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PRECONCENTRATION OF CADMIUM USING AMBERLITE XAD-4 PRIOR TO ATOMIC ABSORPTION SPECTROMETRY

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Abstract:

Cadmium is an important environmental constituent widely used in industrial processes for production of synthetic materials and therefore can be released in the environment causing public exposure especially around the industrial residence area. For evaluation of human exposure to trace toxic metal of Cd (II), environmental and biological monitoring are essential processes, in which, preparation of such samples is one of the most time-consuming and error-prone aspects prior to analysis. The use of solid-phase extraction (SPE) has grown and is a fertile technique of sample preparation as it provides better results than those produced by liquid-liquid extraction (LLE). To evaluate factors influencing quantitative analysis scheme of cadmium in water samples, solid phase extraction using mini columns filled with XAD-4 resin was optimized with regard to sample pH, ligand concentration, loading flow rate, elution solvent, sample volume (up to 500 ml), elution volume, amount of resins, and sample matrix interferences. Cadmium was retained on solid sorbent and eluted followed by simple determination of analytes by using flame atomic absorption spectrometry. Obtained recoveries of the metal ion were more than 92%. The amount of the analyte detected after simultaneous preconcentration was basically in agreement with the added amounts. The optimized 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 environmental and occupational samples as suitable results were obtained for relative standard deviation (less than 10%); therefore, it is concluded that, this optimized method can be considered to be successful in simplifying sample preparation for trace residue analysis of Cd in different matrices for evaluation of occupational and environmental exposures.

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[atomic absorption spectrometry](#)

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