

A Comparison of Electrothermal Atomic Absorption Spectrometry and Inductively Coupled Plasma Mass Spectrometry for the Determination of Selenium in Garlic

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Key words: selenium, ET AAS, ICP MS, garlic

Electrothermal atomic absorption spectrometry (ET AAS) and inductively coupled plasma mass spectrometry (ICP MS) have been used for the determination of the total concentration of selenium in garlic after microwave digestion. Studied garlic samples originated from two different geographical regions differing in respect of selenium content in soil: from Eastern Poland, where the soil is poor in selenium, and from Irapuato in Mexico, where the soil is rich in selenium. For both techniques used, the quantification was accomplished by the external standard addition and the regression coefficients were above 0.999. Spectral interferences were controlled using a background correction of Zeeman's effect and applying rhodium as a chemical modifier. For ICP MS measurements the level of selenium isotopes 78 and 82 were monitored, and $10 \mu\text{g L}^{-1}$ rhodium solution was used for internal standardization. Under the optimum experimental conditions, the obtained detection limits were $0.6 \mu\text{g L}^{-1}$ for ET AAS and $0.05 \mu\text{g L}^{-1}$ for ICP MS. For both methods the precision of the procedure was in the range of 3–7%. The results obtained from both methods are in a good agreement, which confirms the accuracy of the analysis. The contents of selenium in garlic grown in two geographical regions were significantly different.