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Isolation of Hesperidin from Lemon Peel

Experiment 13 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To prepare a hesperidin-enriched fraction from authenticated lemon peel and assess its identity.

Principle

Hesperidin is a citrus flavanone glycoside. Solvent extraction followed by controlled precipitation/crystallisation can enrich it, but citrus species and extraction conditions affect the composition. A crude lemon-peel precipitate is not automatically pure hesperidin.

Requirements

- Clean dried lemon peel, an authentic hesperidin marker and the college's validated citrus-peel isolation method.
- Assigned defatting and extraction solvents, controlled heating, filtration, evaporation and TLC/identity apparatus.

Procedure

1. Prepare peel

Record botanical source, peel portion, dry mass and particle size. Select the laboratory method specifically approved for lemon material.

2. Optional defatting

If the method prescribes it, use the designated defatting step to reduce peel oils, then remove residual solvent under controlled conditions.

3. Extract

Use the assigned aqueous-alcohol or other validated extraction conditions, recording solvent composition, ratio, temperature and time. Do not substitute an orange-peel method without instructor validation.

4. Concentrate

Filter and concentrate without boiling to dryness. Record the resulting volume and any insoluble material.

5. Precipitate

Carry out the prescribed acidification/crystallisation stage with the method's controlled pH or acetic-acid system. Cool for the assigned period, collect and wash the solid.

6. Assess

Dry to the specified condition and weigh. Compare with authentic hesperidin using the assigned TLC and confirmatory test; report a crude enriched fraction when purity is not established.

Observations and Record

Record	Entry
Dry lemon-peel mass / extraction conditions	_____
Precipitation pH or solvent / cooling time	_____
Dry fraction mass / recovery	_____
Marker comparison / purity limitation	_____

Worked Example

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

- A 0.120 g dry fraction from 5.00 g peel is 2.40% crude mass recovery. That value includes any co-precipitated substances.

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.

Viva Questions and Answers

1. Why specify lemon rather than generic citrus peel?

Species and peel composition alter extraction and product identity.

2. What does a co-migrating TLC band establish?

It supports identity under that system but does not alone establish purity.

3. Why record precipitation conditions?

Solubility and co-precipitation depend on pH, solvent and temperature.

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