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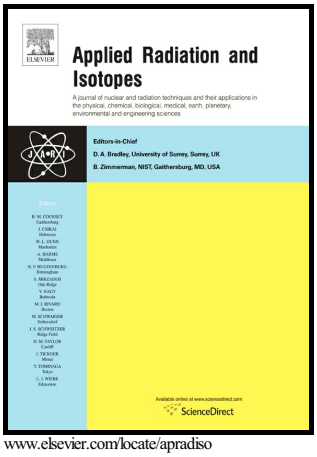

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Evaluation of comparison and proficiency test results of gamma ray spectrometry at Jožef Stefan Institute from 1986 to 2014

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Abstract

One of the best ways to demonstrate the performance and capabilities of testing laboratories is to participate successfully in different international comparison schemes and proficiency tests. The overview of all results of such schemes in the field of high resolution gamma-ray spectrometry where the Laboratory for Radioactivity Measurements (LMR) of the Jožef Stefan Institute, Slovenia, participated in years 1986–2014 is presented. Different schemes are compared, strong points and drawbacks of different providers and schemes regarding evaluation procedures, determination of reference values, reporting time, sets of radionuclides included in the samples and range of activities of different radionuclides are discussed. One of the main conclusions is that the comparison and proficiency test samples normally contain substantially larger activities than are usually detected in environmental samples. Therefore the capability of determination of activities close to detection limits is usually covered only by few schemes.

Keywords: comparisons, proficiency tests, ζ–score, high resolution gamma-ray spectrometry, environmental samples, radioactivity, natural and artificial radionuclides, Co-60, Cs-137, K-40, Ra-226

Introduction

The Laboratory for Radioactivity Measurements (LMR) of the Jožef Stefan Institute, Slovenia, was established in 1981. Since then measurements of activity in samples from the living and working environment, food and feeding stuff, chemicals, building and raw materials, etc., have been carried out using high resolution gamma-ray spectrometry. The laboratory takes part in the measurements of activities of gamma- and X-ray emitters in samples collected in the frame of different monitoring programs: Off-Site Radiological Monitoring of the Krško Nuclear Power Plant, Survey of Radioactivity in the Environment in the Republic of Slovenia, Survey of Radioactivity in Drinking Water in the Republic of Slovenia, Survey of Radioactivity in Environment of Žirovski Vrh Uranium Mine and Temporary Deposit of Radioactive Waste at Brinje. In addition, the inspection of food and other materials for the needs of regulatory bodies regarding import or export of goods is performed. Furthermore the laboratory is involved in characterization campaigns of candidate reference

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