EFFECT OF SO2, GSH AND GALLOTANNINS ON THE SHELF-LIFE OF A CORTESE WHITE WINE

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Oxidation of white wines with consequent browning and loss of typical aroma is a long standing problem in white winemaking [1].
In oenology, SO_2 is the most widely used and the most effective anti-oxidant, but a prolonged absorption of SO_2 can cause health problems [2].
In the future a decrease in the SO_2 concentration limits for wine is expected, and, in some cases, the prospective is a completely SO_2 -free wine.
Other molecules are currently investigated for their antioxidant and antiradical properties, such as reduced glutathione (GSH) and enological tannins [3].
Aim of the work: studying the effect of the addition of GSH and/or gallotannins at bottling to limit the use of SO_2 in white winemaking.

EXPERIMENTAL PLAN

CORTESE WHITE WINE

- Experiment A: oxigenated at 5.5 ppm (oxidation test)
- Experiment B: oxigenated at 3 ppm (bottling-like conditions)

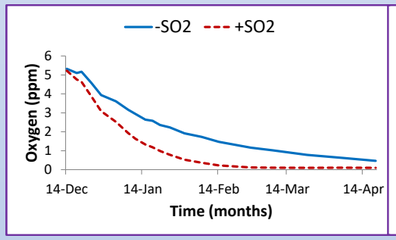
Additives at bottling

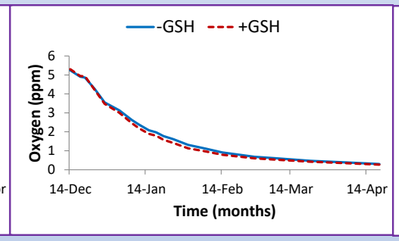
Sample	SO2 (mg/L)	GSH (mg/L)	Gallic tannins (mg/L)
Control	20	0	0
s	60	0	0
t	20	0	40
st	60	0	40
g	20	20	0
sg	60	20	0
gt	20	20	40
sgt	60	20	40

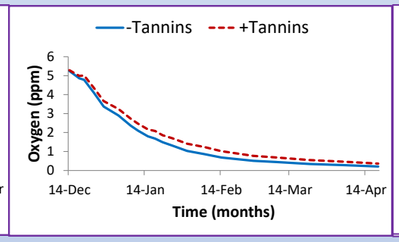
Exp A: Free and total SO_2; Cielab + Abs 420 nm; total polyphenols; catechins; HCTA; GSH (1,3,8,12 months after bottling)
Accelerated browning test (1 and 8 months after bottling)
Oxygen Consumption Rate (OCR) (over time)

Exp B: Free and total SO_2; Cielab + Abs 420, total polyohenols, volatile acidity, acetaldehyde (15 months after bottling)
Sensory analysis (15 months after bottling)
Oxygen Consumption Rate (OCR) (over time)

RESULTS AND DISCUSSION

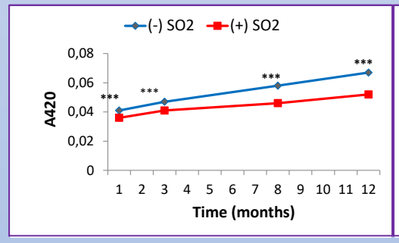


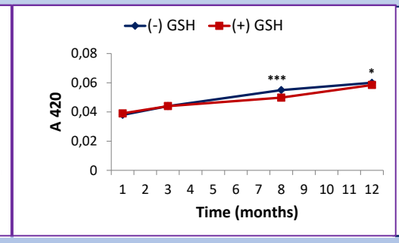




OCR related to the different additives: SO2, GSH, gallic tannins

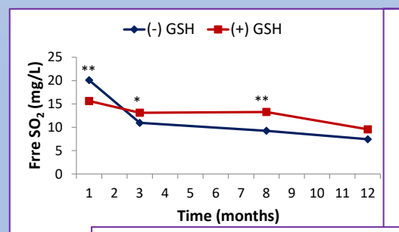
The only significant effect on OCR was observed for SO_2 (faster in "+SO2 samples"), according to literature ([3],[4]) .
The GSH did not influence O_2 cons., but it was slightly faster in "+GSH trials".
A modest increase in oxygen consumption was observed in "-Tannins samples".

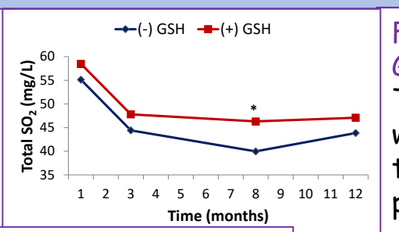




Evolution of wine color during bottle aging: effect of SO_2 and GSH

The higher SO_2, the lower the A420.
The GSH was not able to reduce the wine browning during bottle aging. The trend of the A420 parameter was the same in the "+GSH" and "-GSH" trial, except 8 months after bottling, where +GSH samples had lower A420. This effect decreased after 12 months, even if the differences between the samples were still significant.





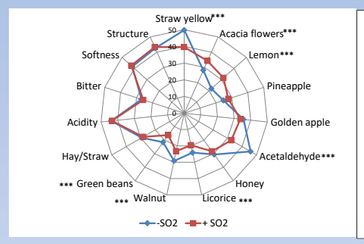
Free and total SO_2 consumption during bottle aging in relation with the GSH additions.

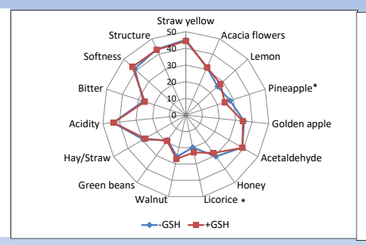
The presence of GSH limited the oxidative losses of SO_2, mostly in the wines with higher SO_2 levels. The effect of GSH decreased over time, together with its content in the wine: after 8 months GSH was only present in traces.

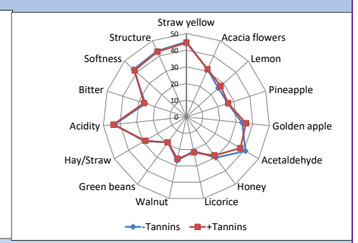
	1 month	3 months	8 months	12 months
GSH (mg/L)	9,8	9,8	0,6	nd

CONCLUSIONS:

The oxidative browning of wines during bottle storage was limited only by the residual presence of free SO_2: colour intensity and free SO_2 content are inversely correlated. Furthermore, the +SO_2 samples have more intense notes related to freshness.
The addition of GSH, alone or together with tannins, reduced the losses of free SO_2. Neither GSH nor gallotannins show efficacy at tested amounts.







Sensory profile of the Cortese wine 15 months after bottling: influence of different amounts of SO_2, GSH and gallic tannnins at bottling

+SO_2 samples = less colored, with more intense notes related to freshness (acacia flowers and lemon) and less intense notes related to oxidation (acetaldehyde, licorice and walnut). A significant effect for GSH was observed only for the odour descriptors pineapple (more intense for -GSH sample) and licorice (more intense for +GSH sample).
No significant effect of tannins was observed.

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