



# REFERENCE SHEET

## REFERENCE MATERIAL

### IAEA-373

#### RADIONUCLIDES IN GRASS

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

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

*Reference Date for decay correction: 31<sup>st</sup> December 1991*

Radionuclide	Recommended Value Bq/kg	95% Confidence Interval Bq/kg	N*
<sup>40</sup> K	432	421 – 443	76
<sup>90</sup> Sr	1312	1266 – 1358	37
<sup>134</sup> Cs	1167	1143 – 1191	80
<sup>137</sup> Cs	12350	12130 – 12570	84

#### Information Values (Based on dry weight)

Element	Recommended Value mg/kg	95% Confidence Interval mg/kg	N*
Th	0.047	0.040 – 0.055	10

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

⊕ Revision of the reference sheet dated August 1994

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 in 1992. The details concerning the criteria for qualification as a recommended value can be found in the report (IAEA/AL/073) "Report on the Intercomparison Run IAEA-373: Radionuclides in Grass" [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 vegetation samples. 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 material was obtained from the "Vladimirovka" collective farm, Poleskoe, Kiev, Ukraine in summer 1990. The material was air dried and milled to give a grain size less than 0.3 mm by the Brjansk Centre for Agricultural Radiology and Chemistry. The material was packed into 10 polythene sacks (containing approximately 14 kg of grass each) and dispatched to the Agency's Laboratories at Seibersdorf in November 1990.

The bulk material was recombined and homogenized at the Agency's Laboratories at Seibersdorf by mixing the powder in a 3000 L drum for 24 hours and then dispensed into plastic bottles in 250 g units. 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 using marker analytes for trace elements (U),  $\beta$ -emitters ( $^{90}\text{Sr}$ ) and  $\gamma$ -emitters ( $^{134}\text{Cs}$  and  $^{137}\text{Cs}$ ) for intake masses of 1 g, 20g and 6g respectively. For this study, six bottles were chosen at random and three determinations were made from each bottle. Taking into account the statistical uncertainties on the observed results, this material can be considered sufficiently homogeneous for its intended purposes at or above the specified intake masses.

*Note: Some evidence has been presented to suggest that this material may be contaminated with "hot particles" resulting from the Chernobyl accident. The frequency of the occurrence of these "hot particles" is unknown and consequently, it is possible that significantly elevated activities may be observed for anthropogenic radionuclides in some sub-samples.*

### **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 minimum intake masses for analysis of trace elements,  $\beta$ -emitters and  $\gamma$ -emitters are 1 g, 20g and 6g respectively.

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] Strachnov V., LaRosa J., Dekner R., Fajgelj A. and Zeisler R., Report on the Intercomparison run IAEA-373: Radionuclides in Grass. IAEA/AL/073, IAEA, Vienna, Austria 1996.

*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*