

Concentrations of Radiocaesium, ^{90}Sr and ^{129}I in Agricultural Crops Collected from Fukushima Prefecture and Reference Areas

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A large inventory of radiocaesium was deposited across the landscape from the FDNPS accident. On April 1, 2012, Standard Limits of radionuclide concentrations allowed in food were reduced as compared to the Provisional Regulation Values in Japan in 2011. The Standard Limits are calculated based on a 1 mSv y⁻¹ annual internal radiation dose through food ingestion of ^{134}Cs , ^{137}Cs , ^{90}Sr , Pu and ^{106}Ru , which were detected or possibly released into the environment from the 2011 accident.

The concentrations of radionuclides, other than radiocaesium, used in this assessment were based on the measured values of radiocaesium ($^{134+137}\text{Cs}$); the concentrations of the other radionuclides (^{90}Sr , Pu and ^{106}Ru) were determined from their assumed ratio compared to the ^{137}Cs concentration. These ratios of the concentration in edible plant tissues of a given radionuclide (^{90}Sr , Pu and ^{106}Ru) to that of ^{137}Cs were determined from ratios observed in deposition to soil and from soil-to-plant transfer factors in the literature. The Standard Limit of radiocaesium in general food was determined to be 100 Bq kg⁻¹ by the Ministry of Health, Labour and Welfare.

Average activity concentration of radiocaesium in the agricultural crops collected in the vicinity of the cities of Fukushima and Date in Fukushima Prefecture in 2012 was 7.6 (<0.2-40) Bq kg⁻¹ fresh weight, but it decreased in 2013 to 2.0 (<0.1-14) Bq kg⁻¹ fresh weight, which was approximately one-fourth of the concentration in 2012. The activity concentration of ^{90}Sr in agricultural crops collected in Fukushima Prefecture in 2013 was 0.0047-0.31 Bq kg⁻¹ fresh weight. This was a similar range to ^{90}Sr activity concentrations derived from the global fallout found in samples collected throughout Japan. The activity concentration of ^{129}I in spinach collected from Fukushima was higher than that collected from reference areas, but less than 0.1 mBq kg⁻¹ fresh weight.

Keywords: *Agricultural environment, Agricultural crop, Internal radiation dose*

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