

Draft Protocol for the measurements of activity in Rice Reference MaterialCCRI(II)-S91. Target Radionuclides to be measured

Target radionuclides	materials	Sample weight (g)	Remark
Cs-137	Rice	150 g/ bottle	<u>1. Reference date</u>  <u>(1-January-2007)</u>  <u>2. 3 bottles will be provided)</u>
K-40			

2. Description of the rice

To produce rice containing  $^{137}\text{Cs}$ , the KRISS was in collaboration with the KAERI (Korea Atomic Energy Research Institute, Dae-Jeon, Korea). The rice culture was conducted from the paddy field in the greenhouse. An aqueous carrier-free radioactive solution (74 to 93 kBq ml<sup>-1</sup> as  $^{137}\text{CsCl}$ ) was applied to distribute uniformly on the water surface and then mixed with the topsoil to about a 15 cm depth. The rice plants were cut from 7 cm to 8 cm above the soil surface and separated into ears and straws. Plant

samples were air-dried in the greenhouse for more than 2 weeks. Chaffs were removed from the spikelets to obtain the hulled rice seeds. As the quantity of material obtained from KAERI was small and the measured activity of  $^{137}\text{Cs}$  was high, the sample was mixed with natural rice (to maintain a value above the Minimum Detectable Activity for  $^{137}\text{Cs}$ ). The rice was then ground into powder with a Bantam Mill, sieved at 500  $\mu\text{m}$ , homogenized using a V-blender. Finally, the rice was irradiated with  $^{60}\text{Co}$  gamma-rays (25 kGy) to sterilize the material.

A particle size analysis has shown that about 66 % of the rice was below 63  $\mu\text{m}$  and 95 % below 125  $\mu\text{m}$ . The density is (1.00)  $\text{g}/\text{cm}^3$ .

The moisture content of the rice was determined by drying several aliquots in an oven at 80 °C to constant weight (over 1 to 2 days) and was identified as (8 to 10) % at the time of sample preparation. **Therefore, it is strongly recommended that the water content be checked prior to use and that all results be reported as  $\text{Bq g}^{-1}$  on a dry-weight basis.**

### 3. Participation

Samples will be issued by the KRISS, on request, up to the end of 2011. Results should be reported to the KRISS within 2 months of the sample issue.

7 June 2011

#### **4. Report**

The Draft A report will be produced at the beginning of 2012 and circulated to all participants. The Draft B report will then be submitted to the KCWG(II) for approval prior to formal submission to the CCRI(II) for publication.