

## Abstract

This study evaluated the soil to plant transfer factors of khat (*Catha endulis*) to determine the absorption potential of natural radionuclides. Soil and leaves of Khat were sampled from Igembe south subcounty, Kenya and analyzed for concentrations of primordial radionuclides using a Thallium doped NaI gamma ray detector. Soil to plant transfer factors were calculated from activity concentrations and radiological safety of the ingested radionuclides was determined by annual effective dose (IAED), internal hazard index ( $H_{in}$ ) and risk assessment parameter (RAP). Test results showed that the average soil to plant transfer factors for  $^{232}\text{Th}$ ,  $^{238}\text{U}$  and  $^{40}\text{K}$  were 0.0825, 0.143 and 1.575 respectively. The transfer factors of  $^{40}\text{K}$  were greater than 1 in more than 88% of the samples. The soil to plant transfer factors varies directly with energy of the gamma ray emitted and inversely with activity concentration of the radionuclides. The average IAED,  $H_{in}$ , and RAP were  $1.136\pm 0.390\text{mSv/y}$ ,  $0.210\pm 0.070$ ,  $0.0568\pm 0.021\%$  respectively. Radiation hazard indices were within the safe limits and the fatality percentage was negligible. Therefore, there is no radiation risk associated with chewing of the sampled khat, and most of the radionuclides present in soil are not absorbed by Khat.