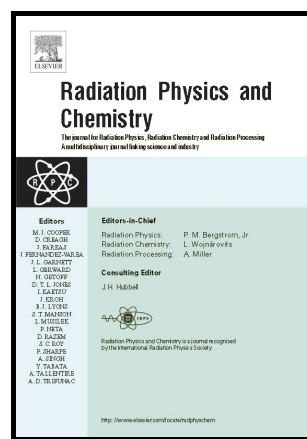


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Radiation dose to the Malaysian populace via the consumption of bottled mineral water

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Highlights

- Radiological characterization performed for commonly available bottled mineral water
- Gamma-ray spectrometry used to make assessment of radionuclide concentrations
- ²²⁶Ra concentrations found to be greater than the WHO recommended limit
- Annual effective doses can potentially exceed the WHO recommended limit.

Abstract

Due to the geological makeup of the various water bodies, mineral- and groundwater can be expected to contain levels of naturally occurring radioactive material (NORM) exceeding that of tap and surface water. Acknowledging mineral water to form a vital component of the intake in maintaining the healthy life of an individual, it nevertheless remains important to study the associated radiological implications of NORM content, especially in regard to the consumption of bottled mineral water, the presence of which is prevalent in modern urban society. In present study, various brands of bottled mineral waters that are commonly available in Malaysia were obtained from local markets, the presence of NORM subsequently being assessed by HPGe γ -ray spectrometry. The activity concentrations of the radionuclides of particular interest, ²²⁶Ra, ²³²Th and ⁴⁰K, were found to be within the respective ranges of $1.45 \pm 0.28 - 3.30 \pm 0.43$, $0.65 \pm 0.18 - 3.39 \pm 0.38$ and $21.12 \pm 1.74 - 25.31 \pm 1.84$ Bq/L. The concentrations of ²²⁶Ra, of central importance in radiological risk assessment, exceed the World Health Organisation (WHO, 2011) recommended maximum permissible limit of 1.0 Bq/L; for all three radionuclides taken together, the annual effective doses are greater than the WHO recommended limit of 0.1mSv/y, a matter of especial concern for those in the developmental stages of life.

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