



# REFERENCE SHEET

## REFERENCE MATERIAL

### IAEA-154

#### RADIONUCLIDES IN WHEY POWDER

Date of issue: January 2000<sup>⊕</sup>

**Recommended Values**  
(Based on dry weight)

*Reference Date for decay correction: 31<sup>st</sup> August 1987*

Element	Recommended Value Bq/kg	95% Confidence Interval Bq/kg	N*
<sup>40</sup> K	1575	1511 – 1644	23
<sup>90</sup> Sr	6.9	6.0 – 8.0	12
<sup>134</sup> Cs	1355	1295 – 1417	25
<sup>137</sup> Cs	3749	3613 – 3887	26

\* Number of accepted laboratory means which were used to calculate the recommended values and confidence intervals.

⊕ Revision of the original reference sheet dated November 1988

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/007) "Report on the Intercomparison Run IAEA-154: Radionuclides in Whey 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 radionuclides in milk products. 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**

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 250 g units without any further processing. Subsequently, the samples were irradiated to a dose of  $2.5 \times 10^4$  Gy using a  $^{60}\text{Co}$  source to ensure long-term stability of the material by inhibiting microbial action.

### **Homogeneity**

The homogeneity of the bottled material was assessed by measuring the  $^{134}\text{Cs}$  and  $^{137}\text{Cs}$  activities in twelve bottles, chosen at random, using gamma spectrometry. On the basis of the results the contribution due to the heterogeneity of the material was less than 2% and therefore the milk powder could be considered to be homogeneous for a sample size 250 g.

### **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 250 g. 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] Cooper E. L., LaBrecque J. J., Dekner R., Reichel F. and Schelenz R., Report on the Intercomparison run IAEA-154: Radionuclides in Whey Powder. IAEA/AL/007, IAEA, Vienna, Austria 1988.

*Issued & supplied by*

Analytical Quality Control Services (AQCS)  
Agency's Laboratories, Seibersdorf  
International Atomic Energy Agency  
P. O. Box 100  
A-1400 Vienna, Austria

*Prepared by*

*Z. Radecki, M. Campbell, K. I. Burns*