

# Options to replace or reduce the sulphite content in Tannat red wines produced with minimal intervention.

Piccardo, D. <sup>1</sup>; González, M. <sup>2</sup>; Favre, G. <sup>1</sup>; Clara, A. <sup>1</sup>; Olivera, J. <sup>2</sup>; González-Neves, G. <sup>1</sup>

<sup>1</sup> Enología, Unidad de Tecnología de los Alimentos, Facultad de Agronomía, UDELAR. Garzón 780, Montevideo.

dpiccardo@fagro.edu.uy

<sup>2</sup> Microbiología de Lácteos, Unidad de Tecnología de los Alimentos, Facultad de Agronomía, UDELAR. Garzón 780, Montevideo.

Several Uruguayan wineries have begun to produce wines with minimal intervention, to increase the sustainability of their vineyards and wines. These wines are characterized by the minimum intervention in the management of the vineyard, its harvest, vinification, conservation and aging<sup>1,2</sup>. Sulfur dioxide (SO<sub>2</sub>) is not used or is used in reduced doses, although chitosan can be substituted or supplemented<sup>1</sup>.

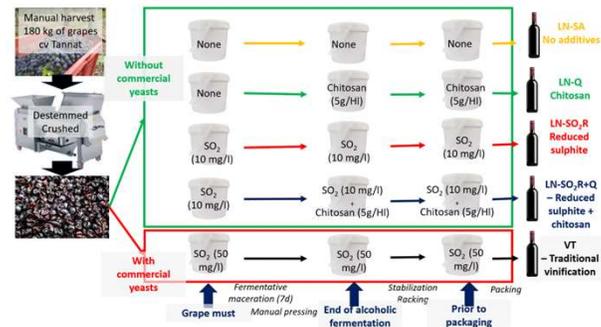
**AIM: Evaluate SO<sub>2</sub> reduction or replacement options adapted to the production of Tannat red wines with minimal intervention.**

## MATERIALS Y METHODS

Vinification of the Tannat grapes with autochthonous yeasts (LN) was carried out during the 2023 vintage. Treatments were SO<sub>2</sub> (LN-SO<sub>2</sub>R=30mg/hl), chitosan (LN-Q=10mg/hl), SO<sub>2</sub>R and chitosan (LN-SO<sub>2</sub>R+Q) and a treatment without aggregate (LN-SA). Also, a vinification was carried out with selected yeasts and usual doses of SO<sub>2</sub> (VT). The vinifications were carried out in containers with a capacity of 10 liters, with three repetitions per treatment. A fermentative maceration was carried out for 7 days, with a daily pump-over.

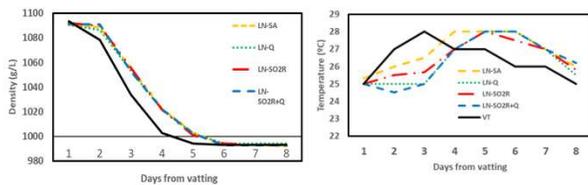
During the alcoholic fermentation of the musts, their density and temperature were monitored daily.

Fermentation kinetics and the composition of the devatted wine were analyzed. Three days after vatting, devatting, 15 days after devatting and before bottling, microbiological analysis of lactic acid bacteria (LAB), acetic acid bacteria (AAB) and yeasts were carried out. The wines were analyzed two months after devatting, determining their basic composition (ethanol content, pH, total acidity, volatile acidity, malic and lactic acid content), their color (L\*, a\*, b\*) and their phenolic composition (total polyphenols, anthocyanins and tannins)

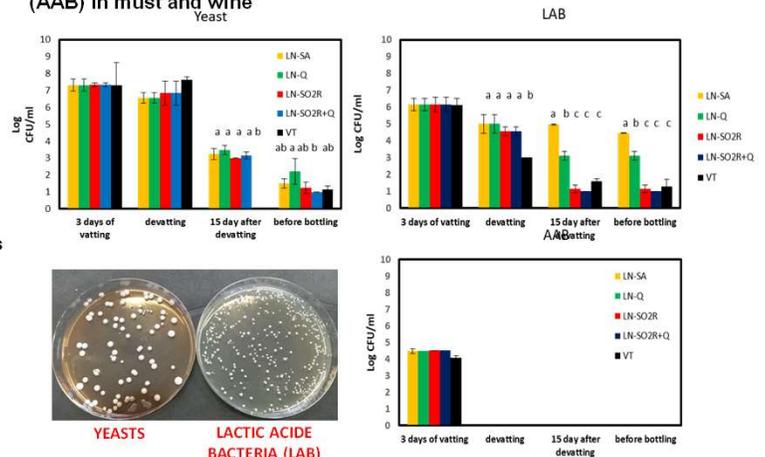


## RESULTS

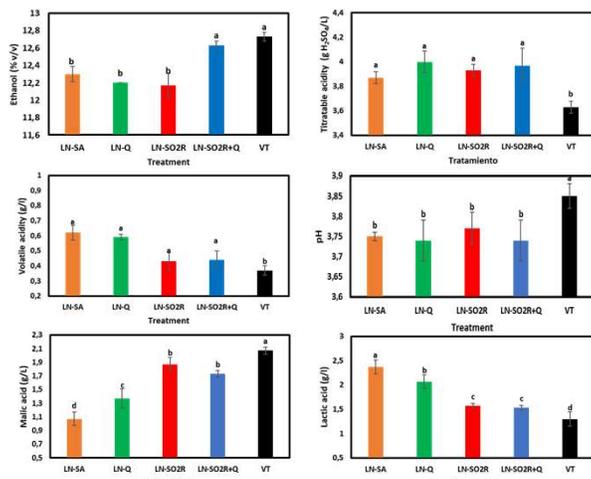
### 1 - Fermentation kinetics of must



### 2 - Enumeration of yeasts, lactic acid bacteria (LAB) and acetic acid bacteria (AAB) in must and wine



### 3 - General wine composition before bottling (two months after devatting)



Means with different fonts indicate significant differences between treatments

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### 4 - Color and phenolic wine composition before bottling (two months after devatting)

Analytical parameter	LN-SA	LN-Q	LN-SO <sub>2</sub> R	LN-SO <sub>2</sub> R+Q	VT	
Color	L*	47,83 a	44,57 b	41,63 bc	38,0 d	38,67 cd
	a*	47,25 d	49,50 c	51,96 b	53,70 a	51,91 b
	b*	2,74 c	4,09 b	4,88 b	5,93 a	6,37 a
Phenolic composition	Total Phenolic (mg/L)	1235,5 a	1311,5 a	1193,3 a	1325,8 a	1269,3 a
	Anthocyanins (mg/L)	162,0 c	157,7 c	192,0 b	229,8 a	212,3 a
	Tannins (mg/L)	374,6 a	382,7 a	327,3 a	370,6 a	358,5 a

Means with different fonts indicate significant differences between treatments

**Final Comments and Conclusions:** Treatments with native yeasts (LN-SA, LN-Q, LN-SO<sub>2</sub>R, LN-SO<sub>2</sub>R+Q) performed a slower alcoholic fermentation compared to musts fermented with commercial yeasts (VT). AABs were only present at the beginning of the fermentation. Towards the devatting, a decrease was observed in all populations in all treatments, except BAL in LN-SA treatment. The yeast count 15 days after devatting the all LN treatments was higher than that observed in VT. Before bottling, only LN-Q yeast counts remained higher than VT. The VT and LN-SO<sub>2</sub>R+Q wines had higher alcohol and malic acid content, while the LN-Q and LN-SA wines had higher volatile acidity and lactic acid content. LN-SO<sub>2</sub>R+Q and VT wines had better chromatic characteristics and a higher concentration of total polyphenols, anthocyanins and tannins compared to LN-SA and LN-Q wines, while LN-SO<sub>2</sub> wines had intermediate values. These results are associated with the antioxidant and anti-oxidative effects of SO<sub>2</sub>, beyond its action on microbiological development. Our preliminary results suggest that the joint use of reduced doses of SO<sub>2</sub> and chitosan maintains the characteristics of wine in relation to traditional winemaking and may be a viable alternative to maintain the quality and improve the conservation of wines made under the concept of minimal intervention.