

Abstract

Nowadays, arsenic is becoming an important pollutant in the environment. Chronic exposure to arsenic can cause number of serious diseases. Therefore, a development of analytical methods for trace and ultratrace speciation analysis- analysis of individual forms or phases in which As is found in the sample - is fully in place.

This Thesis compares four methods of trace speciation analysis, with focus on limits of detection and quantification, and on comparison of results of analysis of river and sea water reference materials. Methods based on hydride generation with preconcentration by cryotrapping and AAS or ICP-MS detection, with limits of detection in ng or tenths of $\text{ng}\cdot\text{dm}^{-3}$, are compared with procedures employing HPLC, with ICP-MS detection. The Thesis includes development and optimization of a pre-reduction step of postcolumn hydride generation with on-line pre-reduction of pentavalent arsenic species, in order to improve sensitivity of this method. Limits of detection around $10 \text{ ng}\cdot\text{dm}^{-3}$ are achieved. The results of analyses obtained by individual methods are in excellent agreement.

Keywords:

Arsenic, speciation analysis, hydride generation, atomic absorption spectrometry, inductively coupled plasma- mass spectrometry, high efficiency liquid chromatography, limits of detection.