Novel Simultaneous Separation and Determination of Seven Radionuclides in Food for the Ingestion Dose Assessment

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Public's concerns in safe food have increased greatly due to nuclear accidents. Radionuclides of both natural and human-made origin are present at various concentrations in food, resulting in exposure to ionizing radiation and an internal radiation dose. Exposure due to radionuclides in food amounts to 0.29 mSv [1]. The natural radionuclides ^{210}Po, ^{210}Pb, ^{226}Ra, ^{228}Ra and the artificial radionuclides ^{90}Sr, ^{137}Cs and ^{14}C have been identified as the main contribution to the dose of internal exposure [2]. In comparison with the radiochemical separation procedure for single radionuclide, we developed cost-effective procedure for simultaneously separating and measuring two group radionuclides [3, 4]. Further study using one Sr Spec column Sr, Pb and Ra could be separated and measured by liquid scintillation counting within two days. All seven radionuclides detection limits meet equivalent or lower to 10% of the IAEA guidance levels [5], specially for ^{210}Pb, ^{226}Ra. We believe that the novel methods will improve the approach for determining the radionuclides in food samples, such as small sample size, short measurement time and lower detection limit. The recovery or overall efficiencies, the minimum detectable activities of radionuclides, and the uncertainty assessment are presented and discussed. (This work was funded by the National Key Research and Development Project, China, No. 2019YFC1604804)

Reference

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