Determination of ^{232}Th in Human Tissues by Pre-concentration Neutron Activation Analysis With Yield Determination Using ^{227}Th

S. E. Glover, R. H. Filby,** S. B. Clark****

Department of Chemistry, Washington State University, Pullman, WA 99164-4630, USA

The accurate and precise determination of ^{232}Th in biological samples is very important for the development of biokinetic models for thorium and for improving our knowledge on its distribution in human tissues. Radiochemical neutron activation analysis has long been one of the most sensitive methods for the determination of ^{232}Th. However, these determinations suffer in reliability because recovery information following the separation is not typically available. This information is particularly important for difficult matrices such as human bone where recover is may be significantly less than unity. Also, the separation of difficult matrices following neutron activation may involve relatively high personal dose from the co-activated matrix. A novel approach for the determination of radiochemical yield has been developed which employs the use of t readily available, gamma-emitting isotope of thorium, ^{227}Th. ^{227}Th, obtained by radiochemical separation from ^{227}Ac, is added to each dissolved sample prior to separation and the chemical yield determined by gamma-ray spectrometry following the separation. This pre-concentration step is then followed by neutron activation and the ^{232}Th determined via ^{233}Pa using gamma-ray spectrometry. Detection limits were approximately and order of magnitude lower that obtained by alpha-spectrometry.

USTUR-0067-97