

## **Abstrakt EN**

The thesis is focused on a speciation analysis of arsenic with use of the hydride generation – cryotrapping – gas chromatography – atomic absorption spectrometry. The aim of this project was the development of a method and instrumentation of the speciation analysis of arsenic based on combination of selective generation of substituted hydrides with a detection by atomic absorption spectrometry and with use of the cryotrapping of generated arsenic species and their separation by the gas chromatography. In the first part of this work the effects of individual parameters which influence the separation in the gas chromatograph were studied. Especially, time of injection from the cryotrap into GC, temperature program, carrier gas flow and carrier gas flow through a “deanswitch”. Optimization of these parameters is an attempt to achieve a satisfactory resolution of the individual peaks of arsenic species separated by gas chromatography. Furthermore, an adequate sensitivity of this method is required to be achieved in comparison to other methods that use AAS detection such as a combination of hydride generation with cryotrapping. For this reason, the detection limits and the quantification of arsenic species were important to be determined as well. A sampling coil was replaced by a sampling tip allowing sampling of various volumes from tenths of microliters up to ten milliliters which lead to broadening the possibilities of sampling volumes and lowering the “concentration” detection limits. To determine the loss of individual arsenic species caused by passing through the gas chromatograph the results were compared to well-established approaches, combinations of hydride generation with AAS detection and hydride generation - cryogenic trapping with AAS detection. The second strategy mentioned above was used to evaluate the influence of the separation on the gas chromatographic column on the peak height, shape and area. Analytical characteristics of the established methods with a novel approach studied in this project were compared. The final part of this project was to assess if the approach studied is sufficiently robust and suitable for speciation analysis of arsenic in diverse types of samples regardless of the origin (environmental or biological samples). For this objective, certified reference materials were used, and the results were compared with other competitive methods e.g. combination of HPLC, hydride generation with atomic fluorescence spectrometry or hydride generation with cryotrapping and atomic fluorescence spectrometry.