INTRODUCTION

The aim of this study was to evaluate, by sensorial analysis, volatile compounds and oenological parameters, the reliability of wines from three different grape varieties (Chardonnay, Pinot and Montepulciano) produced by adding ascorbic acid, lysozyme and tannins replacing sulfur dioxide.

Samples and Winemaking: About 25 kg grapes from each variety were manually harvested and cooled overnight at 8 °C in refrigerated cells. Grapes were de-stemmed and 20 g/hL of gallic tannin and ascorbic acid was added. Grapes were crushed in inert atmosphere. Must was added peptolytic enzyme (1.5 g/hL), decolorizing carbon (20 g/hL) and PVPP (10 g/hL) and clarified by flotation. After the clarification, the clarified must was inoculated at 25 g/hL Saccharomyces cerevisiae and 20 g/hL of ammonium sulphate, 10 g/hL of PVPP, 5 g/hL of tannin and 50 g/hL of malic and tartaric acids were added. The fermentation temperature was maintained below 18°C. The maceration was carried out for 24 h at 25°C for Montepulciano. After nine days, the wines (reducing sugar < 3 g/L) were decanted in inert atmosphere to another tank and added yeast hulls 15 g/hL and two enzymes: β-glucanase 3 g/hL and 2 g/hL β-glucosidase. The wine was left aging for 3 months, taking care to make 2 batonnage a week before and one in the next few weeks.

RESULTS AND DISCUSSION

Volatile compounds:

Twenty-nine volatile components were identified in free volatile fraction from Chardonnay, Pinot and Montepulciano wines. In the white wines, the highest total content was found in the samples without SO₂, with an increase of 13% and 20%, for Chardonnay and Pinot, respectively. Although, for the Chardonnay wine, this increase was not statistically significant. Esters were the main responsible for the highest contents of volatile in the samples without SO₂. The tannins seemed to be the most positive influencing factor on ester production for white wines. As suggested in another paper, these results may be due to the ability of tannins added before fermentation to affect the presence of oxygen in musts and wines, as a consequence of a double mechanism of enzyme inhibition of radical-scavenging activity. Tannins can quickly drop the oxygen availability, contributing to preserve the esters amounts of wines. In general, ethyl esters together with acetates, contribute to the typical fruity aroma of young wines. In another hand, the highest contents of superior alcoholic alcohols were found in the Pinot and Montepulciano wines with SO₂. Sulfites seem to show a positive influence on alcoholic production. It has been reported that during fermentation, sulfites can promote the synthesis of some alcohols by influencing the Ehrlich pathway. These compounds are considered to greatly influence the aromatic properties of wines, so that the levels of 2-methyl-1-propanol and 3-methyl-1-butanol are currently used as a criterion of quality for wines and spirits.

CONCLUSIONS

The replacement of SO₂ with ascorbic acid, lysozyme and oenological tannins influenced the volatile composition, the sensorial quality and the contents of tartaric, malic, lactic and shikimic acids of wines. Wines fermented with SO₂ showed higher total volatile alcohol amounts, while the presence of ascorbic acid, lysozyme and oenological tannins increased the level of volatile esters. The Chardonnay wine showed the best increment in quality caused by the additives, followed by Pinot and Montepulciano wines, showing the improved of these additives in white wines. Although adding SO₂ is still a widespread practice in winemaking process, gathered results are major arguments in favour of the hypothesis to obtain wines of good sensorial quality without using hazardous chemical additives.

Acknowledgements: we would like to thank the Winery Valentina Passalacqua of Apricena (FG), producer of wine made from organic grapes with no added sulfites, for the readiness in the preparation of experimental theses.

References:

