



REFERENCE SHEET

REFERENCE MATERIAL

IAEA-V-8

Trace Elements in Rye Flour

Date of issue: September 1999[⊕]

Recommended Values
(Based on dry weight)

Element	Recommended Value mg/kg	95% Confidence Interval mg/kg	N*
Br	0.38	0.31 - 0.45	8
Ca	149	139 - 159	19
Cl	570	460 - 680	12
Cu	0.95	0.76 - 1.14	20
Fe	4.1	3.4 - 4.8	15
K	1925	1790 - 2060	26
Mg	121	112 - 130	12
Mn	2.06	1.94 - 2.18	22
P	592	506 - 678	8
Rb	0.48	0.41 - 0.55	7
Zn	2.53	2.20 - 2.86	23

Information Values
(Based on dry weight)

Element	Information Value mg/kg	95% Confidence Interval mg/kg	N*
Al	2.6	1.1 - 4.1	3
Ba	0.21	0.10 - 0.32	3
Cd	0.017	0.007 - 0.027	6
Co	0.0023	0.0014 - 0.0032	6
Cs	0.0020	0.0004 - 0.0036	4
Mo	0.12	0.06 - 0.18	3
Na	2.6	1.7 - 3.5	10
Sb	0.0026	0.0006 - 0.0046	4

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

⊕ Update of the reference sheet dated January 1982

The values listed above were established on the basis of statistically valid results submitted by laboratories which had participated in an international intercomparison exercise conducted in 1981. The details concerning the criteria for qualification as a recommended value can be found in the report (IAEA/RL/91) "Report on the Intercomparison V-8 of the Determination of Trace Elements in Rye Flour" [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 vegetation samples. 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.

Preparation of the material

A batch of approximately 200 kg of rye flour (prepared in an industrial mill) was homogenized at the Agency's Laboratories Seibersdorf. The batch was divided into four 50 kg lots. Each lot was sub-divided into four equal parts and a portion from each was re-combined to yield four new 50 kg batches. These batches were homogenized in turn by mixing them in a rotating plastic drum for 24 hours. The cycle of sub-dividing, combining and mixing was repeated once more. The material was then bottled into plastic containers each containing approximately 50 g. Finally, 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 within and between bottle homogeneity was evaluated by determining the content of two marker elements (Zn and K) by instrumental neutron activation analysis. A number of sub-samples (200 mg) was taken from a single bottle and an equal number of single samples were taken from individual bottles selected at random. A statistical analysis of the results using F and t-tests indicated that the within and between bottle results did not differ significantly and the material can therefore be considered homogeneous (at a sample intake mass at, or above, 200 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 200 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] Pszonicki L., Veglia A., Dybczynski R. and Suschny O., Report on the Intercomparison V-8 of the Determination of Trace Elements in Rye Flour IAEA/RL/91, IAEA, Vienna, Austria 1982.

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