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Assessment of Radioactivity Contents and Associated Risks in Some Soil Used for Agriculture and Building Materials in Cameroon

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ABSTRACT

A survey of radioactivity content and associated radiological risks was carried out in various soils used for agriculture and building materials in Cameroon by means of a well-calibrated high-purity germanium detector. Soil samples were collected directly from the agricultural farms and the brick ' s factories, air-dried at room temperature to a constant mass, crushed, sieved and sealed for at least one month before analysis. The specific activity of ^{238}U ranged from 5.36 ± 0.39 to 51.28 ± 9.67 Bq · kg^{-1} with an average of 34.52 ± 7.18 Bq · kg^{-1}; 232Th from 4.03 ± 1.03 to 24.74 ± 3.10 Bq · kg^{-1} with an average of 16.67 ± 4.28 Bq · kg^{-1}; ^{40}K ranged from 16.18 ± 3.11 to 467.40 ± 50.80 Bq · kg^{-1} with an average of 186.96 ± 16.21 Bq · kg^{-1}; while that of the fallout ^{137}Cs ranged from 0.00 to 4.79 ± 1.75 Bq · kg^{-1}with an average of 2.32 ± 0.99 Bq kg^{-1}; The mean result obtained for the Representative levels index (Iγ), the radium equivalent (Ra^{eq}), the total absorbed dose rate (ADR), the external hazard index (H^{ex}), the internal hazard index (H^{in}) and the Ceasium intervention levels were 0.52, 72.75 Bq · kg^{-1}, 33.73 nGy · h^{-1}, 0.20 Bq · kg^{-1}, 0.29 Bq · kg^{-1} and 0.0028 Bq · cm^2 respectively. The discrepancies of our data can be attributed to several factors such as past nuclear disasters, geological formation, transport process, etc. Although our results are just some fractions of the international standard limit, but still within the same ranges when compared with those obtained elsewhere. This results also will serve as a baseline data for future investigations.

KEYWORDS

Radionuclides; Radiological Hazards; Soil; Gamma Spectroscopy; Cameroon

Cite this paper

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