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Amalgamation performances of gold-coated quartz wool, alumina, silica, sand and carbon fiber for the determination of inorganic mercury in waters by cold vapor atomic absorption spectrometry

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Abstract

Different gold-coated sorbents for amalgamation were applied for the determination of inorganic mercury in waters using a home-made cold vapor generation unit coupled to atomic absorption spectrometry. Among the gold-coated materials investigated (quartz wool, alumina, silica, sand and carbon fiber) quartz wool was found to give the most efficient results in terms of sorption and release. Analytical performance of the system without and with amalgamation was investigated and it was found that when amalgamation was applied, the linearity and slope of the calibration plots were independent on the sample volume for 1.0, 5.0 and 10.0 mL. Method validation was realized through the analysis of a sample of spring water spiked with 1.0 µg/L inorganic mercury and the spike recoveries were found to be 95 ± 1 , 91 ± 3 , and $99 \pm 5\%$ for 1.0, 5.0, and 10.0 mL, respectively. The results demonstrated that the methodology can be applied to these types of samples directly or after amalgamation, depending on the mercury concentration.

Keywords

mercury, amalgamation, gold-coated sorbents, preconcentration, cold vapor atomic absorption spectrometry

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