LSC as Powerful and Fast Tool for In-situ Measurement of Natural Radionuclides in Water

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Abstract

When natural radionuclides have to be determined in water samples sampling and sample conservation during transport to the laboratory generally is considered as main cause for errors. Especially when Radon and its Progenies are investigated on site analysis is advantageous. Various measuring principles using different nuclides for the estimation of the Radon level aggravate the assessment of results.

The paper describes methods for in-situ measurement and enrichment of Radium, Radon and daughter nuclides followed by in-situ Liquid Scintillation Spectrometry with the portable liquid scintillation system Triathler. The methods for Radon include extraction into an organic cocktail like Beta Plate Scint or those based on toluene as solvent and gel counting. Radium is enriched by adsorption on MnO2 coated polyamide granulates or on a BaSO4 loaded cationic resin. These procedures have shown to provide reliable results through various intercomparison runs (e.g. Thale in Germany 1999, Luxembourg 1997). Data are presented and compared with other techniques.

When both a- and b-spectra are evaluated a survey on the state of radioactive equilibrium is available. Using the a-channel from a-/b-pulse shape discri-mination a lower limit of detection of 0.05 Becquerel Radon per Liter has been calculated for a 100 min counting period with the TriathlerTM. In addition a two-dimensional spectrometric plot of pulse length versus pulse height provides a powerful quality control of counting data. Preliminary results from field measurements are discussed.

Product Information