

Simultaneous UV Estimation of Two Drugs

Experiment 11 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To resolve two absorbing components using a validated two-wavelength method.

Principle

At two suitable wavelengths, additive absorbances give two independent equations when each component obeys the calibrated response and interference is controlled.

Requirements

- Assigned two-drug mixture, pure standards, UV-visible instrument, matched cells and blank.

Procedure

1. Calibrate components

Determine each component response coefficient at each assigned wavelength on the same concentration/path basis.

2. Measure the mixture

Read mixture absorbance at both wavelengths after appropriate blank correction.

3. Solve

Use the simultaneous equations and check that the coefficient system is sufficiently distinct.

4. Verify

Reconstruct the predicted absorbances and compare with the measurements; report dilution-corrected component concentrations.

Observations and Record

Coefficient / reading	Value
a ₁₁ and a ₁₂ at wavelength 1	_____
a ₂₁ and a ₂₂ at wavelength 2	_____
Mixture A ₁ and A ₂	_____
Calculated C ₁ and C ₂	_____

Worked Example

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

Pharmaceutical Analysis

- $A_1 = a_{11} C_1 + a_{12} C_2$; $A_2 = a_{21} C_1 + a_{22} C_2$.
- $C_1 = (A_1 a_{22} - A_2 a_{12}) / (a_{11} a_{22} - a_{21} a_{12})$; $C_2 = (a_{11} A_2 - a_{21} A_1) / (a_{11} a_{22} - a_{21} a_{12})$.
- Example: $A_1 = 0.25$, $A_2 = 0.25$; coefficients $a_{11} = 0.02$, $a_{12} = 0.01$, $a_{21} = 0.01$, $a_{22} = 0.03$ give $C_1 = 10$ and $C_2 = 5$ in the assigned concentration units.

Result

Record the completed observations, calculations and conclusion with units. State any limitation of the observation.

Precautions

- Use calibrated coefficients with consistent units and path length.
- A nearly zero determinant makes the estimate unstable; other absorbing ingredients invalidate a simple two-component model.

Viva Questions and Answers

1. Why use two wavelengths?

They provide two independent measurements for two unknown concentrations.

2. How can the answer be checked?

Insert calculated concentrations into both equations and compare predicted with observed absorbance.

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