Pre-Concentration and Separation of Thorium, Uranium, Plutonium and Americium in Human Soft Tissues by Extraction Chromatorgraphy

C. A. Moody[1], S. E. Glover [1,2], D. B. Stuit[2], R. H. Filby [1,2]

[1]Department of Chemistry, Oregon State University, Corvallis, OR 97331, USA
[2]Department of Chemistry, Washington State University, Pullman, WA 99163, USA
[3]United States Transuranium and Uranium Registries, Washington State University, Pullman, WA 99163, USA

An extraction chromatographic method is described for the pre-concentration and separation of thorium, uranium, plutonium and americium in human soft tissues. Tissues such as lung and liver are oven dried a t 120^0 C, ashed at 450^0 C and the ashed sample is alternately wet (HNO_3/H_20_2) and dry ashed, and then dissolved in 8 M HCI. Because of the complex matrix and large sample samples (up to 1500 g), the actinides were preconcentrated from the tissue solution using the TRU^{TM} resin (EIChroM) prior to elemental separation by extraction chromatography and determination of americium, plutonium, uranium and thorium by alpha spectrometry. The actinides were eluted from the preconcentration column and each actinide was individually eluted on TEVA^{TM} and TRU^{TM} resin columns in a tandem configuration. Actinide activities were then determined by alpha spectrometry after electrodeposition form a sulfate medium. The method was validated by analyzing human tissue samples previously analyzed for americium, plutonium, uranium and thorium in the United States Transuranium and Uranium Registries (USTUR). Two National Institute of Standards and Technology (NIST) Standard Reference Materials, SRM 4351-Human Lung and SRM 4352-Humna Liver were also analyzed.

USTUR-0065-97