



REFERENCE SHEET

REFERENCE MATERIAL

IAEA-153

Trace Elements in Milk Powder

Date of issue: January 2000

Recommended Values
(Based on dry weight)

Element	Recommended Value mg/kg	95% Confidence Interval mg/kg	N*
Br	12.32	11.01 - 13.64	5
Ca	12870	12540 - 13170	17
Fe	2.53	1.66 - 3.47	12
K	17620	16480 - 18760	15
Mg	1060	1000 - 1150	13
Na	4180	3870 - 4440	16
P	10100	9010 - 11040	7
Rb	14.03	12.27 - 16.10	8
Zn	39.56	37.66 - 41.23	21

Information Values
(Based on dry weight)

Element	Information Value mg/kg	95% Confidence Interval mg/kg	N*
Cu	0.57	0.38 - 0.78	16
Mn	0.19	0.12 - 0.26	7
Mo	0.31	0.09 - 0.60	6
Sr	4.09	3.49 - 4.73	6

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

Revision of the original reference sheet dated December 1997, original report date: May 1989.

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 1987. The details concerning the criteria for qualification as a recommended value can be found in the report (IAEA/AL/010) "Report on the Intercomparison Run IAEA-153: Trace Elements in Milk Powder" [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 milk powder. The material 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

The milk powder was donated to the IAEA by a milk processing facility in the former USSR. The material was produced from cow's milk obtained from animals that had grazed on land contaminated with radioactive fallout resulting from the Chernobyl incident in 1986.

A bulk sample of approximately 500 kg (in 25 kg sacks) of milk powder prepared in a single batch was received by the Agency's Laboratories at Seibersdorf. After a preliminary homogeneity test, the material was bottled into plastic bottles in 50 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 homogeneity was evaluated by determining the content of two marker elements (Ca and Zn) by atomic absorption spectrometry (AAS) and inductively coupled plasma atomic emission spectrometry (ICP-OES) in single samples (300 mg) taken from ten bottles, selected at random. On the basis of the results the contribution due the heterogeneity of the material was less than 3% and therefore the milk powder could be considered to be homogeneous for a sample size 300 mg.

Dry weight determination

All 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 minimum sample size for analysis is 300 mg. Analysts are reminded to take appropriate precautions in order to avoid contaminating the remaining material in the bottle. 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.

Reference

- [1] Strachnov V. I., Schelenz R. F. W., Dekner R., Zeiller E. and Burns K., Report on the Intercomparison Run IAEA-153: Trace Elements in Milk Powder IAEA/AL/010, IAEA, Vienna, Austria 1989.

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