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Speciation and Analysis of Arsenic(III) and Arsenic(V) by Electrochemical Hydride Generation Spectrophotometric Method

[Mohammad Hossein ARBAB-ZAVAR](#)¹⁾, [Mahmoud CHAMSAZ](#)¹⁾ and [Tahereh HEIDARI](#)¹⁾

1) Department of Chemistry, Faculty of Science, Ferdowsi University of Mashhad

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A simple method was developed for speciation and spectrophotometric determination of inorganic As(III) and As(V) using an electrochemical hydride generation technique. For speciation of As(III) and As(V), a graphite rod was used as cathode to reduce As(III) to AsH₃, the rod was then replaced with a tin-lead alloy wire for reducing As(V) to AsH₃. The spectrophotometric determination was based on the reaction of AsH₃ with silver diethyldithiocarbamate to give an absorbing complex at 510 nm. Under the optimized conditions, the calibration curves were linear over the ranges of 0.1 – 5 μg ml⁻¹ for As(III) and 0.5 – 4.0 μg ml⁻¹ for As(V). The concentration detection limits of 0.02 and 0.06 μg ml⁻¹ were achieved for As(III) and As(V), respectively. The relative standard deviations for five replicate speciation and determination of 3.0 μg ml⁻¹ As(III) and As(V) were 0.8 and 7.2%, respectively. The accuracy and recovery of the method were evaluated by analyzing tap water spiked with As(III) and As(V).



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