

DETERMINATION OF INORGANIC ARSENIC (IAs) IN WATER USING AN AUTOMATIZED MOLYBDENUM METHOD BASED ON POLYMERIC INCLUSION MEMBRANES (PIM)

Mario C. Corral Escárcega¹, Eduardo Rodríguez de San Miguel Guerrero², Josefina de Gyves Marciniak², Guillermo González Sánchez³, Beatriz A. Rocha Gutierrez¹ and Lourdes Ballinas Casarrubias¹

¹Faculty of Chemical Science, Autonomous University of Chihuahua, Campus Universitario #2, Circuito Universitario S/N. Chihuahua, Chihuahua, Mexico C.P. 31125

²Faculty of Chemistry, National Autonomous University of Mexico, Ciudad Universitaria Coyoacan, Ciudad de Mexico, Mexico C.P. 04510

³Center of Research on Advance Materials. Chemistry Department, Miguel de Cervantes 120, Complejo Industrial Chihuahua, Chihuahua, Mexico C.P. 31136

Abstract: Arsenic contamination is a serious health problem due to its high toxicity, overseas. An effective arsenic analysis in drinking water is then needed due to its adverse effects on exposed population. The present research was focused in developing an automatized molybdenum blue method, combined with polymer inclusion membrane (PIM) permeation for the determination of inorganic arsenic at trace level ($\mu\text{g L}^{-1}$) in water. This technique could offer convincing results in terms of low analysis time, as well as the advantages of suppressing the use of sophisticated equipment and high costs. The water sample was obtained *in situ*, using a portable flow injection analysis system (FIAS) and introduced to a cell provided with a polymer inclusion membrane (PIM). The PIM made with CTA, CYPHOS 101 and NPOE by the evaporation-precipitation method, allows selective arsenic permeation. The quantification was attained by the generation of a blue heteropolyacid complex. The reaction performed in an acid medium, proceeds between molybdate and arsenate, but not with arsenite, producing a complex that was analyzed by UV-Vis spectrometry. The use of cysteine allowed quantification of the trivalent species [As (III)], and at the same time eliminates the phosphate interferences. The obtained figures of merit of the analysis were: Detection limit of $6 \mu\text{g L}^{-1}$, quantification limit of $1600 \mu\text{g L}^{-1}$, linearity from 8 to $1600 \mu\text{g L}^{-1}$; 96.9% of recovery and 1.24% of precision. In conclusion, the determination of As (V) using a PIM and the molybdenum blue method in one portable system allows comparable results to that observed from instrumental analytical techniques such as GHSSA.

Key Words: *in situ*, arsenic, species, FIAS, PIM, water pollution.

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