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Effect of Maceration Decoction and Soxhlet Extraction on Crude Yield

Experiment 10 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To compare dry crude-extract yields using three extraction approaches.

Principle

Diffusion, solvent renewal, temperature and contact time affect extraction. A fair comparison controls raw-material batch, dry mass, particle size and solvent. The measured yield is total extracted residue, not the concentration of a particular active constituent.

Requirements

- Three equal portions of one authenticated stable teaching drug; water or the common solvent selected by the instructor.
- Maceration vessel, decoction setup, Soxhlet assembly, filtration, evaporation and dry-residue weighing apparatus.

Procedure

1. Design

For a water-compatible stable drug, an illustrative design uses 5.0 g dry material and 50 mL water in each arm. If the Soxhlet arm uses a different solvent, explicitly report that solvent and method are both changing.

2. Maceration

Keep the first portion in a closed labelled vessel for the assigned period, for example 24 h, with the prescribed mixing. Filter and account for retained solvent.

3. Decoction

Heat the second aqueous portion gently for the assigned period, for example 15 min. Cool, filter and restore the extract to a measured volume where the method requires it.

4. Soxhlet

Staff check the condenser, thimble and vapour path. Run the third portion under the approved heating method; record solvent, duration and siphon cycles. Do not seal the system.

5. Dry residue

Take a known extract aliquot into a weighed dish. Evaporate under the assigned method and dry to the specified stable mass condition.

6. Compare

Scale aliquot residue to total measured extract volume and calculate dry-basis yield. Compare replicates, thermal exposure and possible degradation; the largest residue yield need not be the best selective extraction.

Observations and Record

Method	Solvent / time / cycles	Dry residue / yield
Maceration	_____	_____
Decoction	_____	_____
Soxhlet extraction	_____	_____

Worked Example

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

- Total residue = aliquot residue × total extract volume / aliquot volume.
- A 5 mL aliquot from 50 mL gives 0.060 g dry residue: total residue = 0.600 g.
- For 5.0 g dry starting material, yield = 0.600 / 5.0 × 100 = 12.0%.

Result

Record the observed outcome and calculated value, with units. State whether the stated laboratory specification was met; do not copy the worked example as your result.

Precautions

- Use authenticated, labelled teaching material and instructor-prepared reagents. Wear the protection specified for the chemical method.
- Compare with a known control and record actual observations. A single colour, precipitate or odour description cannot authenticate a crude drug.
- Do not taste botanical material or directly inhale vapours; dispose of solvents and staining reagents in their assigned waste containers.
- Check cooling-water flow before heating; use suitable electrical heating for flammable solvents.

Viva Questions and Answers

1. Does higher yield mean more active compound?

No. Sugars, salts and other extractives can increase crude mass.

2. Why use dry-basis starting mass?

Different moisture content otherwise distorts the comparison.

3. What does Soxhlet renewal change?

Freshly condensed solvent repeatedly contacts the material.

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