

Natural Radionuclides and Doses Assessment in Soil Samples from Agbara Industrial Estate, Ogun State, Nigeria

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Abstract : Record of radionuclide concentration in an environment is essential to ensure human safety due to exposure to ionizing radiation. This study aimed at assessing the radionuclide concentration and doses from soil samples in the study area. Twenty soil samples were collected and dried in the oven at 110°C to remove the moisture, pulverized, and sieved. 200 g of each of the samples were sealed in cylindrical sample holders; they were left for four weeks to attain secular equilibrium between ^{226}Ra and its decay daughters, after which the sample was analyzed using gamma-ray spectrometry. After the well-guided procedure for the calibrations, the analysis of the samples was carried out using a well-calibrated NaI (TI) and well-shielded detector coupled to a computer resident quantum MCA2100 R Multichannel analyzer for 36,000 s. The mean activity concentrations of ^{40}K , ^{226}Ra , and ^{232}Th obtained were calculated to be 272.37 ± 33.58 , 10.97 ± 3.24 , 9.39 ± 2.27 Bqkg⁻¹ respectively. The average absorbed dose obtained was 22.10 nGy/h. The radium equivalent activity (Raeq) was estimated to be 43.27 Bq/kg. The activity concentrations (Bq/kg) were below the recommended values, which are 420, 33, and 45 for ^{40}K , ^{226}Ra , and ^{232}Th , respectively. Considering the results, we conclude thus, the radiation level within the estate poses no significant health risk on dwellers and workers.

Keywords : absorbed, effective, multichannel, radionuclide

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