Società Chimica Italiana
Divisione di Spettrometria di Massa

Università di Catania

Book of Abstracts

Oenological potential of the *Hanseniaspora vineae* strain Hv205

A. Gallo[1,2], T. Roman[1*], M. Paolini[1], N. Cappello[1], T. Nardin[1], R. Larcher[1]

[1]Fondazione Edmund Mach - Technology Transfer Centre
[2]C3A – University of Trento

Summary: *It has been studied the volatile composition of Glera and Chardonnay wines produced with a sequential inoculation protocol of the Hanseniaspora vineae strain Hv205 and a commercial Saccharomyces cerevisiae. Results evinced the overproduction of ß-phenylethyl acetate compared to Saccharomyces, thus contributing to increase rose-like hints in wine associated to this compound.*

Keywords: *Hanseniaspora vineae, ß-phenylethyl acetate, acetyltransferase.*

1 Introduction

The use of non-*Saccharomyces* yeast is increasing in winemaking due to some specific features of their metabolism. Among them, recently it has been proposed a new *Hanseniaspora vineae* strain. The yeast isolated in Uruguay has been selected by its high ethanol tolerance compared to other non-*Saccharomyces*, potentially achieving 10% vol of ethanol. Besides, the higher expression of the corismate and mandelate biochemical pathways results in a higher production of some volatile compounds respect to *Saccharomyces*. Among these molecules, ß-phenylethyl acetate is the most interesting due to the floral rose-like hints that imparts to wine aroma. The present work studies the use of this yeast in white winemaking at oenological conditions and the comparison of the results with those achieved whit a commercial *S. cerevisiae* strain. In particular, it will focus on the ability of ß-phenylethyl acetate production.

2 Experimental

The *Hanseniaspora vineae* Hv205 strain was inoculated in duplicate in three Chardonnay and three Glera grape must obtained at semi-industrial conditions and, followed by a sequential inoculation of a commercial *Saccharomyces cerevisiae* strain (LVBC, Oenobrands, France) once the alcoholic fermentation reached 6% vol of ethanol (*Hv* processes). The same production protocol was applied with a fermentation with the sole S. cerevisiae strain (*Sc* processes). At the end of the alcoholic fermentation wines were analysed for their volatile composition according to the methods reported by Paolini et al. [1, 2], respectively a GC-MS/MS approach for the analysis of acetate esters, ethyl esters and fatty acids and GC-FID for the main fusel alcohols.

3 Results

All fermentation processes exhausted reducing sugars. The total production of acetates esters of *Hv* processes resulted meanly higher (n=3) in Glera (4.5±0.2 mg/L) and Chardonnay (4.8±0.6) respect to *Sc*'s (1.2±0.3 and 1.4±0.8 mg/L respectively), according to the ANOVA Tuckey's HSD test ($p<0.05$).

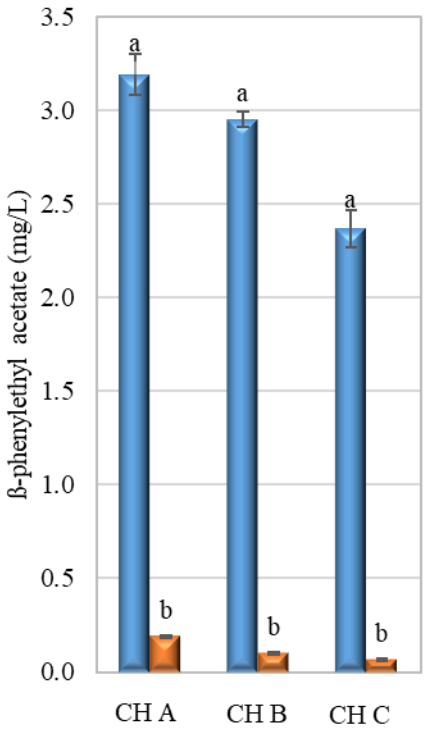

Figure 1. Mean concentration (n=2) of ß-phenylethyl acetate (mg/L) in Chardonnay wines depending on the grape must and the yeast protocol used (■ Hv; ■ Sc)

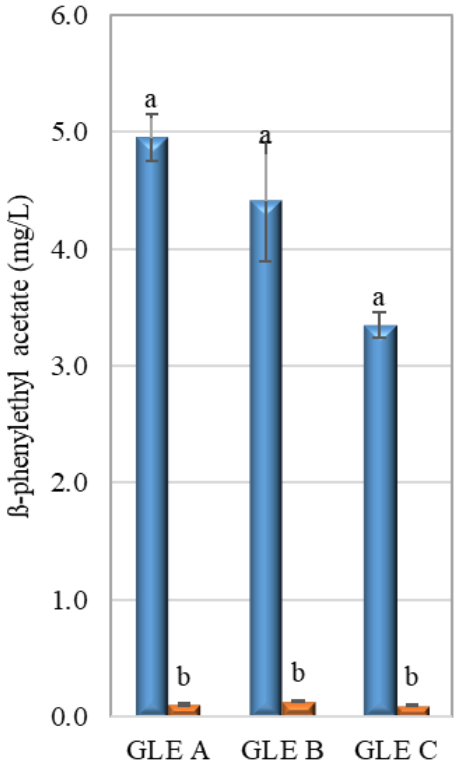

Figure 2. Mean concentration (n=2) of ß-phenylethyl acetate (mg/L) in Glera wines depending on the grape must and the yeast protocol used (■ Hv; ■ Sc)

These differences were mainly due to the increased production of ß-phenylethyl acetate (figures 1 and 2) for which *Hv* processes showed concentrations 38 and 37 folds higher, respectively for Glera and Chardonnay. ß-phenylethyl acetate represented meanly 94% and 59% of the total acetates produced in *Hv* processes respectively in Glera and Chardonnay wines and only 9% and 12% in *Sc*. Furthermore, the concentration of this aroma compound did not exceed the organoleptic threshold (0.25 mg/L) in any of the *Sc* processes.

Table 1 reports the mean values of 2-phenylethanol and the corresponding acetylation ratio for each wine of the two grape varieties under study. The increased production of the ß-phenylethyl acetate is not the result of the overproduction of the corresponding alcohol but rather to the enhanced expression of the acetyltransferase activities in this yeast.

*Table 1. 2-phenylethanol concentration and acetylation ratio of the Hv and Sc processes. Anova Tukey HSD test; *** p<0.001.*

Parcel	2-phenylethanol (mg/L)			Acetylation ratio		
	Hv	*Sc*	Sign	*Hv*	*Sc*	Sign
CH A	5.8±0.2	13.7±0.1	***	55.3 %	1.4 %	***
CH B	4.4±0.3	6.8±0.1	***	66.5 %	1.5 %	***
CH C	6.8±0.2	16.5±0.0	***	34.7 %	0.4 %	***
GLE A	7.0±0.0	16.4±0.4	***	70.4 %	0.6 %	***
GLE B	7.0±0.7	16.1±0.1	***	62.8 %	0.8 %	***
GLE C	6.1±0.4	10.9±0.1	***	54.9 %	0.9 %	***

4 Conclusions

The use of *Hanseniaspora vineae* in sequential inoculation at semi-industrial conditions allowed to increase remarkably the production of ß-phenylethyl acetate compared to *Saccharomyces cerevisiae*. This compound is one of the responsible of the fermentative rose-like aroma scents in wine. The use of this yeast could be used in the blending wines to increase aroma complexity of neutral white varieties.

References

1. Paolini, M., Tonidandel, L., & Larcher, R. (2022). *Food Control*, 136, 108873.
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