Measurement of natural radioactivity in mineral waters for therapeutic evaluations used in Romania

Radulescu I., Calin M.R.
Horia Hulubei National Institute for Physics and Nuclear Engineering – IFIN HH, Bucharest–Magurele, Romania

The paper presents measurements and analyses for the activity concentrations of ^{238}U, ^{232}Th, ^{226}Ra and ^{40}K in carbonated and non-carbonated mineral waters. The study evaluates the levels of natural radionuclides and chemical components, their determination being useful as a direct input to environmental and public health studies, but also as balneary and curative treatment. The study was conducted on more mineral springs from Romania, located in the northern part of the country, for a period of some years. Activity concentrations of ^{40}K, ^{238}U, ^{232}Th and ^{226}Ra were also determined, as well as the associate effective dose. The total effective doses for an adult member of the public in Romania deriving from the intake of naturally occurring alpha or beta radionuclides in natural water are: 0.66–2.17 (μSv/yr) for ^{40}K; 1.12–1.71 for ^{238}U; 1.79–3.95 (μSv/yr) for ^{232}Th and 5.75–20.61 for ^{226}Ra. This assessment on the natural radioactivity in natural mineral water samples update data on the activity concentrations and effective doses due to intake of natural radionuclides for Romania. The obtained values are below the WHO and UNSCEAR recommended reference levels. Analyzes done on samples of natural waters are consistent with the Directive 2009/54/EC of the European Parliament. The obtained data can provide basic information for consumers and competent authorities to be aware of the actual problem of radiation.

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