

# Evaluation of chemical hydride generation for simultaneous spectrophotometric determination of arsenic and antimony using partial least squares multivariate calibration

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Hydride generation spectrophotometric methods using  $\text{NaBH}_4$  – acid reduction is well known techniques for analysis of arsenic and antimony [1]. A batch chemical hydride generation system was developed for the simultaneous spectrophotometric determination of inorganic As(III) and Sb(III) by silver

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diethyldithiocarbamate. This method is based on chemical reduction of As(III) to arsine ( $\text{AsH}_3$ ) and Sb(III) to stibine ( $\text{SbH}_3$ ) in acidic media and on the subsequent reaction of  $\text{AsH}_3$  and  $\text{SbH}_3$  with silver diethyldithiocarbamate to give two absorbing complexes in the range of 400-650 nm that their spectra are closely overlapping in the binary mixture of them [2]. The calibration set consisted of 36 samples with 1–5 mg/lit As plus 1–7 mg/lit Sb; another set of 25 samples was used for external validation. PLS1 model was applied to the spectral data matrix. Agreement between predicted and experimental concentrations was fair. The proposed method was used for the simultaneous determination of As and Sb in industrial samples. The obtained satisfactory results indicate the successful applicability of the proposed method in complex samples.

## References

- [1] M.H. Arbab-Zavar and M. Hashemi, *Talanta* 52 (2000) 1007–1014.
- [2] M.H. Arbab-Zavar, M. Chamsaz and T. Heidari, *Anal. Sci.* 26(2010)107-110.

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