LOW-LEVEL OF THE FDNPP-DERIVED RADIOCESIUM IN MARINE PRODUCTS AROUND THE WESTERN JAPANESE ARCHIPELAGO

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Following the Fukushima Dai-ichi Nuclear Power Plant (FDNPP) (Mar. 2011) accident, large amounts of radionuclides such as ^{134}Cs (half-life; $t_{1/2}$ = 2.06 y), ^{137}Cs (3.02 y), and ^{131}I (8.1 d) were spread into the marine environments of a wide region of eastern Japan. Since the accident, various forms of radioactive monitoring have been actively implemented. In particular, the concentrations of ^{134}Cs and ^{137}Cs have been extensively measured using various marine products collected all around the Japanese Archipelago, particularly the coastal and offshore areas on the Pacific Ocean side of eastern Japan (FA-MAFF, 2016). However, it has been found that around the western Japanese Archipelago, including the Sea of Japan, the concentration of radiocesium (particularly ^{134}Cs) in many marine products is below the detectable limit of conventional γ-spectrometry.

The determination of low-levels of radionuclides using γ-spectrometry of marine biological samples is significantly affected by a Compton continuum caused by the 1461 keV γ-ray emission of ^{40}K. In the previous study, to accurately determine low concentrations of ^{134}Cs and ^{137}Cs in marine products, we developed a simple method for ^{40}K removal using acidified water leaching combined with an ammonium phosphomolybdate coprecipitation method (Inoue et al., 2017) (Fig. 1). Moreover, the detection limit of radiocesium in the samples can be further improved in combination with low-background γ-spectrometry conducted at the Underground Laboratory.

In the present study, we apply these experimental procedures to various types of marine products collected around the western Japanese Archipelago, and precisely assess the low-level concentrations of FDNPP-derived radiocesium. By cross-referencing the data with the low concentrations of radiocesium that we measured in the ambient seawater samples, we further clarify the supply processes of radiocesium to marine products.

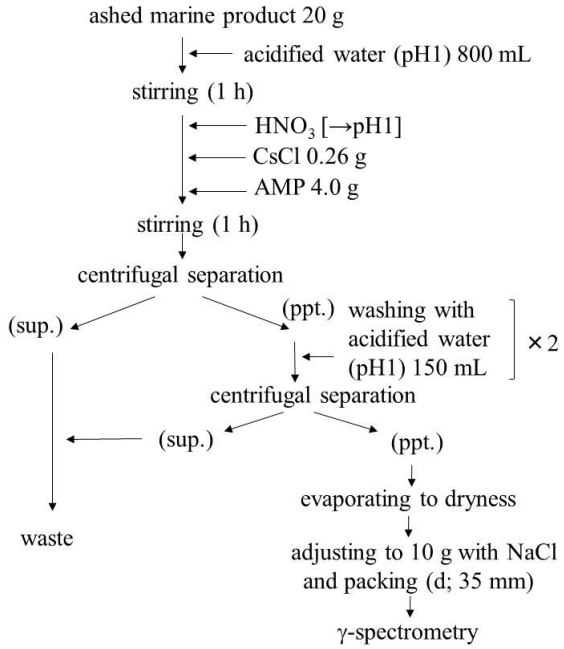

Fig. 1: Acidified water leaching treatment combined with the AMP method.

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