

Abstract

This study examines the exposure levels and the consequent radiological effects of natural radioactivity on the people of Mt. Elgon Kenya. Soil and Irish potato samples were obtained for this purpose. The gathered samples were processed and evaluated using gamma ray spectrometry at the physics laboratory of South Eastern University Kenya. The mean activity concentration of Ra-226, Th-232, and K-40 were determined to be: 68 ± 3.42 , 359 ± 17.98 and 394 ± 19.73 Bq/kg for soil; 38 ± 1.93 , 308 ± 15.44 and 776 ± 38.83 Bq/kg for Irish potatoes. The soil annual effective dosage measured indoors for Ra-226, Th-232, and K-40 falls within the following range of 0.12 – 0.25 mSv/y with an average of 0.18 mSv/y. The average outdoor annual effective doses in soil averaged at 0.12 mSv/y. The average radium equivalent, internal hazard index, external hazard index, absorbed dose rate and annual gonadal index (AGED) for all examined soil samples were 332 ± 16.53 Bq/kg, 1.3 ± 0.06 mSvy⁻¹, 1.4 ± 0.07 mSvy⁻¹, 51 ± 2.56 nGyh⁻¹ and 254 ± 12.7 mSvy⁻¹ respectively. All the radiological parameters were below the recommended standards of 370 Bq/kg, 100 mSvy⁻¹, 60 nGyh⁻¹ and 300 mSvy⁻¹ respectively set by ICRP, with the exception of a few soil samples. The translocation of radionuclides from soils-to-Irish potatoes were 0.5 ± 0.02 , 0.8 ± 0.04 and 1.9 ± 0.09 for ²²⁶Ra, ²³²Th and ⁴⁰K respectively. Hence, soils obtained from the study area are rich in potassium minerals, thorium minerals and uranium minerals.