Abstract

The arsenic-glutathione complexes are very unstable in solution and tend to decompose during separation in liquid chromatography. The aim of this work was to develop a relatively fast method of the synthesis and storage conditions for the arsenic-glutathione complexes.

The thesis is focused on synthesis, stability in-solution and separation of arsenic-glutathione complexes. The synthesis was carried out in solution of 2 mM TCEP (tris(2-carboxyethyl)phosphine) in water and with excess of the glutathione. Solutions of 20 ppb arsenic-complexes were consecutively measured after 1h, 2h, 3h, 4h and 24 hours of synthesis. The results confirmed stability of the arsenic-complexes in the reaction mixtures over 24 h.

The arsenic-glutathione complexes were separated using a reversed phase high performance liquid chromatography (RP-HPLC) coupled with inductively coupled plasma - mass spectrometry (ICP-MS). The chromatographic method was developed using Aeris widepore 3.6u XB-C18 250x2.10mm column. Isocratic and gradient elutions were compared using several compositions of mobile phases and time of the separation. Methods were tested using samples of synthesized arsenic-glutathione complex (DMAs(GS)). An application of the isocratic elution enabled elimination of time needed for the separation and conditioning of the column and the influence of organic solvent on the intensity of arsenic signals in ICP-MS.

Key words: Arsenic, glutathione, arsenoglutathione complexes, isocratic elution, high performance liquid chromatography, inductively coupled plasma mass spectrometry