

A FAST AND SENSITIVE METHOD FOR DETERMINATION OF METHYLMERCURY IN HUMAN MILK AND BLOOD SAMPLES USING ISOTOPIC DILUTION HPLC-ICP-MS WITH SIMPLE SAMPLE PREPARATION.

K. Kroupová¹, J. Kuta^{1*}, J. Maňoušek², S. Adu-Kumi³

(1) Research Centre for Toxic Compounds in the Environment (RECETOX), Faculty of Science, Masaryk University, Brno, Czech Republic

(2) Department of Internal Medicine and Cardiology, University Hospital Brno, Brno, Czech Republic

(3) Environmental Protection Agency, Chemicals Control and Management Centre, Accra, Ghana

Methylmercury as proven neurotoxicant is a significant environmental pollutant. Therefore there is calling for suitable methods of human biomonitoring. The aim of our work was to develop sensitive, fast and robust method for determination of methylmercury in human milk and whole blood. The developed method is based on isotopic dilution (ID) high-performance liquid chromatography (HPLC) coupled to mass spectrometry with inductively coupled plasma (ICP-MS). Sample preparation, matrix elimination and preconcentration procedure prior analysis is made up in liquid-liquid extraction system. Firstly, the methylmercury as halide is extracted into toluene (removal of proteins) and than reextracted into a L-cysteine solution (fat removal). The final cysteine extract is analyzed by HPLC ICP-MS. The whole process of extraction is controlled by addition of isotopic enriched methylmercury (¹⁹⁸MeHg). The recovery ranges between 92 and 96 %. The typical repeatability of the procedure is in single units of percent. Detection limit was estimated to 0.002 µg/L in case of 4x preconcentration. The accuracy of the procedure was verified by analyzing the certified reference material (NIST 955C Caprine blood) with a declared MeHg concentration of 4.5 ± 1.0 µg/L, the measured value was 4.72 ± 0.04 µg/L. The applicability of the method was verified by analyzing 70 blood samples from Czech Republic and 50 samples of breast milk from Ghana. MeHg was detected in all samples in concentration ranging from 0.020 to 1.04 µg/L (blood) respectively from 0.008 to 0.734 µg/L (milk).