

Determination of mercury in fish muscles, fins and scales

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The most toxic specie of mercury, methylmercury, is formed in aquatic system and is included in food chain from bacteria to plankton and consequently to fish. Fish is the significantly source of human methylmercury exposure. The determination of mercury and primarily methylmercury in fish muscle is therefore important. For determination of total mercury is mostly used pyrolysis atomic absorption spectrometry with gold amalgamation using analyser AMA 254. The widely used analytical method for methylmercury determination is gas chromatography (GC) with element specific detection. The analyses are based on a sequence of successive analytical steps – analyte isolation of the sample, modification of analytes through derivatization, preconcentration, separation by chromatography and detection by atomic fluorescence spectrometry (AFS).

For the isolation of methylmercury was used ultrasonication extraction in the presence of 25% w/v KOH in methanol. Extraction efficiency of the total mercury was determined using the AMA 254 mercury analyser, extraction yields of methylmercury using GC-AFS. The pH value and dilution of extract are important factors influencing derivatization process. Aqueous derivatization with sodium tetraethylborate was performed. The procedure for the methylmercury determination was verified by certified reference material DORM-2 analysis and real samples of fish muscle were analyzed.

In samples of fish muscle the high content of methylmercury was determined. Therefore a analysis method for the total mercury determination without a fish kill was searched. The mercury content in fish scales and fins was analyzed. A treatment way of scales, homogenization and possibilities of analysis of individual scales were investigated. For determination of approximate content of mercury in the fish muscle, the dependence of mercury content in the fish muscles on mercury content in the fish scales and fins was studied.