ISA Journal of Medical Sciences (ISAJMS)

Homepage: https://isapublisher.com/isajms/
Email: office.isapublisher@gmail.com

Volume 2, Issue 5, Sept-Oct, 2025 ISSN: 3049-1746

Assessment of Radiation Levels in Building Materials Sold in Selected Shops in Adikpo, Kwande Local Government Area, Benue State

Grace Amadu

Benue State University, Makurdi-Center for Food Research and Technology

Received: 21.08.2025 | **Accepted:** 30.08.2025 | **Published:** 02.09.2025

***Corresponding Author:** Grace Amadu

DOI: *10.5481/zenodo.16985298*

Abstract **Review Article**

This study assesses the radiation levels in building materials sold in selected shops in Adikpo, Kwande Local Government Area of Benue State, Nigeria. The assessment was conducted to determine the potential radiological hazards associated with these materials. Four shops were selected based on their locations: Shop 1 (Katsina Ala Road), Shop 2 (Koti Yough Road), Shop 3 (Obudu Road), and Shop 4 (Jato Aka Road). Radiation levels were measured using a portable Geiger-Muller counter. The results were analyzed to ascertain compliance with international safety standards set by regulatory bodies such as the International Commission on Radiological Protection (ICRP) and the Nigerian Nuclear Regulatory Authority (NNRA). The findings provide insights into the safety of building materials available in the area and their implications for public health.

Keywords: Radiation Levels, Building Materials, Selected Shops in Adikpo, Kwande Local Government Area, Benue State.

1. INTRODUCTION

The presence of naturally occurring radioactive materials (NORMs) in building materials poses a potential health risk to humans, especially through prolonged exposure. Building materials such as cement, bricks, tiles, and granite may contain traces of radionuclides like uranium-238 (238U), thorium-232 (232Th), and potassium-40 (40K). Exposure to ionizing radiation from these materials can contribute to internal and external radiation doses received by individuals over time.

This research aims to measure the radiation levels in selected building materials sold in Adikpo, Kwande LGA, Benue State, to evaluate potential health risks and ensure that they comply with recommended safety standards.

2. METHODOLOGY

2.1 Study Area

Adikpo is the headquarters of Kwande Local Government Area in Benue State, Nigeria. The study focused on four major shops where building materials are sold:

Shop 1: Katsina Ala Road

Shop 2: Koti Yough Road

Shop 3: Obudu Road

Shop 4: Jato Aka Road

2.2 Sample Collection

Samples of commonly used building materials, including cement, sand, granite, and clay bricks, were obtained

from each shop. The samples were labeled and prepared for radiation level measurement.

2.3 Radiation Measurement

A portable Geiger-Muller counter was used to measure the radiation emission from the building materials. Each sample was measured three times, and the average reading was recorded. Background radiation levels were also recorded for comparison.

2.4 Data Analysis

The measured radiation levels were compared with the permissible limits set by the ICRP and NNRA. Statistical methods were used to determine any significant variations among the different shops.

3. RESULTS AND DISCUSSION

3.1 Radiation Levels in Building Materials

Shop location	**Material type**	**Radiation level (µsv/hr)**	**Background radiation (µsv/hr)**	**remarks**
Shop1: katsina road	cement	0.12	0.09	Within limit
	granite	0.15	0.09	Within limit
	sand	0.10	0.09	Within limit
Shop 2: koti yough road	cement	0.14	0.09	Within limit
	Clay bricks	0.18	0.09	Slightly elevated
	sand	0.11	0.09	Within limit
Shop 3: obudu road	cement	0.13	0.09	Within limit
	granite	0.16	0.09	Within limit
	sand	0.09	0.09	Safe
Shop 4: jato aka road	cement	0.12	0.09	Within limit
	Clay bricks	0.20	0.09	Elevated
	sand	0.10	0.09	Safe

The measured radiation levels from each shop were analyzed and compared to global safety standards. Preliminary findings indicate that some materials exhibit slightly elevated radiation levels, which may be attributed to their geological sources.

All materials recorded radiation levels within internationally recommended limits, clay bricks from shop 4 showed slightly elevated radiation levels, but still within the acceptable margins, background radiation levels remain consistent across all locations (0.09 **(µsv/hr)**)

3.2 Health Implications

Prolonged exposure to radiation from these materials may pose health risks such as increased cancer risk and genetic mutations. However, all recorded levels were within acceptable limits, suggesting minimal health risks.

3.3 Regulatory Compliance

All tested materials complied with the radiation safety standards set by regulatory bodies. However, continuous monitoring and regulation are recommended to prevent future health hazards.

4. CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

This study provides a preliminary assessment of radiation levels in building materials sold in Adikpo, Kwande LGA. The findings indicate that the materials are generally safe for use, with radiation levels within permissible limits.

4.2 Recommendations

i. Regular monitoring of radiation levels in building materials to ensure compliance with safety standards.

ii. Further studies using advanced radiation detection techniques for more comprehensive analysis.

iii. Public awareness campaigns on radiation exposure from building materials.

iv. Regulatory bodies should enforce guidelines to limit the use of high-radiation materials in construction.

REFERENCES

International Commission on Radiological Protection (ICRP) guidelines

Nigerian Nuclear Regulatory Authority (NNRA) safety regulations

Previous studies on radiation levels in building materials