Technical Bulletin
Preparation of Lead Reference Material

Magellan Diagnostics

Introduction

In a laboratory's efforts to meet either internal quality control guidelines or Clinical Laboratory Improvement Amendments (CLIA) testing regulations, there may be a need to test samples with known lead concentrations. This bulletin details procedures to prepare both lead stock solutions and spiked blood samples at known lead concentrations.

Preparation of a Lead Stock Solution

Required equipment:

- 100 mL volumetric flasks, decontaminated with Nitric Acid
- 1 mL volumetric pipets, decontaminated with Nitric Acid
- 10 mL volumetric pipets, decontaminated with Nitric Acid

Materials and Supplies:

- Super Q Deionized (DI) Water – filtered to 0.2 µ.
- 70% Nitric Acid
- Lead Reference Standard Solution: 1000 ppm (10^{-3} g/mL)

(Note: Lead Reference Standard Solution can be purchased through your local chemical supply house. For example: Fisher Scientific offers a 100 ml bottle under part number: SL21-100)

Preparation of Lead Stock Solutions

10^{-4} g/mL Lead Solution Formulation

1. Add 75 ml of DI water to 100 mL volumetric flask.
2. Add 1 ml of 70% Nitric Acid to the flask.
3. Add 10 ml of 10^{-3} g/mL Lead Reference Standard to the flask.
4. Fill the volumetric flask to 100 mL with DI water. Mix the solution.
5. Label Solution: **"10^{-4} g/mL Lead Solution"**

10^{-5} g/mL Lead Solution Formulation

1. Add 75 ml of DI water to 100 mL volumetric flask.
2. Add 1 ml of 70% Nitric Acid to the flask.
3. Add 10 ml of **"10^{-4} g/mL Lead Solution"** to the flask.
4. Fill the volumetric flask to 100 mL with DI water. Mix the solution.
5. Label Solution: **"10^{-5} g/mL Lead Solution"**

Sample Preparation Table

Target Lead Concentration µg/dL	10^{-5} g/mL Lead Solution	EDTA Whole Blood
0	0 µL	3 mL
5	15 µL	3 mL
7	21 µL	3 mL
8	24 µL	3 mL
12	36 µL	3 mL
13	39 µL	3 mL
20	60 µL	3 mL
30	90 µL	3 mL
40	120 µL	3 mL
50	150 µL	3 mL
55	165 µL	3 mL
60	180 µL	3 mL

Preparation of Lead Reference Material

Spiking Procedure

1. To prepare spiked samples, draw multiple 3 mL EDTA tubes of blood from a donor whose blood has been confirmed to contain ≤1µg/dL lead by a reference method (GFAAS or ICP-MS).
2. Using the Sample Preparation Table above, add the appropriate volume of **Lead Standard (10^{-5} g/mL)** to a full 3mL tube of EDTA whole blood.

   Note: One tube of blood will **not** be spiked with lead and will serve as the control sample.
3. Let spiked whole blood **rock for 4 hours** at room temperature to equilibrate prior to testing.
4. Test samples within 24 hours if using an Anodic Stripping Voltammetry methodology such as LeadCare or LeadCare II.
5. Assay the resulting spiked whole blood samples by a reference method and compare the results to those obtained on the LeadCare or LeadCare II system.