INTERACTION BETWEEN COMMERCIAL MANNOPROTEINS AND PHENOLIC COMPOUNDS OF TWO RED WINES FROM DIFFERENT PORTUGUESE GRAPE CULTIVARS•

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1. INTRODUCTION

The interaction between mannoproteins and wine phenolic compounds is a subject of great interest as some studies show the possible impact on color stability (Escot *et al.,* 2001, Riou *et al*., 2002, Vasserot *et al*., 1997, Poncet-Legrand *et al.*, 2007) and an improvement in the sensory characteristics namely the reduction of red wine astringency (Vidal *et al*., 2004). This way, the oenological interest of this interaction is extremely high not only because color stability is one of the biggest winemaking challenges but also because sensory improvements are very important for the commercial quality of the end product. Some works (Guadalupe *et al*., 2007, 2010, Guadalupe, Ayestarán, 2008) showed that there was no positive interaction between mannoproteins and color compounds and that the interaction between mannoproteins and tannins results in a decrease of wine tannin content, suggesting the precipitation of tannin and mannoprotein aggregates and a decrease in astringency with an increase in the wine sweetness and roundness. There are several oenological products in the market that contain mannoproteins in their composition having the purpose of stabilizing wine polyphenols and resulting in wines with higher color stability and better mouth-feel. The aim of this work was to evaluate the influence of two commercial mannoproteins in the color stability of two different red wines (one from 'Touriga nacional' and other from 'Alfrocheiro' and 'Aragonês' (sin. 'Tempranillo') grapevine cultivars). The color and tannin content evolution was studied for ten months after vinification.

2. MATERIALS AND METHODS

2.1. Wines

Two wines were used in this study, both made with Dão Sul grapes, from the Dão Region, Portugal – Wine A: 'Touriga Nacional' and Wine B: 'Alfrocheiro'+'Aragonês'. Two different commercial preparations containing yeast mannoproteins (M1 and M2) were added in the concentrations 0,2 g L^{-1} (C1) and 0,4 g L^{-1} (C2) after malolactic fermentation,

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followed by bottling of the resulting wines. T samples refer to wine with no addition of commercial preparations.

2.2. Color characterization

In order to characterize the wine color compounds it was used the spectrophotometrical method described by Somers, Evans (1977).

2.3. Isolation and analysis of tannin composition

The isolation of tannins was made according to the methods described by Sun *et al*. (1998) and Labarbe *et al*. (1999).

2.4. Mannoprotein characterization

The mannoproteins were isolated on a Concanavalin-A column as described by Gonçalves *et al.* (2002). The carbohydrate composition was determined by gas chromatography according to Albersheim *et al*. (1967). The total protein content was determined as described by Lowry *et al*. (1951).

3. RESULTS

3.1 Colour Evolution

Both studied wines had the same evolution for color parameters. The evolution for wine A is represented in fig. 1. IC tends to diminish through time for all samples in the same way, as a result of color compounds polymerization and precipitation, diminishing the red coloured compounds with absorbance at 520 nm. PP represents longer chain coloured compounds and tends to increase with time, with no important differences between samples. AC represents the coloured anthocyanins at wine pH and they diminish through time, resulting on wine browning. As on the other parameters no significant difference is seen between samples.

3.2 Tannin evolution

Both studied wines had similar evolutions for tannin parameters. The evolution for wine A is represented in fig. 2. Concerning wine A, T sample had a slower decrease both on DPm and PA content through time and M1C1 had the fastest. The method used to achieve the concentration of proanthocyanidins on wine refers to native tannins, resulting in a big decrease of these forms as they conjugate with acetaldehyde and anthocyanins, during wine ageing.

4. CONCLUSIONS

It seems like the enriched mannoprotein commercial preparations did not have effect on color and tannin stabilization of the studied wines. The evolution of color parameters through time was similar for all trial modalities, showing no efficient effect of both commercial products on color stability parameters for the wines. This fact was already reported by some authors also (Guadalupe *et al*., 2007, Guadalupe, Ayestarán, 2008). The tannin profile evolution showed some differences between modalities, showing a possible

stabilizing effect for one of the modalities studied in one wine, where one of the commercial mannoproteins seems to delay the polymerization process. Although there was no influence on color parameters, it is possible that the commercial mannoproteins used in this work have some influence on tannin aggregation evolution, contributing to the delay of tannin polymerization in red wines.

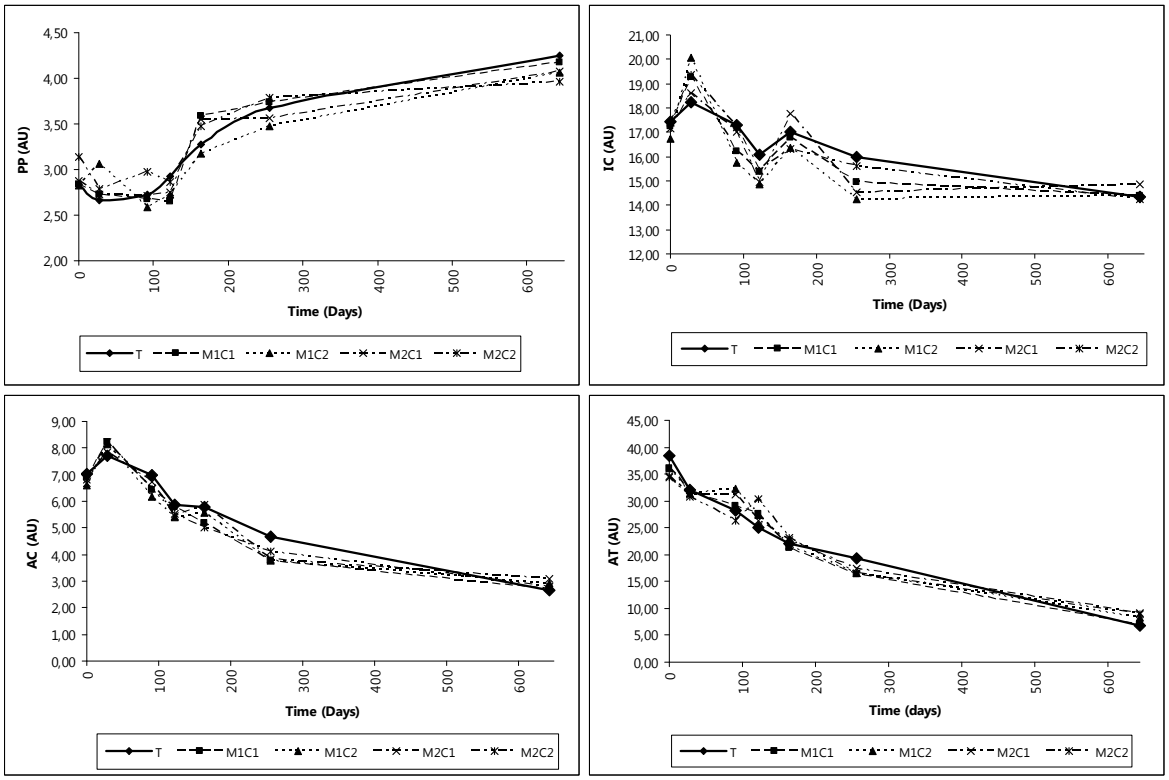

Fig. 1 – Color Intensity (IC), Polymeric Pigments (PP), Colored Anthocyanins (AC) and Total Anthocyanins (AT) evolution of Wine A.

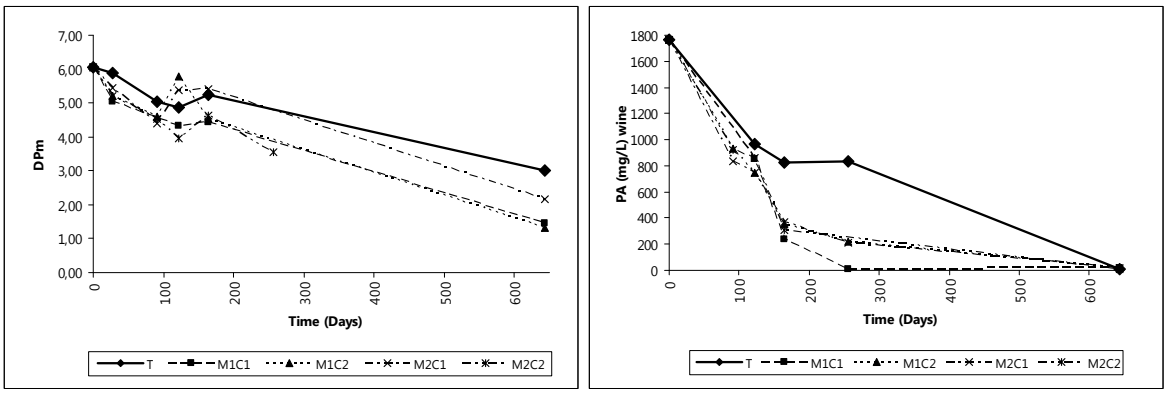

Fig. 2 – Medium degree of polymerization (DPm) and Proanthocyanidins content (PA) evolution in Wine A.

Abstract

The interaction between mannoproteins and wine phenolic compounds is a subject of great interest as some studies show the possible impact in color stability and an improvement in the sensory characteristics namely the reduction of red wine astringency. Several commercial oenological products contain mannoproteins in their composition having the purpose of stabilizing wine polyphenols and resulting in wines with higher color stability and better mouth-feel. In the present work the influence of two commercial mannoproteins in the color stability of two different red wines for ten months is studied. Although there was no influence on color parameters, it is possible that the commercial mannoproteins used in this work have some influence in tannin aggregation evolution, contributing to the delay of tannin polymerization in red wines.

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