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Study on the analytical method of arsenic species in marine samples by ion chromatography coupled with mass spectrometry

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Abstract

The present study focused on the analytical method of the arsenic species in various marine samples (seafood and marine sediment). Five inorganic and organic arsenic species (arsenite, arsenate, monomethylarsonic, dimethylarsinic and arsenobetaine) were investigated. The extraction method for seafood was chosen with sonication in which a water : methanol mixture (1:1, v/v) was used as the extract solvent. The arsenic species in marine sediment were extracted by shaking using 0.5 M phosphoric acid as extract solvent. The species were separated by a Hamilton-X100 analytical column, and detected by a mass spectrometry separately. Due to the interference caused by ArCl at mass 75, we tried to detect the arsenic at mass 91 by combining arsenic with oxygen (AsO), and the interference of ArCl was eliminated successfully. The seafood certified reference material was used to validate the method for the extraction of arsenic species in seafood samples, and the recovery efficiency of arsenobetaine was detected as 89.4 % by this method. For marine sediment, inorganic standard solutions were spiked to confirm the recovery efficiency. The results showed that the recovery efficiencies were 85.7 % and 82.2 % for arsenite and arsenate. The analysis method was also applied to many real marine samples. The extraction efficiencies of arsenic species were 79.2 % ~ 90.6 % and 57.4 % ~ 91.3 % for the real seafood and marine sediment samples.

Keywords: collision gas; AsO; arsenic species; seafood; sediment

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