

Assessment of Radionuclide Content of Shore Sediments Collected from the Bank of River Benue, North-Central Nigeria

Terver Sombo¹, Ejembi Emmanuel², Jonathan Ugwuanyi¹

¹Department of Physics, University of Agriculture, Makurdi, Nigeria

²Department of Natural and Applied Sciences, Namibia University of Science and Technology, Windhoek, Namibia

Email: emmy2save@yahoo.com

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Abstract

Ionizing Radiation emitted from radionuclide has an adverse effect on human health. A continuing population exposure to naturally occurring radioactive materials (NORMS) found in our environment is one of the major scientific subjects that attract public attention. The assessment of radionuclide content of shore sediments of river Benue-North Central Nigeria was carried out using gamma-ray spectrometry. The activity concentrations of U-238, Th-232 and K-40 were found to have an average concentration of 1.17, 3.31 and 405.95 Bq·kg⁻¹ respectively. The values gotten from present study were compared with the world average values. World average values of U-238, Th-232 and K-40 are 50 Bq·kg⁻¹, 50 Bq·kg⁻¹ and 500 Bq·kg⁻¹ respectively. The mean concentration of daughter radionuclides generated from U-238, Th-232 was 4.32, 10.37, 5.24, 3.86, 11.87, and 6.52 for Bi-212, Pb-212, Bi-214, Pb-214, Ra-226 and Ac-228, respectively. The mean of the absorbed dose, Annual effective dose equivalent, for radium equivalent activity, and external hazard index, were evaluated to be 19.45 nGy·h⁻¹, 23.82 μSv·y⁻¹, 37.16 Bq·kg⁻¹, 0.10 mSv·y⁻¹, below the permissible limit of 57 nGy·h⁻¹, 70 μSv·y⁻¹, 370 Bq·kg⁻¹ and 1 mSv·y⁻¹ respectively. These shore sediments from river Benue are therefore, radiologically safe for construction and other domestic and industrial purposes.

Keywords

Radionuclides, Sediments, Gamma Spectrometry, Radiological Parameter

1. Introduction

Trace numbers of radionuclides such as U-238, U-235 and Th-232 occur in the

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