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Rafael Apolinar Valiente, Thomas Salmon, Pascale Williams, Michael Nigen, Christian Sanchez, Richard Marchal, Thierry Doco

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Acacia gum and Sparkling Wines: the beginning of a beautiful friendship?


1UMR 2088 Ingénierie des Agronucléaires et Technologies Emergentes, Université de Montpellier2-CIRAD, Montpellier Sup-Agro-INRA, Montpellier, France
2Laboratoire d’Oenologie et Chimie Appliquée, Université de Reims, Reims, France.
3UMR 1083 Sciences Pour Oe uvologie, Montpellier Sup-Agro, INRA, Université de Montpellier2, Montpellier, France.

In sparkling wines, the foam characteristic is the first quality observed by the consumer. Producers often add bentonite to the wine in order to prevent the protein haze. But bentonite treatments cause loss of wine “foamability”1. Wine industry searches new techniques/treatments which prevent this undesirable effect. Acacia gum (AcG) is used in winemaking, mainly for stabilizing color in red wines. AcG can be fractionated by chromatographic techniques. HIC2 provides 3 fractions with increasing hydrophobicity: HIC-F1, HIC-F2 and HIC-F3.

The objective of this study is to evaluate the impact of the addition of AcG or their HIC-fractions on the foamability of sparkling wines.

Materials & Methods:

A synthetic wine (SYW1) was prepared (12% v/v ethanol; 3 g L−1 of tartaric acid). 3 base wines from several origins (Spain: Tarragona -TA; Saragossa -SA; and Malaga -MA; France: Champagne Reims region –RE1, RE2, RE3, RE4 and RE5) were elaborated by the traditional method. Wines were treated with bentonite (20 g L−1), stirred gently (10 days, 4 °C) and filtered (1 μm). A control without bentonite was performed in every wine (CWBE). Acacia angust (AsenG) and Acacia nigra (AseyG) gums were separately added to SYWY (60 g L−1) and to base wines (30 g L−1). The fractions of AsenG obtained by HIC (HIC-F1, HIC-F2, HIC-F3) were also tested in SYW1 (60 g L−1) and in 2 selected base wines (MA and RE2) (30 g L−1). The foaming parameters were compared by Shaking Test for SYW1 samples and by classical Mosalux method6 for SYW1 and for all the wines sample. Shaking Test: 15 ml of sample were introduced in tubes, being strongly shaken 12 times and pictures were taken every 10 seconds during 2 minutes (Shaking Test 1, or ST1). After 5 minutes, this process was once more repeated (Shaking Test 2, or ST2). The foam height (mm) was measured. Mosalux method: Pictures were also taken to look the foam quality after 4 minutes.

AsenG increases MFH and FHM5 respectively in five and three out of eight wines, whereas AseyG does likewise in six and four out of eight (Figure 4). In two selected MA and RE2 wines (Figure 5), both foaming parameters are enhanced when HIC-F2 is added to RE2 wine, improving this treatment MFH but not FHM in MA wine. HIC-F3 shows an opposite effect in both foaming parameters depending on the wine: RE2 wine exhibits improving values but MA wine exhibits decreasing values.

In SYW1, HIC-F2, HIC-F3 and AseyG make increase the foam height during ST1 and ST2. AsenG and HIC-F1 show the same trend during ST1, but it appears only during the first half of ST2 in AsenG sample and only punctually in HIC-F1 sample (Figure 1). Concerning Mosalux method, all the treatments enhance the Maximum Foam Height and the Foam Height at 5 minutes, mainly HIC-F2 and HIC-F3 (Figure 2). Protein interfacial properties have been related to the molecule flexibility4, therefore the lower partial specific volume of fraction HIC-F16 would imply lower interfacial properties, thus less foaming properties6. Similarly, fraction HIC-F3 presents the highest partial specific volume4 together with the greatest foamability. The mouse aspect appears as less compact and presenting larger bubble in AseyG sample (Figure 3).

The “foamability” of wines treated with bentonite differs greatly depending on the gum or the fraction gum treatment, but also on the wine. To increase the studied foaming parameters, AseyG appears as more effective gum than AsenG. The HIC-fractions from AsenG show varying effects on each foam parameter depending on the wine. Further studies about wines composition must be done to better understand the foamability behavior.

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