Cs transfer to rice plants from soil after continuous application of organic materials at Iitate Village

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Iitate Village is located at about 40 km northwest from the Fukushima Daiichi Nuclear Power Plant. An agricultural fertile layer in agricultural fields was contaminated by radiocesium (134-Cs and 137-Cs) due to the accident of the Fukushima Daiichi Nuclear Power Plant in 2011. All the villagers in Iitate Village have been forced to evacuate since May 2011. The local and central governments announced that villagers who wanted to come back to the village were allowed to return home by some time in 2017 after the decontamination work. The villagers, especially farmers, returning home may face and overcome damage caused by harmful rumors or misinformation. Wiping off such damage may be very difficult so that it is necessary to continue sending correct information. We examined radiocesium transfer to rice plants from soil at paddies with continuous application of organic materials after stripping the contaminated top soil off.
We used an approximate 6x10 m paddy field at Iitate Village in Fukushima Prefecture. At first we decontaminated the field using the method of stripping 5 cm top soil off in 2013. After decontamination, we made three different treatments such as (1) mixed with rice straw harvested previous year at the same paddy, (2) only decontaminated as a control, and (3) mixed with cattle manure compost. We sampled top soils from each treatment and 134-Cs and 137-Cs concentration of the sampled soils were analyzed using a Ge semiconductor detector. The concentration of 134-Cs and 137-Cs in rice plants was also analyzed by a Ge semiconductor detector after harvest.
A transfer rate defined as total radioactive Cs concentration with 134-Cs and 137-Cs in rice plants relative to that in soil was very small in every treatment. The amount of 134-Cs was smaller than that of 137-Cs because the half-life time of 134-Cs was shorter than that of 137-Cs. The transfer rate of brown rice was lower than that of unhulled rice, meaning that rice husk contained more Cs than brown rice. Transfer rates in 2014 were lower than in 2013. It might be resulted from smaller transfer rates in 2014 because of more Cs fixed by soil and more radioactive decay having advanced.

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