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Isolation of Pectin from Orange Peel

Experiment 15 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To recover a crude pectin-rich fraction from orange peel and calculate dry-basis recovery.

Principle

Acidified hot water releases pectic material from the plant cell wall. Alcohol lowers its solubility and promotes precipitation. Other polysaccharides or soluble substances may accompany the recovered material.

Requirements

- Clean dried orange peel, water, prepared citric-acid system and the assigned ethanol grades.
- Controlled water bath, filter, cooling facility, collection setup, drying oven and balance.

Procedure

1. Prepare

Weigh 5.00 g dried powdered peel for an illustrative scaled teaching method. Add 30 mL water and adjust to approximately pH 2 with the assigned citric-acid system.

2. Extract

Heat the stirred dispersion at approximately 90°C for 2 h in the supervised setup. Limit evaporation and record actual temperature, pH and liquid loss.

3. Clarify

Filter the hot extract using the approved apparatus, then cool before alcohol addition.

4. Precipitate

Add an equal measured volume of cold ethanol to the clarified extract as prescribed. Keep at approximately 4°C overnight in a suitable labelled container.

5. Wash

Collect the precipitate. Where this method is used, wash successively with the assigned 75%, 85% and 95% ethanol systems.

6. Dry and assess

Dry at the prescribed condition, for example 40°C overnight followed by the laboratory stable-mass check. Weigh and record the pectin-rich fraction; a gel test alone is not a full purity or esterification assay.

Pharmacognosy and Phytochemistry

Observations and Record

Record	Entry
Peel dry mass / water / pH	_____
Extraction temperature / time / filtrate volume	_____
Alcohol volume / collection / drying	_____
Dry fraction mass / yield	_____

Worked Example

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

- Dry recovery (%) = recovered dry fraction / dry peel mass × 100.
- A 0.800 g fraction from 5.00 g dry peel gives 16.0% crude recovery.

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.
- Cool the extract before adding ethanol and keep alcoholic liquids away from flames; use an authorised drying/evaporation arrangement.

Viva Questions and Answers**1. Why acidify the extraction water?**

Controlled acidity helps release soluble pectic material.

2. Why is ethanol added?

It reduces solubility and promotes precipitation of the pectin-rich fraction.

3. Does recovered mass measure degree of esterification?

No. That needs a separate analytical determination.

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