



TORT-2

Lobster Hepatopancreas Reference Material for Trace Metals

The following table lists those elements for which certified values have been established. Certified concentrations are based on results of determinations by at least two independent methods of analysis. The uncertainties represent 95% confidence limits for an individual subsample. That is, 95% of samples, 250 mg or greater, from any bottle would be expected to have concentrations within the specified range 95% of the time. Values are based on a dry weight.

Trace Metals (milligrams/kilogram)

Arsenic (g,h,m)	21.6	±	1.8
Cadmium (g,p)	26.7	±	0.6
Chromium (g,p)	0.77	±	0.15
Cobalt (g,m)	0.51	±	0.09
Copper (g,i,p)	106.	±	10.
Iron (g,i)	105.	±	13.
Lead (g,p)	0.35	±	0.13
Manganese (g,i,m)	13.6	±	1.2
Mercury (c,e)	0.27	±	0.06
Molybdenum (g,p)	0.95	±	0.10
Nickel (g,p)	2.50	±	0.19
Selenium (g,h,q)	5.63	±	0.67
Strontium (i,p)	45.2	±	1.9
Tin (p)	(0.04)*		
Vanadium (g,i,m)	1.64	±	0.19
Zinc (g,i,p)	180.	±	6.
Methylmercury(as Hg) (e,t)	0.152	±	0.013

*information value only

c - cold vapour atomic absorption spectrometry
 e - cold vapour microwave induced plasma atomic emission spectrometry
 g - graphite furnace atomic absorption spectrometry (GFAAS)
 h - hydride generation GFAAS
 i - inductively coupled plasma atomic emission spectrometry
 m - inductively coupled plasma mass spectrometry (ICPMS)

p - isotope dilution inductively coupled plasma mass spectrometry
 q - isotope dilution hydride generation ICPMS
 t - gas chromatography - electron capture detection

The coding refers only to the ultimate method of analyte determination. Methods of sample preparation or decomposition are available by request.

This reference material is primarily intended for use in the calibration of procedures and the development of methods used for the determination of trace metals in biological materials.

Storage

It is recommended that the reference material to be stored in a cool, clean location. The bottle should be well mixed by rotation and shaking prior to use, and tightly closed immediately thereafter.

Preparation of TORT-2

The starting material was freshly frozen "edible grade" lobster tomalley from Prince Edward Island. Prior to processing at the Canadian Institute of Fisheries Technology, Technical University of Nova Scotia, the tomalley was stored at -30°C to inhibit protein/oil degradation. The tomalley was thawed, homogenized to produce a finely divided slurry and spray dried. Following extraction with acetone to remove the oil, the powder was vacuum dried. The material was then mixed in a rotary blender, screened through a 0.058" mesh nylon screen, reblended and bottled. After bottling, the samples were radiation sterilized at Nordion International, Laval, Quebec.

Instructions for drying

TORT-2 can be dried to constant weight by:

- (1) drying at reduced pressure (e.g. 50 mm Hg) at room temperature in a vacuum desiccator over magnesium perchlorate for 24 hours.
- (2) vacuum drying (about 0.5 mm Hg) at room temperature for 24 hours

Stability

Inorganic components certified in the predecessor to TORT-2 (TORT-1) have been periodically analyzed for more than seventeen years with no loss of integrity. Similar characteristics are expected from TORT-2.

The methylmercury content of TORT-2 is continually monitored by NRC. Studies indicate the methylmercury content in similar materials has been stable for twelve years. This is not expected to change, provided the material is stored in an appropriate manner.

Updates

It is possible that more data may become available and the established values may be updated and certified values assigned to more elements. These updates will be forwarded to all users of this reference material and posted on our website (http://inms-ienm.nrc-cnrc.gc.ca/calserv/chemical_metrology_e.html).

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D.C. Baxter, H. Emteborg and W. Frech, Department of Chemistry, University of Umeå, S-901 87 Umeå, Sweden.

C. Anderson, M. Deuth and B. Lasorsa, Marine Science Laboratories, Battelle Pacific Northwest, Sequim, Washington.

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The results listed in this certificate are traceable to the SI through gravimetrically prepared standards of established purity and international measurement intercomparisons. As such, they serve as suitable reference materials for laboratory quality assurance programs, as outlined in ISO/IEC 17025. This CRM is registered at the Bureau International des Poids et Mesures (BIPM) in Appendix C of the Comité International des Poids et Mesures database listing Calibration and Measurement Capabilities accepted by signatories to the Mutual Recognition Arrangement of the Metre Convention.

Comments, information and inquiries should be addressed to:

Dr. R.E. Sturgeon
National Research Council of Canada
Institute for National Measurement Standards
M-12, Montreal Road
Ottawa, Ontario, Canada K1A 0R6

Telephone (613) 993-2359
Facsimile (613) 993-2451
E-mail crm.inms@nrc-cnrc.gc.ca

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