

5th MS-Wine Day

May 22-24, 2024

Research Centre for Enology and Viticulture, Asti

TRACES IN THE GLASS

MASS SPECTROMETRY

FOR QUALITY AND PROFILING

IN WINES, FERMENTED BEVERAGES, AND DISTILLATES

Main topics

Wine and Fermented Beverages quality

Traceability and Counterfeit in Fermented Beverages

Metabolomic and Proteomic Profiles in Wine, Beer, and Spirits

Cutting-Edge MS Techniques Applied to Enology

Monitoring Oenological Processes

Contaminants and Faults in Alcoholic Beverages

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**MASS SPECTROMETRY FOR QUALITY AND PROFILING IN WINES,
FERMENTED BEVERAGES, AND DISTILLATES**

Uni-Astiss Rita Levi Montalcini University Hub,

Fabrizio De Andrè Square, in Asti

May 22-24, 2024

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The volatile composition of wine is affected by the *Hanseniaspora vineae*-to-*Saccharomyces cerevisiae* inoculum ratio

Mauro Paolini¹, Adelaide Gallo^{1,2}, Nicola Cappello¹, Roberto Larcher¹, Tomas Roman¹

¹Fondazione Edmund Mach - Technology Transfer Centre

²C3A – University of Trento

Corresponding author: tomas.roman@fmach.it

Keywords: mixed fermentation, β -phenylethyl acetate, non-*Saccharomyces*

The non-*Saccharomyces* yeast, *Hanseniaspora vineae* Hv205 (Hv), is an apiculate yeast proposed for winemaking due to its good alcohol tolerance. Moreover, its metabolic characteristics can enhance some organoleptic traits, contributing to the aroma and texture of wines. Previous studies have demonstrated that sequential inoculation of Hv and *Saccharomyces cerevisiae* (Sc) leads to the overproduction of β -phenylethyl acetate, associated with an increase in rose-like hints in wine. However, sequential inoculation management with Sc could be complicated in white winemaking [1]. In this study, the fermentation of a Glera must was performed with an initial inoculum of 2×10^6 CFU/mL at five different co-inoculation ratios of Hv and Sc: 67%, 80%, 90%, 95%, and 98%. The kinetics of fermentation and wine aroma were compared with the results obtained from pure inoculation with Sc.

Compared with Sc, the presence of Hv accelerated fermentation until 30% of the process was reached, regardless of the co-inoculation ratio. After that point, the superior performance of Sc became most apparent, leading to an earlier completion of fermentation. Moreover, increasing the Hv ratio slowed sugar consumption rate, and the 67% Hv protocol delayed only 2% the time needed to complete fermentation in comparison with the pure inoculum of Sc.

The GC-MS/MS volatilome analysis [2] confirmed that both the presence of Hv and the co-inoculation ratio significantly affected the content of specific yeast-derived aroma compounds in wines. Regarding 2-phenylethanol, Sc wines showed the highest values (~20 mg/l), followed by the 67% Hv protocol (~11 mg/l), and were lower in the rest of the trials (~8 mg/l). Regarding its acetate, the results were reversed: increasing Hv ratio led to a higher content of β -phenylethyl acetate in wine, racing 20-folds the concentration obtained with only Sc. Concerning isoamyl acetate, the pure Sc fermentation was comparable to those with a higher Hv inoculum (90%, 95%, 98%), while the 67% and 80% inoculations were even higher. The concentration of ethyl hexanoate was affected by yeast species, and Sc produced up to 3-folds the concentration compared with the Hv protocols, for which it was not found any difference between them.

Interestingly, the concentration of the four yeast-derived metabolic markers was linearly correlated with the co-inoculation ratio: positive for β -phenylethyl acetate and negative for the other markers. Overall, Hv co-inoculum can be considered a good alternative to sequential inoculation, shortening fermentation time while maintaining the Hv aroma characteristics.

References

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