

## Poster SA-09

**Direct determination of arsenic compounds in beverages by HPLC-ICP-MS using interference standard method**

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The arsenic distribution in drinking water, foods and beverages is caused by its natural presence in the atmosphere, aquatic systems, sediments and living organisms, which contributes to its daily intake by humans<sup>1</sup>. Brazil's environmental laws have established a limit of 100 µg/L of As in beer and fluid milk, ready for consumption. The quantitative determination of different chemical forms of As can be carried out using high-performance liquid chromatography (HPLC) coupled to inductively coupled plasma mass spectrometry (ICP-MS), which can be affected by spectral interferences. Such interferences are generally caused by polyatomic ions with similar mass/charge ratio to the analyte and cannot be resolved in a quadrupole mass analyzer (ICP-QMS). A new alternative to solve the problem in the use of interference standard method (IFS), which involves the use of species naturally present in the plasma to correct variations in analytical signal due to spectral interference<sup>2</sup>. Unlike the conventional use of internal standard, that employs standards with similar characteristics of analyte, the IFS method uses species with similar behavior of interfering species. The signal analyte/IFS ratios are used in the analytical calibration curves and in sample signal measurements to minimize the effects of signal variation of the interference on the accuracy. In this study, krypton, which is present as an impurity in argon gas, was evaluated as IFS. The main objective of the present study was the development of a procedure for speciation of As in beverages after a simple and fast sample pre-treatment procedure. Five beer samples of different brands and three juice samples were analyzed. Samples were degassed, filtered and directly analyzed. The speciation analysis was performed by HPLC-ICP-MS, using an anionic column and phosphate buffer 12.5 mmol/L (pH=5.6) as mobile phase flowing at 1.0 mL/min. The analytical signals (<sup>75</sup>As<sup>+</sup>) and IFS (<sup>83</sup>Kr<sup>+</sup>) were monitored at m/z = 75 and 83, respectively. The separation of arsenic species provided peaks of As(III) at 3.6 min, DMA at 5.5 min, MMA at 6.8 min and As(V) at 7.8 min. The detection limits, defined as three times the standard deviation of the lowest standard measurements, were 0.79, 0.94, 0.81 and 0.88 µg/L for As(III), DMA, MMA and As(V), respectively. It was quantified at least one of investigated arsenic species in four beers and in one juice samples with concentration varying from 4.2 up to 30.0 µg/L. The developed method was also applied to determine arsenic in water certified reference material (NIST 1643e) and recoveries of 97.2% using IFS and 78.1% without using IFS for As(V) were established. It can be concluded that the direct analysis of beverages using the IFS method may be an attractive alternative to improve the accuracy of arsenic determinations by HPLC-ICP-MS.

1. N. M. M. Coelho, L. M. Coelho, E. S. de Lima, A. Pastor, M. de La Guardia, *Talanta*, 66: 818, 2005.

2. G.L. Donati, R.S. Amais, J.A. Nóbrega, *J. Anal. At. Spectrom.*, 26:1827, 2011.

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