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POTENTIALITIES OF HYDRIDE GENERATION ATOMIC ABSORPTION SPECTROMETRY (HGAAS) IN THE FAST SEQUENTIAL DETERMINATION OF AS, BI AND SB

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In this study, a sensitive hydride generation method was combined with fast sequential flame atomic absorption spectrometry (FS-FAAS) for the sequential determination of As, Bi and Sb in water samples. A Doehlert design was performed to identify a compromise condition to determine sequentially the three elements. The best condition was reached using NaBH40.8 % mv-1as the reducing agent. Another four variables were also tested: HCl concentration as the carrier solution (2 to 10 mol L-1), KI concentration as the pre-reductor solution (1 to 7 % mv-1), employment of ascorbic acid (0 to 6 % mv-1) as auxiliary pre-reductor, and integration time (3 replicates of 0.5 to 2 s). All these evaluated conditions were not significant at the investigated levels. Therefore, the optimized parameters were: HCl 6 mol L-1in order to avoid interferences from the matrix, KI 1 % mv-1 without ascorbic acid to reduce reagent consumption and waste generation, finally, because of the lower delay time (20s) of the measurements, integration time of 1 s with 5 replicates was employed to precision improvement. That delay time was chosen as the minimum time to signal stabilization after the entire signal profile examination. The linear ranges were from 0.5 to 10 µg L-1 of As, Bi and Sb. The accuracy of the proposed method was checked using two Certified Reference Materials (CRM) related with trace metals in water, HPS-TMDW and NIST 1643e. The results obtained for both CRM were in agreement with the certified value, with the following recoveries: As (average of 76%), Bi (average of 104%), Sb (average of 89 %).The proposed method has several advantages for routine analysis of As, Bi and Sb in water such as: good sensitivity (LOD: 0.132mg L-1for As, 0.088mg L-1for Bi and 0.110mg L-1for Sb; n=10), high analytical throughput (270 determinations per hour), and low reagent consumption when compared with single elements determinations.