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Biological monitoring of total antimony in urine by supercritical carbondioxide extraction and graphite furnace atomic absorption

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Antimony (Sb), a toxic metallic element, is widely used in agriculture and industry. Antimony has undoubtedly harmful effects on health and well-being, and antimony toxicity occurs either due to occupational exposure or during therapy. Biological monitoring of exposures antimony is urgently developed to prevent hazardous exposure. With respect to analytical practicability and validity, urine is an important indicator for determination of internal exposure to antimony. This study presented supercritical carbon dioxide (SC-CO2) extraction as an inherently safer and cleaner sample treatment method for analyzing trace antimony in human urine. Extraction was performed in the presence of a fluorinated β-diketones chelating agent, thenoyltrifluoroacetone(TTFA), by unmodified SC-CO2. Quantitative extractions were conducted at 60°C and 17.2 MPa with 15 min static plus 10 min dynamic extractions. The extracts were subsequently analyzed by graphite furnace atomic absorption spectroscopy (GFAAS) with spiking Pd(NO3)2-Mg(NO3)2 matrix modifier. The proposed procedure was successfully applied to determine the concentrations of antimony in spiked urine samples with satisfactory recoveries of 95.6%-102.9% (n=6) and relative standard deviations < 5%. The accuracy of the proposed procedure was also validated by the analysis of the certified reference materials.

Biography

Hui-Ming Liu has completed her Ph.D in applied chemistry from Providence University in 2000. She is the associate professor in Department of safety, health and environmental engineering of Hungkuang University. She has published more than 17 papers in reputed journals. Her current research interests are the development green sample pretreatment methods for identifying trace metals in various biological matrices¸ especially in urine.

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