

TRANSFER OF TECHNETIUM FROM SOIL TO PLANT

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Technetium-99 is regarded as an important radionuclide in radiation protection. This is due to its long half life (2.1×10^5 y) and relatively high fission yield. This nuclide is discharged into the environment from nuclear weapons testing and nuclear facilities. For nuclear safety assessment, it is necessary to obtain information on the behavior of this nuclide in the soil-plant system. In our previous studies, we have performed radiotracer experiments using ^{95m}Tc on the transfer of Tc from soil to the edible part of selected agricultural crops. The soil-plant transfer factor which is defined as "concentration of the nuclide in plant (Bq g^{-1} fresh weight)" divided by "concentration of the nuclide in dry soil (Bq g^{-1} dry weight)" observed for rice grain (hulled) was ≤ 0.005 . The transfer factors for wheat plants were considerably higher than those for rice plants, e.g. 0.027 in the hulled grain. The transfer factor for upland rice grains (0.021) was also higher than those for rice plant [2]. The Tc tracer (TcO_4^-) added to the paddy soil was observed to be transformed to insoluble forms under the reducing conditions resulting from flooding. This caused the low transfer factor in plants grown on the flooded soil. The transfer factor for rice plants also varied with soil types [3].

In case of vegetables, transfer factors of Tc were higher than those of rice grains and they depended on the type of plants [4]. The values for non-leaf vegetables, e.g. carrot (0.3), onion (0.05), sweet potato (0.03) and tomato (0.03), were considerably lower than those for leaf