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Evaluation of the multi-element capabilities of collision/reaction cell inductively coupled plasma - mass spectrometry in wine analysis

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Abstract

This work explores the multi-element capabilities of inductively coupled plasma - mass spectrometry with collision/reaction cell technology (CCT-ICP-MS) for the simultaneous determination of both spectrally interfered and non-interfered nuclides in wine samples using a single set of experimental conditions. The influence of the cell gas type (i.e. He, He + H₂ and He + NH₃), cell gas flow rate and sample pre-treatment (i.e. water dilution or acid digestion) on the background-equivalent concentration (BEC) of several nuclides covering the mass range from 7 to 238 u has been studied. Results obtained in this work show that, operating the collision/reaction cell with a compromise cell gas flow rate (i.e. 4 mL min⁻¹) improves BEC values for interfered nuclides without a significant effect on the BECs for non-interfered nuclides, with the exception of the light elements Li and Be. Among the different cell gas mixtures tested, the use of He or He + H₂ is preferred over He + NH₃ because NH₃ generates new spectral interferences.

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