

Relationship between foaming properties and polysaccharide composition of sparkling wines

Leticia Martínez-Lapuente,^a Zenaida Guadalupe,^a Belén Ayestarán^a and Silvia Pérez-Magariño^b

a) Instituto de Ciencias de la Vid y del Vino (Universidad de la Rioja, Gobierno de La Rioja y CSIC), C/ Madre de Dios 51, 26006, Logroño, La Rioja, España; b) Instituto Tecnológico Agrario de Castilla y León, Consejería de Agricultura y Ganadería. Ctra. Burgos Km. 119. 47071, Valladolid, España; leticia.rioja@hotmail.com

Sparkling wines elaborated following the champenoise method undergo a second fermentation in closed bottles of base wines, followed by aging of wines with lees for at least 9 months. The foam of sparkling wines is a key parameter of their quality but the compounds that are directly involved in foam quality are not yet completely established. Some authors have attempted to correlate the amount of mannoproteins in sparkling wines with the quality of their foam properties but there are few studies regarding other grape or yeast polysaccharides. Therefore, the aim of this work was to correlate the foaming properties with the polysaccharide composition in different white and rosé sparkling wines elaborated during three consecutive vintages. Foam instrumental parameters were analyzed by the Mosalux method.^[1] Wine polysaccharides were recovered by precipitation after ethanolic dehydration and their carbohydrate composition was determined by GC-MS of their trimethylsilyl-ester O-methyl glycolsyl-residues.^[2]

Table 1. Correlation coefficients (r) and significance levels (p) between parameters that determine foam instrumental properties (HM, HS, TS) and wine polysaccharides

	HM		HS		TS	
	r	p	r	p	r	p
Total polysaccharides	0.071	0.679	0.189	0.270	0.641	0.000
Polysaccharides from yeast	-0.081	0.637	0.054	0.753	0.533	0.001
Polysaccharides from grapes	0.184	0.283	0.280	0.098	0.684	0.000
Mannoproteins	0.150	0.383	0.157	0.360	0.465	0.004
Glucans	-0.225	0.187	-0.041	0.811	0.396	0.017
Polysaccharides rich in arabinose and galactose	0.042	0.806	0.285	0.092	0.723	0.000
Homogalacturonans	0.290	0.087	0.209	0.221	0.577	0.000
Rhamnogalacturonans type II	0.602	0.589	0.240	0.846	0.204	0.869

None of the wine polysaccharides was correlated with the foam maximum height (HM) or the foam stability height (HS), indicating that they would not affect the foamability of sparkling wines. On the contrary, positive correlations were found between foam stability time (TS) and all wine polysaccharides with the exception of rhamnogalacturonans type II. Polysaccharides rich in arabinose and galactose showed the highest correlations.

[1] Maujean, A.; Poinssaut, P.; Dantan, H.; Brissonnet, F.; Cossiez, E. *Bull OIV*. **1990**, *63*, 405.

[2] Guadalupe, Z.; Martínez-Pinilla, O.; Garrido, A.; Carrillo, J. D.; Ayestarán, B. *Food Chemistry* **2012**, *131*, 367.

The authors thank the INIA for financing this study through the project RTA2009-029-C02.