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Measurement of ^{236}U in Biota by accelerator mass spectrometry.

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^{236}U (half-life 2.34×10^{7} y) is a radioisotope of uranium of key importance for tracing the movement of nuclear waste through the environment. Accelerator mass spectrometry (AMS) is the most robust and capable method for measuring ^{236}U, which has a natural abundance range between 10^{-8} to 10^{-12} or lower. Here we study ^{236}U uptake in biota samples (plants, animals) and river water samples collected in the region surrounding the Chalk River Nuclear laboratories (Chalk River, ON) by AMS. Plants included the common submerged aquatic waterweeds elodea, myriophyllum and vallisneria. Animals consisted of a variety of freshwater mussle (unionids), an amphipod crustacean (gammarus), a freshwater crustacean resembling small lobsters (crayfish), a small freshwater minnow (spot- tail), a freshwater fish (yellow perch) and a mayfly variety (heptageniids). Samples were ashed, digested, spiked with a ^{233}U tracer and cleaned through a single-pass UTEVA chemistry in HNO3 followed by U elution in HCl. Post-load UTEVA washes were saved for ^{90}Sr analysis (Francisco et al [this meeting]). A fraction of the final U eluent was removed for ^{235}U/^{238}U isotopic composition measurements by multi-collector ICP-MS, and the remaining U fraction co-precipitated in iron hydroxide, calcinated, and pressed into AMS targets with an appropriate matrix to optimize uranium emission (Kazi et al [this meeting]). Water samples were processed by direct iron hydroxide co-precipitation of U followed by UTEVA chemistry. We present the AMS analytical testing and results of ^{236}U partitioning and the ^{235}U/^{238}U isotopic compositions of these biota and water samples.

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