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Determination of mercury species in foodstuffs using LC-ICP-MS: the applicability and limitations of the method

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Reversed-phase liquid chromatography hyphenated with inductively coupled plasma mass spectrometry (LC-ICP-MS) was used for mercury speciation analysis in food samples. A short chromatographic column (Purospher® RP-8e, 75 ´ 4 mm, 3 µm) and a mobile phase containing 0.02 mol/l CH_3COONH_4 + 0.2% (v/v) 2-mercaptoethanol (2-ME) + 1% (v/v) CH_3OH were applied. A repeated extraction of samples with hydrochloric acid/2-ME solution (1 mol/l HCl + 0.2% (v/v) 2-ME) was applied as the isolation step. The results were satisfactory for

most food matrices (fish, shellfish, plant materials). Conversely, to analyse high-protein animal matrices, which contain mostly the inorganic form of mercury, a procedure including partial hydrolysis using hydrochloric acid should be used. For methylmercury and inorganic divalent mercury, the LOQ values of 0.3 and 2 ng/g, respectively, can be achieved if precautionary measures against contamination are fulfilled. The method was applied for the determination of methylmercury and inorganic divalent mercury in fish, vegetables, herbs and cereal products.

Keywords:

mercury speciation; liquid chromatography; inductively coupled plasma-mass spectrometry

[fulltext]