

44<sup>th</sup> Annual Conference on Bioassay, Analytical, and Environmental Radiochemistry  
Albuquerque, New Mexico, November 15-19, 1998  
Paper Title and Abstract

Rapid Response Determination of  $^{89}\text{Sr}/^{90}\text{Sr}$  in Environmental Samples

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$^{89}\text{Sr}$  and  $^{90}\text{Sr}$  are fission products of high radiotoxicity formed in fairly high abundance. The accident at Chernobyl in 1986 revealed that many laboratories were incapable of performing quick determinations of  $^{89}\text{Sr}/^{90}\text{Sr}$  (many methods requiring up to 2 weeks and often suffering from considerable fluctuations in chemical yield).

A relatively rapid technique (1-2 day turnaround time) has been developed for the analysis of milk and water samples (@1L) employing open column ion exchange chromatography as a pretreatment, followed by a final polishing with instrumental ion chromatography coupled to a liquid scintillation detector for high pressure liquid chromatography (HPLC). Both separations employ a diaminocyclohexanetetraacetic acid (DCYTA) /ethylenediaminetetraacetic acid (EDTA) pH gradient. Chemical yield is typically 95+%, and is determined on-line with a conductivity detector.

Liquid scintillation (2-window) counting under stop flow conditions allows simultaneous determination of  $^{89}\text{Sr}/^{90}\text{Sr}$  at ratios typically expected in an emergency. MDA=s for each radionuclide are around 0.2 Bq for comparable ratios, and increase at higher ratios.

The method has been verified with spiked water/milk samples and intercomparison water and milk powder samples.