Acacia gum and sparkling wines: the beginning of a beautiful friendship?
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To cite this version:

HAL Id: hal-01982726
https://hal.archives-ouvertes.fr/hal-01982726
Submitted on 15 Jan 2019

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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”. Wine industry seeks 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. HIC\(^2\) 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 of tartaric acid). 8 base wines from several origins (Spain: Tarрагона; TA, Saragosse; 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), stirred gently (10 days, 4 °C) and filtered (1 µm). A control without bentonite was performed in every wine (CWBE). Acacia senegal (AsenG) and Acacia nyal (AsyG) gums were separately added to SYW1 (60 g/L) and to base wines (30 g/L). The fractions of AsenG obtained by HIC (HIC-F1, HIC-F2, HIC-F3) were also tested in SYW1 (60 g/L) and in 2 selected base wines (MA and RE2) (30 g/L). The foaming parameters were compared by Shaking Test for SYW1 samples and by classical Mosalux method for SYW1 and for all the wines samples. 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.

In SYW1, HIC-F2, HIC-F3 and AsyG 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 flexibility\(^4\), therefore the lower partial specific volume of fraction HIC-F1 would imply lower interfacial properties, thus less foaming properties\(^6\). Similarly, fraction HIC-F3 presents the highest partial specific volume\(^6\) together with the greatest foamability. The mouse aspect appears as less compact and presenting larger bubble in AsyG 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, AsyG 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.

**REFERENCES**


\(^{2}\)Mella-Tamayo et al., Colloids and Interfaces, 2018, 2, 11.