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Comparison of two Software Packages for High Resolution Gamma Spectrometry Used for Neutron Activation Analysis of Biomonitors

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Abstract content
   (Max 300 words)

Neutron Activation Analysis (NAA) is a sensitive radioanalytical method used to determine elemental composition of a sample (Frontasyeva, 2011). Elements to be determined are assayed using nuclear reactions (mostly (n,γ)) via irradiation of samples with neutrons whereby stable isotopes are converted into radionuclide(s) subject to decay process in which γ-rays (among other modes) are being emitted. Gamma-ray detectors are then used to convert the energy of nuclear radiation into an electrical signal. The radiation with suitable properties for measurement, i.e. energy and emission rate, in the γ-ray spectrum of radioactive sources is frequently measured using γ-ray spectrometry (Kucera, et.al., 2004). Gamma-spectrometry is recognized world-wide as a multi-nuclide method of analysis based mainly on the use of high resolution semiconductor detectors (e.g. HPGe). Gamma-ray spectrometric analysis of environmental samples aims to identify and determine the activity concentration of gamma-ray emitting radionuclides and the associated uncertainty of the results (Dovlete and Povinec, 2004). To process γ-ray spectra by identifying nuclides and calculating activity concentrations of elements in our biomonitoring study of the atmospheric deposition of trace elements in the Western Cape, γ-ray spectra analysis was performed in FLNP-JINR, Dubna, Russia, using Genie2000 Gamma Analysis Software package complemented by a program allowing calculate concentrations based on the known activity of the relevant isotope in the sample. We present a comparison of results with those from the FitzPeaks Gamma Analysis Software package (http://www.jimfitz.demon.co.uk/fitzpeak.htm, 2009).

This study was undertaken in the framework of a JINR-SA co-operative program with SU.

References

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