

# Determination of Bismuth in Plasma

Trace elements are important in modern medicine, for example bismuth can be found in many drugs used to treat intestinal bacteria. High levels of accumulated bismuth in the body can be biologically toxic. Some of the most common methods used to detect bismuth in plasma include atomic absorption spectrometer, electrochemical or ICP-MS. Now with Aurora's LUMINA 3300 you can also determine bismuth with atomic fluorescence spectrometer.

## 1. Major equipment and reagents

- LUMINA 3300 atomic fluorescence spectrometer

### **KBH<sub>4</sub> solution (2% KBH<sub>4</sub> in 0.5%NaOH):**

- Measure 2.5 g NaOH, dissolve in 500 mL distilled water, add 10 g KBH<sub>4</sub>.

### **Bismuth standard solution:**

- Commercially available Bi (1000 ppm) standard solution, diluted to 1 ppm, 100 ppb, 10 ppb and 1 ppb with 20% HCl
- Concentrated HClO<sub>4</sub> solution
- Concentrated HCl solution
- High pure argon (>99.99)
- High pure distilled water

## 2. Method

Place 1 mL of plasma in a 50 mL flask, add 5 mL concentrated HNO<sub>3</sub> and 1 mL HClO<sub>4</sub>. Heat the flask on a hot plate until white smoke comes out, then add 2 mL HCl. Move the sample to a 10 mL volumetric flask, dilute with distilled water till total volume is 10 mL.

## 3. Instrument parameters

Carrier gas	500 mL/min
Shield gas	700 mL/min
HCL current	120 mA
PMT voltage	400 V
Integration time	6 s
Pump speed	40 r/min
Reducing reagent solution	2% KBH <sub>4</sub> in 0.5%NaOH

## 4. Results

This method gives:

Detection limit: 0.2 ppb,

Recovery rate: 92~103%

Relative standard deviation: 2~6%