

Volatile-Oil Distillation and TLC Study

Practical 14 | Pharmacognosy and Phytochemistry II

Aim

To study Volatile-Oil Distillation and TLC Study, and interpret the recorded observations.

Principle

- Distillation co-collects suitable volatile constituents with water, while TLC compares the recovered oil fingerprint with the assigned standard. Distillation recovery and chromatographic identity are separate outcomes.
- Compounds separate because they interact differently with the stationary and mobile phases.
- Identity assessment uses an appropriate comparison standard and method conditions; one migration or retention value alone is not conclusive.
- Trace the demonstration path from vapour formation through condensation and phase separation.
- Discuss losses from incomplete separation, retention in apparatus or altered material composition without assuming that all volatile compounds are recovered equally.

Materials and Apparatus

- Instructor-demonstrated volatile-oil apparatus, prepared oil and TLC standards/records.
- Assigned test extract or mixture, comparison standards and the specified stationary/mobile phase system.
- Appropriate chromatographic apparatus, application equipment, developing chamber or instrument and the assigned detector.

Method

1. Record the stationary phase, mobile phase and the purpose of the separation.
2. Prepare test and comparison solutions at suitable concentrations for the assigned method.
3. Introduce measured test and comparison portions without overloading the separation system.
4. Develop or run the separation under the assigned conditions, recording the relevant operating details.
5. Locate separated bands, spots or peaks using the specified observation method.
6. Compare the test pattern with the standard and calculate the appropriate separation metric.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Plant basis	_____
Recovered oil amount	_____
Oil appearance	_____
TLC pattern	_____
Standard comparison	_____

Calculations and Interpretation

- Oil recovery = recovered oil amount/defined plant-material amount, with the reporting units stated.
- R_f = spot-centre distance/solvent-front distance.

Worked Illustration

Illustration: a spot travelling 3.0 cm with a solvent front travelling 6.0 cm has $R_f = 0.50$.

The values in this illustration are for calculation practice.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Keep application concentrated and avoid overloading.
- Record the solvent front immediately for planar chromatography.
- Use retention or migration data only with the stated system and relevant identity evidence.

Viva Questions

1. Why does overloading impair separation?

It broadens bands or spots and can change apparent migration or retention.

2. Why run a comparison standard?

It supplies a relevant reference pattern under the same analytical conditions.

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