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Cloud Point Extraction of Plutonium in Fish Tissues Coupled to Alpha Spectrometry

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A cloud point extraction procedure was developed to quantify the plutonium in environmental samples. This procedure uses a selective ligand within micelle which will complex with the element to be extracted. The extraction is effective in highly acidic solution with the addition of bromine in the system thereby forming a shield around the micelles. In this study, this procedure is used to preconcentrate the plutonium in samples of fish. The selected ligand is P,P di-(2-ethylhexyl) methanediphosphonic acid (H2DEH[MDP]) because it has a high potential of extraction for actinides and especially for the plutonium. The cloud point extraction is coupled with an alpha spectrometer for plutonium quantification. But first, the flesh fish is treated to remove water and organic matter before doing cloud point extraction. The samples were dried at 105 ℃ for 24 hours followed by dry ashing at 450 ℃ for 5 hours in an oven. The resultant ashes are then treated by wet digestion with dilute nitric acid. These steps are repeated until complete removal of organic matter. The step of dry ashing is critical since a temperature exceeding 450 ℃ reduces the yield of plutonium because of the formation of refractory species.

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