

Transfer factor of natural radionuclides from clay loam soil to sesame and Cowpea : radiological hazards

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ABSTRACT

Background: This work investigated the transfer factor of radionuclides from clay loam soil to sesame and cowpea plants. Materials and Methods: Twenty samples from the plant and twenty samples from its soil were collected from five different locations (farms). Gamma-ray spectrometry was used to determine the activity concentration for the samples. In addition, the soil physicochemical characteristics such as pH value, the amount of organic content and texture of soil were investigated by pH meter, Walkley-Black and particle size distribution (Pipette) methods, respectively. Results: The average activity concentrations, respectively, of ²²⁶Ra, ²³²Th, and ⁴⁰K were 12.75, 10.20 and 131.75 Bq kg⁻¹ for the clay loam soil, 5.20, 4.15 and 171.00 Bq kg⁻¹ for sesame and 6.70, 5.60 and 182.90 Bq kg⁻¹ for cowpea. The transfer factor from soil to sesame and cowpea was discussed. The average values of transfer factor were 0.51, 0.53 and 1.36 (for cowpea) and 0.42, 0.43 and 1.33 (for sesame), respectively for ²²⁶Ra, ²³²Th and ⁴⁰K. The results showed that the transfer factor in cowpea is much greater than that in sesame. As a result of the ingestion of the radionuclides from the plants, the average annual dose was lower than the 290 μSv y⁻¹ world average. Conclusion: Accordingly, the radiological risk due to the intake of the natural radionuclides in these plants was immaterial.

KEYWORDS

Natural radionuclides; Clay Loam soil; Transfer factor; Radiological hazards

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