

Study on the Migration and Health Risk of Uranium in the Paddy Soil Downstream the Uranium Mine Tailing

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Extraction of uranium and ore proceeding produce uranium tailings, which result in soil contamination[1]. To determine the migration law of uranium in soil and assess the health risks of this radionuclide, paddy soil downstream an abandoned uranium tailing was selected as the subject in the present work. Field survey was conducted in the northern Xiangshan uranium ore field located in the central part of Jiangxi Province. The static adsorption test and soil pillar experiment for uranium were conducted based on the soil sampled in the study area. The results of static adsorption test showed that the adsorption data of soil were well fitted with the Langmuir isotherm and pseudo-second order model, and monolayer adsorption capacity of uranium onto soil was 0.6354 mg/g. The soil pillar experiment showed that the uranium migration velocity was 0.384 cm/d and 1.655 cm/d when the initial concentration of uranium was 10 mg/L and 20 mg/L, respectively. With the two different initial uranium concentrations, the retention factor of the soil was 78.12 and 18.13, respectively. Additionally, The adsorption distribution coefficient was 7.75 and 1.72, respectively. The health risk assessment of uranium in soil showed that the max personal exposure level is 9.47×10^{-2} mSv, which was lower than the recommended value (1 mSv) provided by the regulations for environmental radiological assessment in uranium mining and milling[2]. Therefore the uranium in soil of study area will not pose cancer risk to human health.

[1] Jagetiya, B.L. *et al.* (2006), *Biologia*, 61, 103-107.

[2] EJ521-1990 (1990). Regulations for environmental radiological assessment in uranium mining and milling.