Inductively coupled plasma - mass spectrometry (ICP-MS) and inductively coupled plasma – optical emission spectrometry (IP-OES) analysis of elements in Macedonian wines

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Abstract

In this study the major, minor and trace elements in 25 Macedonian white, rose and red wines from different wine regions were determined. Analysis was performed with inductively coupled plasma - mass spectrometry (ICP-MS) and inductively coupled plasma – optical emission spectrometry (ICP-OES) for accurate determination of the concentration of 42 elements (Ag, Al, Au, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ge, Ho, La, Lu, Mg, Mn, Mo, Na, Nd, Ni, P, Pb, Pr, S, Sm, Tb, Ti, Tl, Tm, U, V, Yb, Zn, Zr). Statistical treatments, including factor and cluster analysis were performed in order to discriminate wines according to the wine type (white vs. red) and geographical origin. The main observed discriminant elements were Ba, Ca, Cu, P, Na and S. The obtained results show that ICP-MS and ICP-OES elemental analyses are promising techniques regarding the categorization of wine origin.

Keywords: elemental composition, wines, factor analysis, cluster analysis, ICP-MS, ICP-OES.

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