Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.16093

Direct Quantification of ^{90}Sr in Biosamples Using Isotope Dilution–Thermal Ionization Mass Spectrometry Assisted by Quadrupole Energy Filtering

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Whereas thermal ionization mass spectrometry (TIMS) is capable of high-precision analysis of isotope ratios, the direct quantification of both the artificial monoisotopic radionuclide strontium 90 (^{90}Sr) and the natural Sr has been difficult. In this study, the isotope dilution-quadruple energy filter-TIMS (ID–RPQ–TIMS) method has been achieved in the direct quantification of trace amount of radio Sr in samples such as teeth and bone. This study used the linear relationship between the remaining natural strontium *via* RPQ and the background (BGN) at *m*/*z* 90. By subtracting the amount of ^{90}Sr corresponding to the BGN caused by ^{88}Sr-tailing and dark noise, the LOD was improved. Although ^{90}Zr is an isobaric interference nuclide, its existence in sub mg/L levels did not negatively impact on the MS determination. To avoid isobaric interferences, Sr was purified by Sr-resins. Addition and recovery tests for microgram of samples, such as tears, saliva, eyelashes, and teeth, were conducted. This method was compared with radiometric method, and the results were corresponded. A small quantity of ^{90}Sr was detected from tooth samples. This method is expected as standard measurement technique for ^{90}Sr.