

Atomic Absorption Method Guide

K in blood serum

Key Words

- Blood Serum
- Potassium
- Flame
- Atomic Emission

Principle

The sample is diluted 1:250 with deionised water, and potassium 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

Potassium master standard (10.0mM/L)

Dissolve 0.7455g of dry potassium chloride in deionised water, and make up to 1.0 litre with deionised water in a volumetric flask. This solution must be stored in a plastic bottle.

Potassium sub-stock standard (0.4mM/L, dilute 10.0mL of the master standard to 250mL with deionised water)

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

Working standards

Prepare working standards containing 0, 0.008, 0.016, 0.024 and 0.04mM/L of potassium by adding 0, 2.0, 4.0, 6.0 and 10.0mL of the potassium sub-stock standard into a series of 100mL volumetric flasks. Add 10.0mL of the ionisation buffer stock solution to each flask and dilute to volume with deionised water.

Sample Preparation

Using a micro-pipette, transfer 200µL of the serum sample into a clean, dry 50mL volumetric flask, add 5.0mL of the ionisation buffer stock solution and make up to volume with deionised water. Ensure that the solution is thoroughly mixed before analysis. 0.04mM/L of potassium in this solution is equivalent to 10.0mM/L in the original sample.

Instrument Parameters

The screenshot displays two panels of the instrument software interface for measuring Potassium (K) in blood serum. The top panel, titled 'K blood (K)', contains the following settings: Measurement Mode: Emission; Number of Resamples: 3; Fast Resamples: checked; Measurement Time: 4.0 s; Wavelength: 766.5 nm; Lamp Current: 1%; Bandpass: 0.5 nm; Signal: Continuous; Transient Peak Measurement: Measure From: 0.00 s, To: 4.00 s. The bottom panel, also titled 'K blood (K)', contains the following settings: Flame Type: Air-Acetylene; Fuel Flow: 1.1 L/min; Optimise Fuel Flow: unchecked; Auxiliary Oxidant: unchecked; Stabilisation: Burner Stabilisation Time: 0 min, Nebuliser Uptake Time: 4 s; Burner Height: 7.0 mm; Optimise Burner Height: unchecked.

Rotate the burner to 90° to the optical axis of the spectrometer to improve the linearity, and use the 0.04mM/L potassium working standard as the optimisation solution to set up the spectrometer.

Figure 1 Instrument parameters

Results

Sample	Reference serum (1)	Reference serum (2)	Reference serum (3)	Reference serum (4)	Reference serum (5)
Potassium found (mM/L)	2.6	4.0	5.7	6.1	2.4
Reference Value (mM/L)	2.8	3.9	5.7	6.0	2.5

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The method of sample treatment described in this publication should be performed only by a competent chemist or technician trained in the use of safe techniques in analytical chemistry. Users should acquaint themselves with particular hazards which may be incurred when toxic materials are being analysed and handled in the instruments, and the instrument must be used in accordance with the operating and safety instructions given in the Operators manual.

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