

ESTIMATION OF RADIATION DOSE PARAMETERS AND RADIOLOGICAL HAZARD INDICES DUE TO A LIMESTONE MINING COMPANY AROUND IN SAGAMU, OGUN STATE, NIGERIA

This work investigated the radioactivity due to some selected radionuclides in the vegetation, soils and waters in an urban settlement around a cement producing factory. Samples of the vegetation, soils and waters were collected from different locations close the factory and were treated for HPGe gamma spectroscopy to detect and measure the activity concentration of the radionuclides present in the different samples. The gamma absorbed dose rate and annual effective dose equivalent were calculated so as to estimate the hazard index of the primordial radionuclides. The mean absorbed dose and effective dose is 51.61 nGy h^{-1} and 0.237 mSv respectively. The excess lifetime cancer risk was calculated as 0.772. The mean annual effective dose estimated for infants, children and adult citizens that ingest river water sampled were $0.23, 0.63 \times 10^{-3}$ and $0.90 \times 10^{-3} \text{ mSv y}^{-1}$ respectively. The values of annual effective dose for infants, children and adults were within the reference levels of 0.26, 0.20 and 0.10 mSv y^{-1} respectively. The estimated fatal cancer risk to adult citizens and the lifetime hereditary effects was estimated for an adult. The radiological hazard indices such as absorbed dose rate, hazard indices (H_{ex} and H_{in}), gamma index, alpha index, annual gonads dose were calculated and found to be below the internationally recommended values. But the annual outdoor and indoor effective dose equivalent (AEDE) which are 2.44 and 9.79 mSv y^{-1} respectively were above the recommended limit of 1 mSv y^{-1} . The excess lifetime Cancer Risk (ELCR_{out}) was above the world average value of 0.29×10^{-3} as recommended by UNSCEAR.

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