

Original Research Article

Computation of radiation risk parameters due to gamma radiation doses from some rivers within oil producing communities of Abia State, Nigeria

ABSTRACT

Oil production involves the extraction of petroleum, gas and produced water, with some associated natural radionuclides from the sub-surface which could enhance background ionization radiation. This study presents the radiological analyses and computation of radiation risk parameters due to gamma radiation doses from some water samples harvested from around some oil producing communities in Abia State, Nigeria. The measurement was carried out using Sodium Iodide detector that is activated by thallium, and the radiological risk parameters computed were the annual effective dose of radiation due to ingested water (EDIW), the Annual Gonadal Dose Equivalent (AGDE) and the Excess Lifetime Cancer Risk (ELCR). The computed radiological risk parameters show that the annual effective dose of radiation due to ingested water by an individual ranged from 1.89 mSv y^{-1} to 3.52 mSv y^{-1} , and exceeded the 0.1 mSv/yr permissible limit recommended by the International Commission on Radiological Protection (ICRP). The Annual Gonadal Dose Equivalent ranged from 0.041 mSv y^{-1} to 0.075 mSv y^{-1} and is below the World average value of 0.3 mSv y^{-1} . The Excess Lifetime Cancer Risk ranged between 5.30×10^{-3} and 9.87×10^{-3} and is above the World permissible limit of 0.29×10^{-3} . The elevation of most of the radiological parameters may be attributed to oil production activities within these environments and may likely have negative impacts on inhabitants who consume the water and also use for other economic activities.