

## ANNUAL EFFECTIVE DOSE AND EXCESS LIFE CANCER RISKS FROM COMMONLY CONSUMED VEGETABLES CULTIVATED THROUGH SURFACE WATER IRRIGATION IN LAGOS METROPOLIS

The specific activities of  $^{226}\text{Ra}$ ,  $^{232}\text{Th}$  and  $^{40}\text{K}$  in some commonly consumed leafy vegetables cultivated through surface water irrigation in Lagos metropolis were determined using High Purity Germanium (HPGe) detector. To assess the radiation hazards associated with the consumption of these vegetables, annual effective dose (AED) and excess lifetime cancer risk (ELCR) were also determined. The specific activities of  $^{226}\text{Ra}$ ,  $^{232}\text{Th}$  and  $^{40}\text{K}$  in the investigated samples ranged from  $0.49 \pm 0.44$  to  $6.00 \pm 1.19$  Bq/kg, with an average value of  $2.08 \pm 0.59$  Bq/ for  $^{226}\text{Ra}$ , from  $0.10 \pm 0.07$  to  $0.61 \pm 0.12$  Bq/kg with an average value of  $0.85 \pm 0.08$  Bq/kg for  $^{232}\text{Th}$  and from  $28.69 \pm 3.09$  to  $126.71 \pm 5.86$  Bq/kg with an average value of  $72.56 \pm 5.36$  Bq/kg for  $^{40}\text{K}$ . The mean activities of  $^{226}\text{Ra}$  and  $^{232}\text{Th}$  were 40 and 56 times higher than the (World Health Organisation (WHO) reference values for  $^{226}\text{Ra}$  and  $^{232}\text{Th}$  in leafy vegetables respectively. The AED estimated from the consumption of vegetables was  $0.048$  mSv/y, which is about 16 % of the reference AED value for radionuclides of natural origin in the total diet while leafy vegetable represents about 8 % of the total diet of an adult in Lagos. The ELCR obtained from this study was  $0.17 \times 10^{-3}$  this is lower than the world's average value. This study has found elevated concentrations of  $^{226}\text{Ra}$  and  $^{232}\text{Th}$  in leafy vegetables, and noticeable increase in AED associated with  $^{226}\text{Ra}$  exposure in the consumption of leafy vegetables cultivated in Lagos. There are therefore potential radiological health risks to the health of the public from long-term consumption of leafy vegetables cultivated through surface water irrigation in Lagos, Nigeria.

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**Session Classification:** Environmental Measurements

**Track Classification:** Environmental Measurements