International Atomic Energy Agency
Analytical Quality Control Services
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REFERENCE SHEET

REFERENCE MATERIAL

IAEA-A-13

TRACE ELEMENTS IN FREEZE DRIED ANIMAL BLOOD

Date of issue: January 2000⊕

Recommended Values
(Based on dry weight)

Element	Recommended Value mg/kg	95% Confidence Interval mg/kg	N*
Br	22	19 – 24	13
Ca	286	226 – 332	18
Cu	4.3	3.7 – 4.8	32
Fe	2400	2200 – 2500	34
K	2500	2100 – 2700	18
Na	12600	11600 – 13500	19
Rb	2.3	1.7 – 3.1	10
S	6500	6000 – 7000	4
Se	0.24	0.15 – 0.31	7
Zn	13	12 – 14	34

* *Number of accepted laboratory results which were used to calculate the recommended values and confidence intervals about the median value.*

⊕ *Revision of the original reference sheet dated March 1983*

Information Values
(Based on dry weight)

Element	Information Value mg/kg	95% Confidence Interval mg/kg	N*
Mg	**99**	**81 – 139**	**16**
Ni	**1.0**	**0.6 – 1.4**	**4**
P	**940**	**690 – 1120**	**5**
Pb	**0.18**	**0.15 – 0.29**	**5**

***** *Number of accepted laboratory results which were used to calculate the information values and confidence intervals about the median value.*

The values listed above were established on the basis of statistically valid results submitted by laboratories which had participated in an international intercomparison exercise organized during 1981. The details concerning the criteria for qualification as a recommended value can be found in the report (IAEA/RL/98) "Report on the Intercomparison Run A-13: Trace Elements in Freeze Dried Animal Blood" [1]. This report is available free of charge upon request.

Intended Use

This sample is intended to be used as a reference material for the measurement of trace elements in blood. It can also be used as a quality control material for the assessment of a laboratory's analytical work, for the validation of analytical methods and for quality assurance within a laboratory.

Origin and preparation of the material

Fresh bovine blood was obtained from a slaughter house and was freeze dried at Seibersdorf. A batch of 40 kg of the dried material was prepared and further processed in a ball-mill. The fraction that passed through a 300 µm nylon sieve was further homogenized by mixing in a rotating plastic drum for 70 hours. The material was dispensed into plastic bottles in 25 g units without any further processing. Subsequently, the samples were irradiated to a dose of 2.5×10^4 Gy using a ^{60}Co source to ensure long-term stability of the material by inhibiting microbial action.

Homogeneity

The between and within bottle homogeneity of the material was assessed by determining the concentrations of potassium and zinc in 200 mg sub-samples using neutron activation analysis (NAA). The results were subjected to F and T tests and it was concluded that the material could be considered to be homogeneous for a sample size greater than or equal to 200 mg.

Dry weight determination

All recommended values are expressed on a dry weight basis. Therefore the dry weight must be determined at the time of analysis, using separate sub-samples of at least 500 mg dried to constant weight in a drying oven set to 105 °C. Subsequent weighings should differ by less than 5 mg.

Instructions for use

The recommended sample size for analysis is 200 mg. Analysts are reminded to take appropriate precautions in order to avoid contamination of the material during handling. No special precautions are required for the storage of this material.

Legal disclaimer

The IAEA makes no warranties, expressed or implied, with respect to the data contained in this reference sheet and shall not be liable for any damage that may result from the use of such data.

References

[1] Pszonicki L., Hanna A. N. and Suchny O., Report on the Intercomparison Run A-13: Trace Elements in Freeze Dried Animal Blood.
IAEA/RL/98, IAEA, Vienna, Austria 1983.

Issued & supplied by

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