



Thesis title: Effect of different levels of sulfur dioxide on the population dynamics of *Saccharomyces cerevisiae* in spontaneous fermentation of red wine.

Student name:	Leandro Javier Nosal
Institution/company involved:	Università degli Studi di Torino.

Jury members (name/position):

Novello, V./Presidente della LM, UniTo
Gerbi, V./Professor, UniTo
Di Lorenzo, R./Professor, University of Palermo
Tirelli, A. /Professor, University of Milan
Pisciotta A./Professor, UniTo
Bosco, D./Professor, UniTo
Guidoni, S./Professor, UniTo

Names & emails of supervisors:

Dr. Kalliopi Rantsiou	kalliopi.rantsiou@unito.it
Prof. Vincenzo Gerbi	vincenzo.gerbi@unito.it

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Confidential: **Yes** **No**

Abstract (max 300 words)

Topic position & objectives: The use of SO₂ is quite extended in the wine industry due to its many properties. However, there is a growing interest in the wineries, as well as among consumers to reduce and, eventually, to eliminate its use, given the health problems this molecule can trigger in workers and consumers. The aim of this study was to evaluate the effect of different levels of SO₂ in the population dynamics of *S. cerevisiae* strains and in the final wine composition.

Methods: In 2014, at La Stella winery in British Columbia, Canada, Merlot grapes were fermented in 200 L capacity tanks, with three levels of initial SO₂ added (0; 20 and 40mg/l). No commercial active dry yeast was used. To study the microbial populations, sampling was performed three times (early, mid and late stage of the fermentation). Yeasts were isolated onto culture media at each stage. DNA was extracted from yeast cultures and amplified using primers defining eight different microsatellite loci. Results were compared with a database comprising microsatellite fingerprints of yeasts from the University of British Columbia.

Results: It was found that even though no ADY was added, in all the cases the fermentation was carried by commercial yeast that had been previously used at the winery. In addition, it was shown that some strains developed better at certain levels of SO₂. When evaluating the chemical or enological parameters, no statistical differences were found in terms of ethanol, sugar, major organic acids, anthocyanins and tannins. Finally, the sensory analysis did not produce any differences among wines.

Main conclusions: It was concluded that adding no SO₂ at the beginning of the fermentation is an alternative in the direction of eliminating the use of this molecule and that it is a practice compatible with spontaneous fermentation where in many cases it ends up being driven by ADY anyways.

Keywords (5): Sulfur dioxide, *Saccharomyces cerevisiae*, Merlot, Yeast strains, Microsatellites.