Estimation of Serum Calcium

Experiment 22 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To estimate total calcium in a serum teaching specimen using the assigned validated method.

Principle

An assigned o-cresolphthalein-complexone method forms a calcium-related colour; alternative validated methods use their own chemistry. The blank-corrected test response is compared with calibration under the method's linearity and quality-control requirements.

Method and Interpretation

Total calcium is affected by protein binding and is different from ionised calcium; interpretation requires the appropriate context.

Requirements

- Simulated serum, calibrator and low/high quality controls
- Assigned validated reagent kit, pipettes and photometer or analyser
- Current product method sheet

Procedure

1. Read method

Record specimen suitability, reagent volumes, wavelength, incubation/read times, calibration, linearity and interference information.

2. Prepare

Label blank, calibrator, controls and test; dispense the kit-specified quantities.

3. Develop and read

Use the prescribed reagent, blank, calibration and photometric conditions.

4. Check validity

Confirm controls meet their assigned limits and the response is within the method range.

5. Calculate

Use the validated calibration procedure and any documented specimen dilution.

6. Report

State result, units, method, dilution and whether the controls support a valid measurement.

Observations and Record

Field	Student record
Method / kit / wavelength	_____
Blank / standard / test response	_____
Control results / limits	_____
Standard concentration / units	_____
Dilution factor	_____
Calculated concentration	_____

Worked Example

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

- One-point teaching calculation, only when permitted by the method: concentration = corrected test response / corrected standard response × standard concentration × dilution factor.
- Illustrative responses: test 0.460, standard 0.500; standard 10 mg/dL; dilution factor 1.
- Calculated teaching result = 9.2 mg/dL.

Result

Concentration of total calcium: _____ mg/dL. Controls: _____. Dilution and limitations: _____.

Precautions

- A multi-point calibrated or kinetic method may require its own curve/equation rather than the one-point illustration.
- Do not treat a failed control or out-of-range response as reportable.
- Biological specimens require authorised collection and handling; the classroom exercise uses simulated material.

Viva Questions and Answers

1. Why subtract the blank?

It removes the assigned reagent/background contribution.

2. Why include dilution?

The tested solution may be less concentrated than the original material.

3. Can a concentration alone diagnose disease?

Total calcium is affected by protein binding and is different from ionised calcium; interpretation requires the appropriate context.

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