

Rapid determination of uranium, thorium, plutonium, americium and strontium activities in water, soil and vegetation.

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A rapid technique for the isolation of U, Th, Pu, Am and Sr isotopes from environmental matrices has been established using resin cartridges and a vacuum box which are commercially available from Eichrom Technologies (Darien, IL, USA).

Separation and isolation of the various elemental fractions from a single sub-sample is possible, thereby eliminating the need for multiple analyses. The time taken for concentration, separation, purification and source preparation is 10 hours for 12 samples, making this technique an excellent option when fast turn-around is required.

The technique involves sample dissolution, concentration via calcium phosphate co-precipitation, resin separation and purification using TEVATM, TRUTM and Sr-SpecTM resin cartridges and alpha spectrometry for U, Th, Pu and Am and Cerenkov counting for Sr.

The technique was tested with various standard reference materials. Chemical yields are in the range of 80 – 95 % for all elemental fractions, except for Sr which is typically 60%. Sample sizes of up to 10 litres for water, 5 grams for soil and 10 grams for ashed vegetation were able to be processed using this technique. Major matrix interferences that were encountered include potassium and strontium.