Arsenic is ubiquitous in the environment in the form of inorganic and organic compounds, with different properties and uses. Speciation of arsenic is routinely performed with HPLC coupled to ICP-MS. The quantification of arsenic species is difficult because of the low concentration of the species in environmental samples. Insufficient selectivity and sensitivity of the separation media lead to the present study. High efficiency ion exchange monolithic silica capillary columns have been developed that showed superior performance compared to particle packed columns. An anion exchange monolithic silica capillary column having a quaternary ammonium salt functionality showed an improved performance for the separation of common inorganic anions and arsenic species. A hybrid monolithic silica modified by on-column copolymerization of N-[3-(dimethylamino) propyl] acrylamide methyl chloride-quaternary salt (DMAPAA-Q) with 3-methacryloxypropyl moieties showed a $\mu$HPLC separation of common inorganic ions and arsenic species using 50 mM phosphate buffer at pH 7 as a mobile phase. The performance with the inorganic anions provided ca. 40,000 theoretical plates (33 cm column length), but poorer performance for arsenic species. Although reduced efficiency was observed for an anion that was retained for a long time, the results of this study shows the potential utility of the DMAPAA-Q stationary phase for anions separation. Evaluation by capillary
electrochromatography (CEC) was also performed to compare the performance of this column, using 50 mM phosphate buffer at pH 7. CEC produced better performance of up to ca. 90,000 theoretical plates. A weak cation-exchange (WCX) and HILIC modes columns were also prepared and evaluated for the separation of proteins.