Abstract

The mercury occurs in the environment in a variety of forms. Mercury compounds can be found in the soil, atmosphere, water and living organisms. Although some of the mercury substances are very toxic, they are often used in various sectors of industry, agriculture and medicine. Mercury compounds differ in their toxicity, so it is necessary to do speciation analysis.

The aim of this diploma thesis was to develop and validate a new analytical method for the determination of mercury compounds in different samples. This method involves the combination of high performance liquid chromatography, UV-photochemical cold vapor mercury generation and atomic absorption spectrometry. Effective separation of mercury(II), methylmercury(I), ethylmercury(I) and phenylmercury(I) ions and subsequent comparable efficient of mercury cold vapor generation from all of forms was achieved using these techniques. The reached detection limits were 8 $\mu g\ l^{-1}$, 31 $\mu g\ l^{-1}$, 16 $\mu g\ l^{-1}$ and 38 $\mu g\ l^{-1}$.

At the end of experimental work, the proposed method of RP-HPLC-UV-CVG-QTAAS was used for the determination of mercury compounds in real samples (fish tissue and water samples: Labe, Vltava and tap water) and in certified reference materials (DORM-3 and DOLT-4). Several methods for extraction of mercury species from solid samples were tested in this work. Although these methods were described in scientific journals, neither of them was suitable for use for proposed analytical method. No form of mercury was identified in the water samples, because the total mercury content was below the limit of detection of the proposed method. The accuracy of this result was verified by the AMA 254. Consequently, these samples were used for determination of recovery when they were spiked.