

Atomic Absorption Method Guide

Li in Blood Serum

Key Words

- Blood Serum
- Lithium
- Flame
- Atomic Emission

Principle

The sample is diluted 1:10 with deionised water, and lithium is determined by flame atomic emission spectrometry using an air-acetylene flame. Sodium is added to standard and sample solutions as an ionisation buffer.

Reagents

Lithium master standard (10.0 mM/L)

Dissolve 0.3695 g of dry lithium carbonate in the minimum necessary quantity of hydrochloric acid, and make up to 1.0 litre with deionised water in a volumetric flask. This solution must be stored in a plastic bottle.

Lithium sub-stock standard (1.0 mM/L, dilute 10.0 mL of the master standard to 100 mL with deionised water)

Ionisation buffer stock solution

Dissolve 0.3273 g of dry sodium chloride in water and make up to 1.0 litre with deionised water.

Working standards

Prepare working standards containing 0, 0.05, 0.1 and 0.2 mM/L of lithium by adding 0, 5.0, 10.0, and 20.0 mL of the lithium sub-stock standard into a series of 100 mL volumetric flasks. Add 10.0 mL of the ionisation buffer stock solution to each flask and dilute to volume with deionised water.

Sample Preparation

Using a micro-pipette, transfer 1.0 mL of the serum sample into a clean, dry 10 mL volumetric flask, add 1.0 mL of the ionisation buffer stock solution and make up to volume with deionised water. Ensure that the solution is thoroughly mixed before analysis. 0.2 mM/L of lithium in this solution is equivalent to 2.0 mM/L in the original sample.

Instrument Parameters

The screenshot shows the instrument parameter software interface for Lithium (Li) analysis. The interface is divided into two main sections: 'Measurement Mode' and 'Flame'. The 'Measurement Mode' section includes settings for 'Emission', 'Number of Resamples' (3), 'Fast Resamples' (checked), 'Measurement Time' (4.0 s), 'Wavelength' (670.8 nm), 'Lamp Current' (0%), 'Bandpass' (0.5 nm), 'Signal' (Continuous), and 'Transient Peak Measurement' (Measure From: 1.00, To: 1.00). The 'Flame' section includes 'Flame Type' (Air-Acetylene), 'Fuel Flow' (1.1 L/min), 'Optimise Fuel Flow' (unchecked), and 'Auxiliary Oxidant' (unchecked). The 'Stabilisation' section includes 'Burner Stabilisation Time' (0 min), 'Nebuliser Uptake Time' (4 s), 'Burner Height' (7.0 mm), and 'Optimise Burner Height' (unchecked). The 'RSD Test' section includes 'Use Test' (unchecked), 'RSD greater than' (0%), and 'AND signal greater than' (1.1 Int). The 'Filter Rejection' section includes 'Use Filter Rejection' (unchecked) and 'Rejection Limit' (0%). The 'Background Correction' is set to 'Off'. The 'High Resolution' checkbox is unchecked. The 'Cook Book' button is visible in the top right corner.

Rotate the burner to 90° to the optical axis of the spectrometer to improve the linearity, and use the 0.2 mM/L lithium working standard as the optimisation solution to set up the spectrometer.

Figure 1: Instrument parameters

Results

Sample	Precinorm U (lot 3-504)	Precipath U (lot 150-458)
Lithium found (mM/L)	2.6	4.0
Reference value (mM/L)	2.8	3.9

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