

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 (10.0 mM/L)

Dissolve 0.7455 g 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 (0.4 mM/L, dilute 10.0 mL of the master standard to 250 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, 0.008, 0.016, 0.024 and 0.04 mM/L of potassium by adding 0, 2.0, 4.0, 6.0 and 10.0 mL of the potassium 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 200 µL of the serum sample into a clean, dry 50 mL volumetric flask, add 5.0 mL of the ionisation buffer stock solution and make up to volume with deionised water. Ensure that the solution is thoroughly mixed before analysis. 0.04 mM/L of potassium in this solution is equivalent to 10.0 mM/L in the original sample.

Instrument Parameters

The image shows two screenshots of the instrument parameter software interface. The top screenshot displays the 'Measurement Mode' set to 'Emission', 'Number of Resamples' at 3, 'Fast Resamples' checked, 'Measurement Time' at 4.0 s, 'Wavelength' at 766.5 nm, 'Lamp Current' at 10%, and 'Bandpass' at 0.5 nm. It also shows 'Signal' set to 'Continuous' and 'Transient Peak Measurement' with 'Measure From' at 0.00 s and 'Tg' at 1.00 s. The bottom screenshot shows 'Flame Type' set to 'Air-Acetylene', 'Fuel Flow' at 1.1 L/min, 'Burner Stabilisation Time' at 0 min, 'Nebuliser Uptake Time' at 4 s, and 'Burner Height' at 7.0 mm. Both screenshots have a title bar that reads 'K blood (K)'.

Rotate the burner to 90° to the optical axis of the spectrometer to improve the linearity, and use the 0.04 mM/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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