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ASSESSMENT OF MERCURY AVAILABILITY IN WATER SAMPLES USING DGT AND TD-AAS TECHNIQUES

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Abstract

This study presents mercury (Hg) assessment in water from tailing dumps collected from NW Romania by using commercial Diffusive Gradients in Thin-films (DGT) devices and Thermal Desorption - Atomic Absorption Spectrometry method (TD-AAS) technique. Additional aim of this study is to present Hg method validation and measurement uncertainty estimation for selected samples. An atomic absorption spectrometer based on thermal desorption for mercury vapor generation and DGT devices specific for Hg (containing Spheron-Thiol resin in polyacrylamide as binding gel) were used for the experiments. The limit of quantification (three times LOD) of liquid samples was determined to be 0.10 ng mL^{-1} for bioavailable mercury. The DGT resin is directly introduced into the analyser and no elution step is necessary, therefore this method can be considered as possibility for *in-situ* mercury preconcentration. Standard deviations of internal repeatability and reproducibility for liquid samples were determined to be 7.3% and 9.8%, respectively, while the relative expanded uncertainty was 21%. Hg bioavailability was assessed in several water samples. The values of total dissolved Hg were of about three times higher than the DGT measured concentrations.

Key words: bioavailability, diffusive gradients in thin-films, mercury, method validation, speciation

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