

Effect of Bentonite Characteristics on the Elemental Composition of Wine

SOFIA CATARINO,^{*,†,‡} M. MADEIRA,[§] F. MONTEIRO,[§] F. ROCHA,[△]
A. S. CURVELO-GARCIA,[†] AND R. BRUNO DE SOUSA[‡]

Estação Vitivinícola Nacional, 2565-191 Dois Portos, Portugal, Universidade Técnica de Lisboa, Instituto Superior de Agronomia, Departamento de Química Agrícola e Ambiental, Tapada da Ajuda, 1349-017 Lisboa, Portugal, Universidade Técnica de Lisboa, Instituto Superior de Agronomia, Departamento de Ciências do Ambiente, Tapada da Ajuda, 1349-017 Lisboa, Portugal, and Universidade de Aveiro, Departamento de Geociências, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal

Physical, chemical, and mineralogical characteristics of six bentonites were assessed and related to their elemental release to wine. Extraction essays of bentonites in wine at three pH levels were carried out. The multielemental analysis of bentonites and wines was performed by atomic absorption spectrometry (AAS) and inductively coupled plasma mass spectrometry (ICP-MS). Bentonite addition resulted in significantly higher concentrations of Li, Be, Na, Mg, Al, Ca, Sc, V, Mn, Fe, Co, Ni, Ga, Ge, As, Sr, Y, Zr, Nb, Mo, Cd, Sn, Sb, Ba, W, Ti, Bi, and W. In contrast, the concentrations of B, K, Cu, Zn, and Rb significantly decreased. A strong correlation between Na concentrations of treated wines and its content in bentonite exchange complex was observed. Al and Fe contents reflected bentonite extractable aluminous and ferruginous constituents, while Be, Mg, Ca, V, Mn, Ni, Ge, Zr, Nb, Mo, Sn, Sb, Ti, Pb, and U concentrations reflected the elemental composition of bentonites. Several nonconformances with OIV specifications demonstrated the need for an effective control.

KEYWORDS: Contaminant elements; wine; bentonite physical and chemical characteristics; ICP-MS

* Corresponding author. E-mail: evn.sofia.catarino@mail.net4b.pt.
Telephone: +351 261712106. Fax: +351 261712426.

[†] Estação Vitivinícola Nacional.

[‡] Universidade Técnica de Lisboa, Instituto Superior de Agronomia, Departamento de Química Agrícola e Ambiental.

[§] Universidade Técnica de Lisboa, Instituto Superior de Agronomia, Departamento de Ciências do Ambiente.

[△] Universidade de Aveiro, Departamento de Geociências.