STATE OF NEW YORK
DEPARTMENT OF HEALTH

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CERTIFICATE OF ANALYSIS

Lot 047

Reference Material for Blood Lead and Erythrocyte Protoporphyrin

This blood-based reference material was prepared from whole blood obtained from lead-dosed animals. Whole blood was preserved with K_2EDTA and lyophilized as described in the literature[1]. These materials may be used in determinations of blood lead and/or erythrocyte protoporphyrin (EP) as appropriate.

BLOOD LEAD: 14.5 µg/dL (±0.6) 0.70 µmol/L (±0.03)

(Acceptable Range for QC Purposes: 10 – 19 µg/dL)

Target values for blood lead are the all-method mean calculated following an interlaboratory study that included GFAAS, ASV and ICP-MS techniques. The estimated uncertainty, given in parentheses, is the sample standard deviation of values reported by nine reference laboratories. A complete report is available upon request from the program director. The acceptable range is based on fixed criteria required in the U.S. by federal and state proficiency testing programs (i.e., ±4 µg/dL or ±10% above, whichever is greater). To convert from µg/dL to SI units (µmol/L), multiply by 0.04826.

ERYTHROCYTE PROTOPORPHYRIN ($m\varepsilon$ = 241): 42 µg/dL (±4)

(Acceptable Range for QC Purposes: 36 - 48 µg/dL)

Target values for EP are calculated from an interlaboratory study based on 6 reference laboratories using the reference ethyl acetate-acetic acid extraction procedure. A copy of this procedure is available upon request. Extraction techniques are calibrated against protoporphyrin IX (PPIX) standards from Porphyrin Products, Logan, UT, and using a millimolar absorptivity ($m\varepsilon$) value of 241. The estimated uncertainty, given in parentheses, is the sample standard deviation. A complete summary is available upon request from the program director. The acceptable range is based on fixed criteria required in the U.S. by state proficiency testing programs (i.e., ± 6 µg/dL or ±15% whichever is greater). To convert from µg/dL into SI units (µmol/L), multiply by 0.0178.

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[1] For a complete description of the preparation and characterization of blood-based reference materials, see Parsons, P.J., "Monitoring Human Exposure to Lead: An Assessment of Current Laboratory Performance for the Determination of Blood Lead" (1992) 87 149-162

RECONSTITUTION INSTRUCTIONS:

1. Allow the vial to reach ambient temperature.

2. Tap the bottom of the vial to dislodge most of the particles adhering to the stopper. Carefully remove the stopper from the vial.

3. Reconstitute the lyophilized sample by adding **2-mL** of high quality deionized water. The deionized water to be used must be free of detectable lead.

4. Replace the stopper and homogenize by continuous agitation with a mixing apparatus for at least 2 hours.

5. The reconstituted material should be stored refrigerated at 4 °C. Protect from light if analyzing for EP. Materials should be stable for at least one week if stored under refrigeration but may be less if brought to room temperature and sampled on a daily basis.

LONG TERM STABILITY:

The long term stability of lyophilized materials such as this when stored below -20°C has been documented and is at least 10 years from the date of preparation.

USES / APPLICATIONS:

This reference material may be used for the following purposes:

-- as a secondary standard for the determination of blood lead using matrix sensitive techniques such as Delves-cup AAS or some Graphite Furnace AAS methods without digestion.
-- verification (accuracy) of analytical methodology for all blood lead methods, or to determine recovery of lead using APDC or NaDDC-MIBK extraction procedures.
-- as quality control materials for the determination of BPb or EP by ethyl acetate-acetic acid extraction procedures. This material is NOT suitable for either filter paper Pb/EP methods, or for hematofluorometers (ZPP) which require intact red blood cells. We have other reference materials especially for Aviv hematofluorometers; call for more information.

AVAILABILITY:

This reference material was produced as the result of an Research and Development project. The lot number is limited in size, and is not renewable. To satisfy a maximum number of users, we must therefore restrict the supply of these materials to a maximum of 24 vials per laboratory per calendar year.

January 17, 2001

APPENDIX

Blood Lead /Erythrocyte Protoporphyrin Reference Materials Currently Available

Lot #	Sample Matrix	Pb (µg/dL)*	2SD Range	Acceptable Range	Volume (mL)
47	cow blood	14.5 ±0.6	13.3 - 15.7	11 - 19	2
48	goat blood	5.9 ±0.4	5.1 - 6.7	2 - 10	2
49	goat blood	42.2 ±1.8	38.6 - 45.8	38 - 46	2
51	goat blood	19.3 ±1.4	16.5 - 22.1	15 - 23	2

Blood lead units: To convert µg/dL or µg/100 mL. into SI units (µmol/L) ,multiply by 0.04826.

Lot #	Sample Matrix	EP (µg/dL)†	2SD Range	Acceptable Range	Volume (mL)
47	cow blood	42 ± 4	34 - 50	36 - 48	2
48	goat blood	34 ± 4	26 - 42	28 - 40	2
49	goat blood	54 ± 6	42 - 66	46 - 64	2
51	goat blood	183 ± 7	169- 197	156 - 210	2

†EP units: To convert µg/dL into SI (µmol/L), multiply by 0.0178. Note: EP target values are based on a millimolar absorptivity (mε) of 241.

PURCHASING INFORMATION:

Purchase requests may be mailed, faxed or telephoned or e-mailed to:

Lead Poisoning/Trace Elements Laboratory
Wadsworth Center, New York State Department of Health
PO Box 509, Albany, NY 12201-0509

518-473-0452 (voice) 518-473-7586 (fax) trel@wadsworth.org (e-mail)

Please include with all orders:

Company name, Purchase order number, Shipping name, Address, Telephone number,
AND Billing name, Address, and Telephone number, if different.

Price: $20.00/vial (effective 1/1/2001). There is a $5.00 shipping and handling charge per order. We ship via UPS 2nd day air (blue label).

Technical Information:

Dr. Patrick J. Parsons, Laboratory Director (518) 474-5475

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