Application of low energy γ spectrometry in rapid actinide analysis for emergency preparedness

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For preparedness purposes, a fast and reliable method to quickly assess radioactive fallout in the environment is essential. The rapid determination of certain nuclides such as alpha emitting actinides is necessary to make initial environmental and agricultural advisories. Therefore, a method using a preconcentration resin and low energy gamma spectrometry was developed to quickly determine certain nuclides in soil samples. The preconcentration resin allows samples to be partially purified and then directly measured with gamma spectrometry without further extraction or separation. The initial gamma measurement provides fast and accurate determination of certain nuclides such as ^{241}Am and ^{235}U that are normally analyzed by alpha spectrometry, which requires additional time-consuming purification and separation steps. Following gamma measurement, the sample may be further processed and analyzed by traditional methods to obtain more precise determination of actinides or other nuclides.