150e Optimisation of Adsorption and Desorption Processes of Heavy Metals from Different Matrices Prior to Atomic Absorption Spectroscopy

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Heavy metals are important constituents widely used in different industrial processes for production of various synthetic materials. For evaluation of human exposure to Pb, Mn, Cr, Co, Cd, and Hg, environmental and biological monitoring are essential processes, in which, preparation of samples is one of the most time-consuming and error-prone aspects prior to analysis. In this study, solid phase extraction (SPE) using minicolumns filled with different sorbents including various Chromosorbs (102, 105) and XAD resins (2, 4, 7, and 16) was optimized with regard to sample pH, sample concentration, loading flow rate, elution solvent, washing solvent, sample volume, elution volume, amount of resins, and sample matrix interferences. Trace metal ions were sorbed on different sorbents and were eluted simultaneously with 2-10 ml HNO3/ethanol and determined by flame atomic absorption spectrometry. Obtained recoveries of metal ions were more than 96%. The amount of the analytes detected after simultaneous preconcentration were basically in agreement with the added amount. The procedure was also validated with three different pools of spiked urine samples and showed a good reproducibility over six consecutive days as well as six within-day experiments. The developed method promised to be applicable for evaluation of other metal ions present in different samples as suitable results were obtained for relative standard deviation (less than 10%), therefore, it is concluded that, this optimized method can be successful in simplifying sample preparation for trace residue analysis of heavy metals in different matrices.