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Research note

Determination of optimal PSA for the measurement of gross alpha and beta radioactivity in water samples by LSC

H Ranjbar and B Salimi

Nuclear Fuel Cycle Research School, Nuclear Science and Technology Research Institute, Tehran, Iran

E-mail: hranjbar@aeoi.org.ir

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Abstract

Measurement and determination of gross alpha and gross beta radioactivity in water are important in all societies and countries of the world because of their radiobiological risks and is part of the goals of standards and public health organizations. Liquid scintillation counting technique is one of the best methods for simultaneously measuring alpha and beta-particle-emitting in water. In this technique, due to the overlap of spectra of alpha and beta, evaluation of the alpha and beta interference and the appropriate PSA value is very important for sample counting rate. The purpose of this work is to measure the activity concentration of gross alpha and beta in bottled water and compare them with the allowable limit and international standards. To achieve the goal of this research, the work was carried out in two phases. In phase 1, the alpha and beta interference and the appropriate PSA are obtained using two standard solutions of americium-241 and strontium-90 with activity of 21 and 40 Bq. In phase 2, The 10 bottled drinking water samples from different brands are analyzed using LSC. The results of the sample counting showed appropriate PSA value of 110 for the measurement of gross alpha and gross beta radioactivity in water. The measurement results showed that the gross alpha and beta activity concentrations were 41-62 mBqL⁻¹ and 57-85 mBqL⁻¹ which are below the allowable limit by comparing the standard limits.

Keywords: alpha interference, beta interference, PSA value, water radioactivity, LSC

For full article, refer to the Persian section