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Radiological Assessment of cement particles from Obajana Factory

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Massive building constructions result to high demand of cement production in recent time. This lead Obajana cement plant to operate at maximum capacity in Nigeria. Exposure to high level radiation for prolong period can result to acute health effects such as skin burns, cancer and cardiovascular disease. This study evaluates the natural radionuclides and radiological indices of cement particles from productions plant of Obajana Factory. Gamma ray spectroscopy was used to analyze the activity level of 226Ra, 232Th and 40K in the samples. The activity concentration of the sample ranged between (7.4719±1.9179 – 60.1351±8.5508) BqKg-1, (29.4892±1.1009 – 90.1191±6.2124) BqKg-1 and (84.8930±3.8076 – 179.3318±11.4227) Bqkg-1, with the average value 36.0011±17.5529 Bqkg-1, 49.2077±21.1908Bqkg-1, and 146.6098±45.0115 Bqkg-1 for 40K, 226Ra and 232Th respectively. The activity concentrations of 226Ra and 232Th were slightly above the corresponding world average concentration of 32 BqKg-1 for 226Ra and 45 BqKg-1 for 232Th. The high concentration might be attributed to material composition used for cement production in Obajana Cement Factory. The average values of Absorbed dose (D), Annual effective dose rate (H), Annual gonad dose equivalent (AGDE) and Excess lifetime cancer risk (ELCR) are 53.303 nGy-1, 0.065 mSv, 363.961 mSvy-1 1.928 x10-3 respectively. The absorbed dose and annual gonad dose equivalent were lower than the world standard of 60 nGy-1 and 1.0 mSv respectively, while the Annual gonad dose equivalent (AGDE) and Excess lifetime cancer risk (ELCR) were slightly above the world standard of 300 mSvy-1 and 0.29 x10-3 respectively. The average value of External and Internal hazard indices (Hex and Hin) were below world standard of unity. The radiological assessment from this research compared favorably with other related published studies and world permissible limits, therefore constitute no radiological risk.

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