug, balance and water or specified vehicle.
- Stoppered graduated cylinders, boiling vessel, filters, test tubes, rack and timer.

Procedure

1. Set swelling conditions

Weigh the prescribed mass and use the stated particle size, cylinder and vehicle. Record all conditions because they affect the result.

2. Hydrate

For the common teaching cylinder method, use the prescribed 25 mL vehicle, agitate at 10-minute intervals over the first hour and allow the specified three-hour standing period. Read material plus mucilage volume.

3. Repeat swelling

Obtain the prescribed replicates and express mean occupied volume per gram. Do not substitute a percentage expansion calculation for a mL/g result.

4. Prepare the foam series

Use the prescribed aqueous decoction. In the standard teaching series, place 1-10 mL portions in separate tubes and bring each to 10 mL with water.

5. Assess foam

Shake and stand under the method's fixed conditions, commonly 15 seconds shaking and 15 minutes standing. Identify a, the original decoction volume producing 1 cm foam; index = $1000/a$. If no tube reaches or all exceed the criterion, apply the method's extension.

Introduction to Pharmacognosy

Observations and Record

Test	Recorded data	Calculated result
Swelling	Mass ____ g; volumes ____ / ____ / ____ mL	____ mL/g
Foam series	a = ____ mL for 1 cm foam	Index ____
Conditions	Particle size, vehicle and timing	_____

Worked Example

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

- Swelling example: three 1.0 g portions occupy 11, 12 and 13 mL. Mean = 12 mL; index = 12 mL/g.
- Foam example: a = 5 mL. Foaming index = $1000 \div 5 = 200$.
- For the standard 1-10 mL series: all foam below 1 cm implies an index below 100; all above 1 cm implies above 1000 and needs the specified extended dilution.

Result

Swelling index = ____ mL/g. Foaming index = _____. Both results include the specified test conditions.

Precautions

- Use consistent particle size and the same reading convention for material plus mucilage.
- Clean tubes must not contain detergent residues that could produce foam.
- Do not change shaking time or standing time between tubes.

Viva Questions and Answers

1. What are swelling-index units?

Commonly mL per gram under the stated method.

2. What does a mean in $1000/a$?

The mL of original decoction producing the specified 1 cm foam height.

3. Why are test conditions important?

Hydration, agitation and time affect both swelling and foam behaviour.

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