DETERMINATION OF TOTAL SELENIUM AND SELENO-AMINO ACIDS IN YEAST AND AQUATIC ORGANISMS BY LIQUID CHROMATOGRAPHY AND INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY

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ABSTRACT

The primary goal of this dissertation research was to develop methods for routine speciation analysis of selenium in tissues. A method for total selenium using on-line stable isotope dilution analysis with conventional ICP-MS (SIDA-ICP-MS) was developed. Masses at 77, 78, 79, 81, and 82 were monitored and quantitation of Se was determined based on both 78Se and 82Se. SIDA-ICP-MS was successfully applied to the determination of total selenium in biological materials, such as selenized yeasts, certified reference materials, lab-cultured oligochaetes and desert pupfish.

The separation and quantitation of seleno-amino acids was accomplished by ion-pairing reversed-phase liquid chromatography (RPLC) and detected by ICP-MS at mass 82 using the standard mode. It was found that methanesulfonic acidic hydrolysis demonstrated a higher extraction efficiency of selenomethionine than enzymatic digestion. Selenomethionine (SeMet) was the only significant Se-containing species detected in the biological samples that were examined.