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Influence of different reducing agents on Graševina white wine aromatic profile

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INTRODUCTION

Graševina is a grape variety (*Vitis vinifera* L.) whose origin has not been determined yet. It is an extremely valuable variety because it is suitable for obtaining different white wine styles and categories. Sulfur dioxide (SO_2) is the most commonly used enological preparation for preservation of wine. It has unique triple property, antioxidative, antimicrobial and coagulative, and protects aromatic properties and color of wines. Despite all good sides, in certain concentrations, SO_2 can be harmful to wine consumers, so it should be handled according to recommendations and production conditions. Due to the negative correlation between SO_2 and health, there is an increasing demand for wines with less SO_2. However, the production of wine without it faces many problems. In order to avoid negative consequences, wine producers started to use alternative and natural preparations. Some of them are glutathione and inactive yeasts.

MATERIAL AND METHODS

In the harvest 2022, the primary processing of grapes was carried out, and during further processing of the must, two treatments were carried out: with SO_2 (5 %-sulfuric acid, H_2SO_3) and with alternative protocol no-SO_2.

Alternative protocol implied the treatment of grapes with inactive yeast *Metschnikowia pulcherrima* (LEVEL2 INITIA™), glutathione (GLUTASTAR™), pectolytic enzyme (Lallzyme CUVÉE BLANC™) and antibacterial biopolymer (Bactiless™).

After clarifying and decanting from the lees, the alcoholic fermentation was carried out under the same conditions in both treatments. At the end of alcoholic fermentation, Reduless™, Lallemand, yeast derived and Noblesse™ (Lallemand), partially autolyzed yeast derivative was added to no-SO_2 treatment and 5 %- H_2SO_3 was added to wine with SO_2.

Basic physicochemical analysis was carried out according to standard methods, together with GC-MS analysis of aromatic profile. The sensory evaluation was performed by six qualified wine evaluators.

RESULTS AND DISCUSSION

Fig 2. Descriptive sensory evaluation of 'Graševina' with SO_2 and no-SO_2

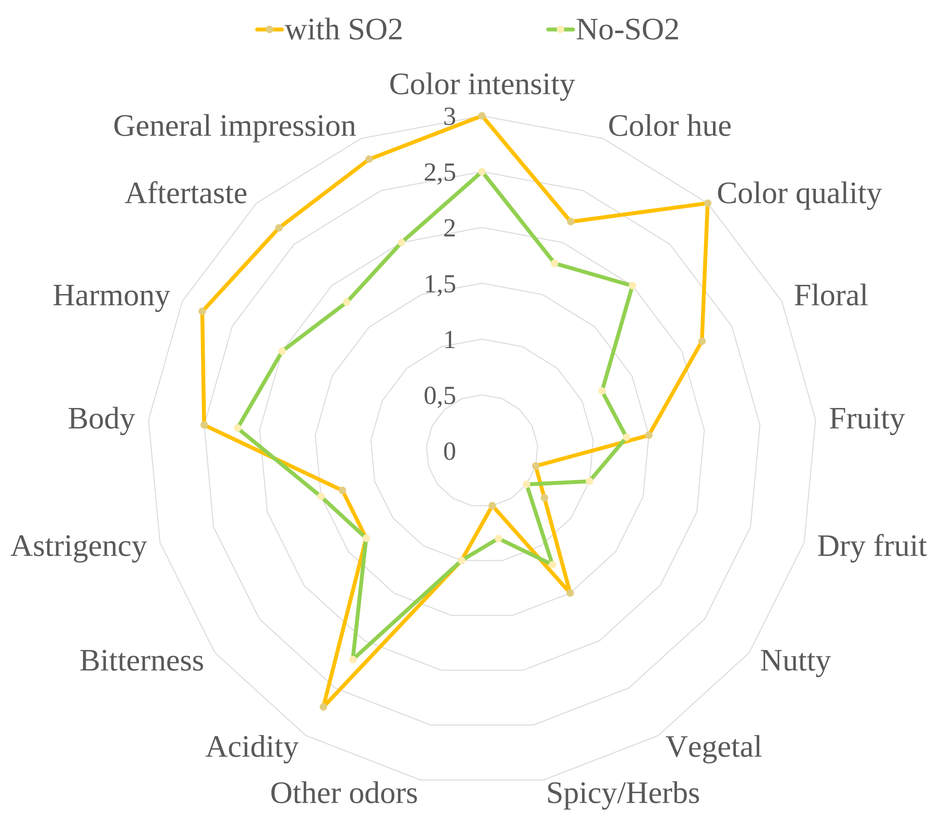
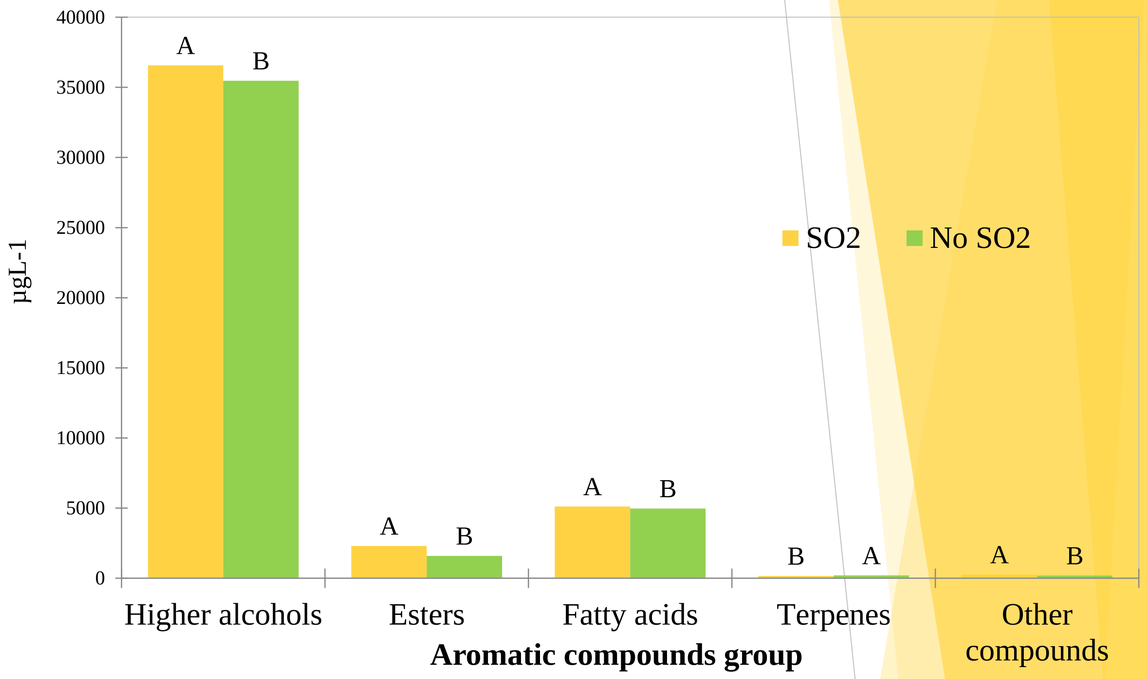


Fig.1. Concentration of aromatic compound groups (μg L^{-1}) in Graševina wines



*Different upper case letters in the same column represent statistically significant differences between means at $p \leq 0.05$

75 different aromatic compounds were detected in wines produced with SO_2 and 56 compounds were detected in wines without SO_2. All compounds were divided into six aromatic groups: higher alcohols, esters, fatty acids, terpenes, C13-norisoprenoids and other compounds. Significant differences ($p < 0.05$) were noticed for all groups of aromatic compounds, except for C13-norisoprenoids.
Four higher alcohols were above the detection threshold, more prevalent in wines with SO_2. Four fatty acids were detected above the detection thresholds and their concentration was higher in wine with SO_2. Esters were present in higher concentrations in wine with SO_2.

CONCLUSION

More aromatic compounds were detected in Graševina wines with SO_2 in comparison to wines with glutathione and alternative reducing agents. Higher alcohols and fatty acids together with total esters were found in higher concentration in wines with SO_2. Significant differences were found among all analyzed groups of aromatic compounds regarding the treatment, except for C13 norisoprenoids.
According to the physicochemical analysis it can be stated that no significant differences were found in the basic composition of Graševina wines.
According the sensory evaluation Graševina produced with SO_2 was declared as better quality wine with more floral and fruity aromas.