Monitoring Inspection for Radiocesium in Agricultural, Livestock, Forestry and Fishery Products in Fukushima Prefecture

*Nihei Naoto[1], Keitaro Tanoi[1], Tomoko Nakanishi[1]

1. Graduate School of Agricultural and Life Sciences, The University of Tokyo

The Tohoku Region Pacific Coast Earthquake, which occurred on March 11, 2011, caused an accident at the Fukushima Daiichi power station operated by the Tokyo Electric Power Company. Radioactive material, such as cesium, released by the accident spread to farmlands in Fukushima and neighboring prefectures, and contaminated the soil and agricultural products. The Ministry of Health, Labor and Welfare established a provisional regulation level of 500 Bq/kg for radiocesium in cereals, vegetables, meat, and fishery products. In April 1, 2012, a new maximum limit of 100 Bq/kg was established as a new standard of radiocesium in general food. To verify the safety of agricultural products, the Nuclear Emergency Response Headquarters have been conducting emergency environmental radiation monitoring of agricultural and fishery products (hereafter referred to as monitoring inspections). Monitoring inspections were performed before shipment of the food products. If the radioactivity detected in the food exceeded the regulation level, the government would order the municipalities to suspend the shipment or limit consumption. By the end of March 2016, approximately 500 types of foods were selected, and 100,000 samples were analyzed in total. We summarized the monitoring inspections of radiocesium concentration levels in Fukushima Prefecture for 5 years.

The ratio in which radiocesium concentration exceeded the 100 Bq/kg from March 2011 to June 2011 was 18% in agricultural products (excluding rice), 3% in livestock productions, 49% in forest productions, and 52% in fishery produced. The maximum concentration of radiocesium in this period was 84,000 Bq/kg. The high concentration value could be attributed mainly to direct deposition of the fallout on plants that had already grown at the time of the accident. If people consume vegetables, fruits, forestry products, meat, milk, and fishery products grown in Sousou area during March to June 2011, the calculated internal exposure is expected to be 0.75 mSv/year.

After June 2011, radiocesium concentration reduced drastically. Radiocesium concentration in agricultural and livestock products hardly exceeded 100 Bq/kg. Radiocesium concentrations of forestry and fishery products have been falling every year, but there were a little sample which exceeded 100 Bq/kg. In addition to the decrease in the concentration of radioactive nuclides based on the physical half-lives, tillage also contributed to the decrease in the concentrations of radioactive nuclides in plants grown in the field, because radioactive cesium is firmly attached to the clay minerals, and by mixing, the concentration of cesium decreases. Application of potassium, an element homologous to cesium, to the field is another effective tool to minimize cesium uptake in the plants.

Rice is the main staple food of the Japanese diet, and the most valuable agricultural product. In 2012, Fukushima Prefecture decided to investigate the radiocesium concentration in all rice using custom-made belt conveyor testers. Notably, rice with radiocesium concentration levels over 100 Bq/kg were detected in only 71, 28 and 2 bags out of the total 10,338,000 in 2012, 11,001,000 in 2013, 10,956,000 in 2014 respectively. Since 2015, there were no bags which with higher radioactivity than 100Bq/kg.

Keywords: Radiocesium, Monitoring Inspection, Checking all bags of rice for radiation

©2017. Japan Geoscience Union. All Right Reserved.