Study on physicochemical fractions of radionuclides -Fractions of ^{137}Cs in soil and irrigation water and their transfer to rice-

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The fate of radiocesium in the environment depends on its physicochemical fractions. In order for radiocesium to be taken up by plants it has to be dissolved in water. Therefore, it is important to determine the dissolved and soluble fractions of radiocesium in irrigation water and soil. The transfer of radiocesium from soil (Bq kg^{-1}) to brown rice (Bq kg^{-1}) via root uptake is not efficient, with the transfer ratio being approximately 0.001. However the transfer ratio of radiocesium from irrigation water (Bq L^{-1}) to brown rice (Bq kg^{-1}) is 10, (indicating that plant adsorption of radiocesium is 10,000 times more efficient than root uptake). The concentration of radiocesium in brown rice collected from Oguni, Date in 2011 was over 500 Bq kg^{-1} (Provisional regulation value at 2011). Soil, irrigation water and brown rice were collected from Oguni in 2013, and the concentration and the physicochemical fractions of radiocesium were determined. The concentration of radiocesium in the soil was 3,000 Bq kg^{-1} and most of the radiocesium in the soil existed in a strongly bound fraction (87 %). The concentration of radiocesium in the water was 0.03 Bq L^{-1}, which was a negligible value for uptake of radiocesium by rice. Prior to 2011, potassium fertilizer in Oguni was applied inefficiently and radiocesium uptake accelerated in rice plants.

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