

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

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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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Table of Contents Relations Among Radionuclide Content P

1. Understanding the eBook Relations Among Radionuclide Content P
 - The Rise of Digital Reading Relations Among Radionuclide Content P
 - Advantages of eBooks Over Traditional Books
2. Identifying Relations Among Radionuclide Content P
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Relations Among Radionuclide Content P
 - User-Friendly Interface
4. Exploring eBook Recommendations from Relations Among Radionuclide Content P
 - Personalized Recommendations
 - Relations Among Radionuclide Content P User Reviews and Ratings
 - Relations Among Radionuclide Content P and Bestseller Lists
5. Accessing Relations Among Radionuclide Content P Free and Paid eBooks

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- Relations Among Radionuclide Content P eBook Subscription Services
- Relations Among Radionuclide Content P Budget-Friendly Options
- 6. Navigating Relations Among Radionuclide Content P eBook Formats
 - ePub, PDF, MOBI, and More
 - Relations Among Radionuclide Content P Compatibility with Devices
 - Relations Among Radionuclide Content P Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Relations Among Radionuclide Content P
 - Highlighting and Note-Taking Relations Among Radionuclide Content P
 - Interactive Elements Relations Among Radionuclide Content P
- 8. Staying Engaged with Relations Among Radionuclide Content P
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Relations Among Radionuclide Content P
- 9. Balancing eBooks and Physical Books Relations Among Radionuclide Content P
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Relations Among Radionuclide Content P
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Relations Among Radionuclide Content P
 - Setting Reading Goals Relations Among Radionuclide Content P
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Relations Among Radionuclide Content P
 - Fact-Checking eBook Content of Relations Among Radionuclide Content P
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development

- Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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