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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.

## 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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