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Isolation of Glycyrrhizin from Liquorice Roots

Experiment 14 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To obtain a glycyrrhizin-enriched fraction from liquorice and distinguish it from its aglycone.

Principle

Glycyrrhizin is a triterpenoid saponin glycoside. Aqueous alcohol extracts it along with other soluble constituents, and controlled acid precipitation can enrich the fraction. Glycyrrhetinic acid is the aglycone and must not be reported as the same compound.

Requirements

- Authenticated dried liquorice root, authentic glycyrrhizin marker and the approved aqueous-alcohol/acid precipitation method.
- Ultrasonic or other assigned extraction setup, filters, controlled evaporator, instructor-supplied acid and identity-test apparatus.

Procedure

1. Prepare

Record dry root mass and grinding conditions. The teaching method must specify solvent composition and extraction ratio.

2. Extract

An illustrative literature-based extraction uses 70% aqueous methanol with brief repeated sonication. A 5 g portion can be studied with approximately 87 mL first extraction and two 65 mL repeat extractions, subject to the college's microscale method.

3. Pool

Filter each extract, combine and concentrate under the authorised reduced-temperature method. Record total recovered liquid rather than assuming no solvent loss.

4. Precipitate

Staff supervise addition of the assigned acid to the specified endpoint. Collect the resulting precipitate after the approved standing/cooling period; avoid prolonged strong-acid heating that changes the glycoside.

5. Wash and dry

Wash by the validated method and dry under controlled conditions. Record dry mass as crude enriched recovery.

6. Identify

Compare the fraction with glycyrrhizin and, where available, glycyrrhetinic-acid markers. Report the identity evidence separately from crude mass; further purification may be required.

Observations and Record

Record	Entry
Root mass / solvent / extraction repetitions	_____
Concentration and precipitation endpoint	_____
Dry fraction mass / glycyrrhizin comparison	_____

Worked Example

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

- From 5.00 g root, 0.250 g dry enriched fraction gives 5.00% crude recovery. It does not imply that the fraction is 100% glycyrrhizin.

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.
- Methanol extraction and acid handling use the designated hood and trained supervision; no tasting of the root or isolate is permitted.

Viva Questions and Answers

1. What is the difference between glycyrrhizin and glycyrrhetinic acid?

The former is a glycoside; the latter is its aglycone.

2. Why repeat extraction?

Fresh solvent can remove material left after the first extraction.

3. Why avoid prolonged strong-acid heating?

It can hydrolyse or otherwise change the intended glycoside.

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