INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY (ICP-MS) DETECTION OF PROCESSED URANIUM IN FOOD

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The US Food and Drug Administration (FDA) has excellent capability for monitoring food for radionuclide contamination. However, the current methods available for alpha- and beta-emitting radionuclides are limited because they are time consuming with multi-day procedures often required to isolate them from sample matrix and interfering radionuclides. In the aftermath of an accident involving nuclear-energy or -weapon materials, the US FDA could be tasked with monitoring the food supply for this type of contamination. Our research goal is to develop rapid and high-throughput methods for these radionuclides in foods. Our initial application will be the detection of processed uranium in foods using isotope ratio mass spectrometry (IR-MS). Although uranium is a naturally-occurring radionuclide, processed uranium has nuclear weapons and energy applications whereby its natural isotopic ratio of $^{238}U/^{235}U$ has been altered for its intended uses. The natural $^{238}U/^{235}U$ ratio is 137.82 but this ratio is much lower for processed uranium. For example energy grade uranium contains 3 - 5% of ^{235}U, and weapons grade uranium contains >90% of ^{235}U. The IR-MS method is capable of revealing uranium source term via accurate and precise measurement of $^{238}U/^{235}U$ ratio. This project is intended to further improve the US FDA's radioanalytical capacity for monitoring radioactive food contamination.