

Vitamin availability as a driver of *Saccharomyces cerevisiae* activity during wine fermentation

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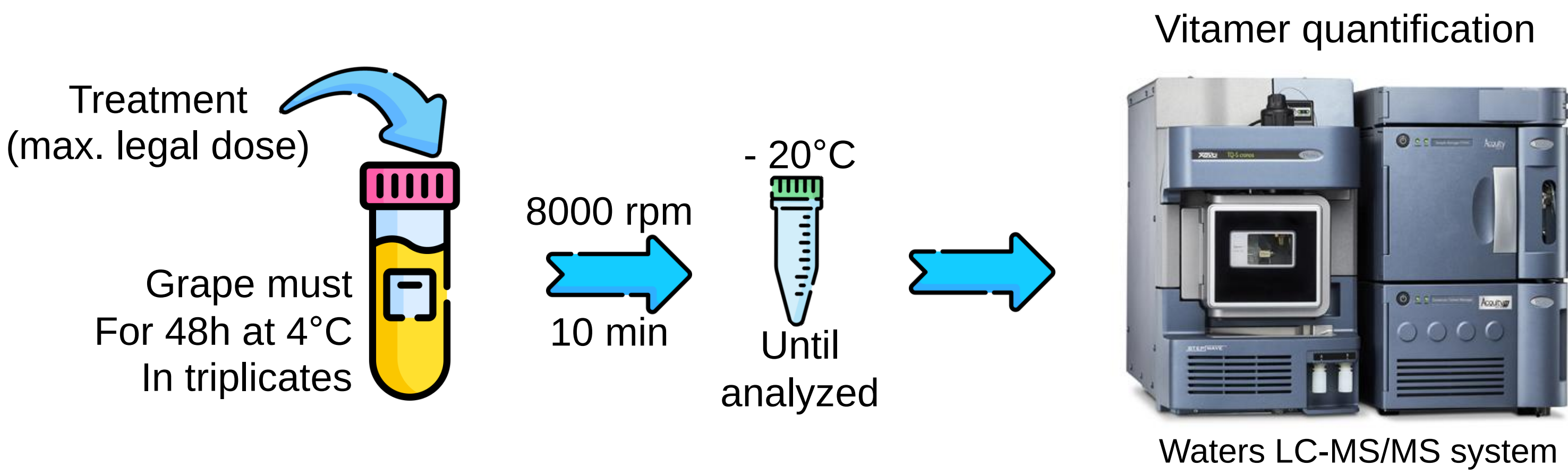
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INTRODUCTION

The management of yeast nutrition is an essential approach for a better control over wine fermentation process. Among known nutrients, vitamins received little attention in oenology in the last decades. However, work recently conducted on synthetic must media [1,2] demonstrated a significant impact of vitamin availability on fermentation kinetics, cell population and volatile compounds production during alcoholic fermentation. Other work on a few pre-fermentative treatments (such as fining agents or yeast-based additives) showed they can impact nutrient availability, including vitamins, before the alcoholic fermentation takes place [3]. This could then impact must fermentability and the final product composition and sensory properties.

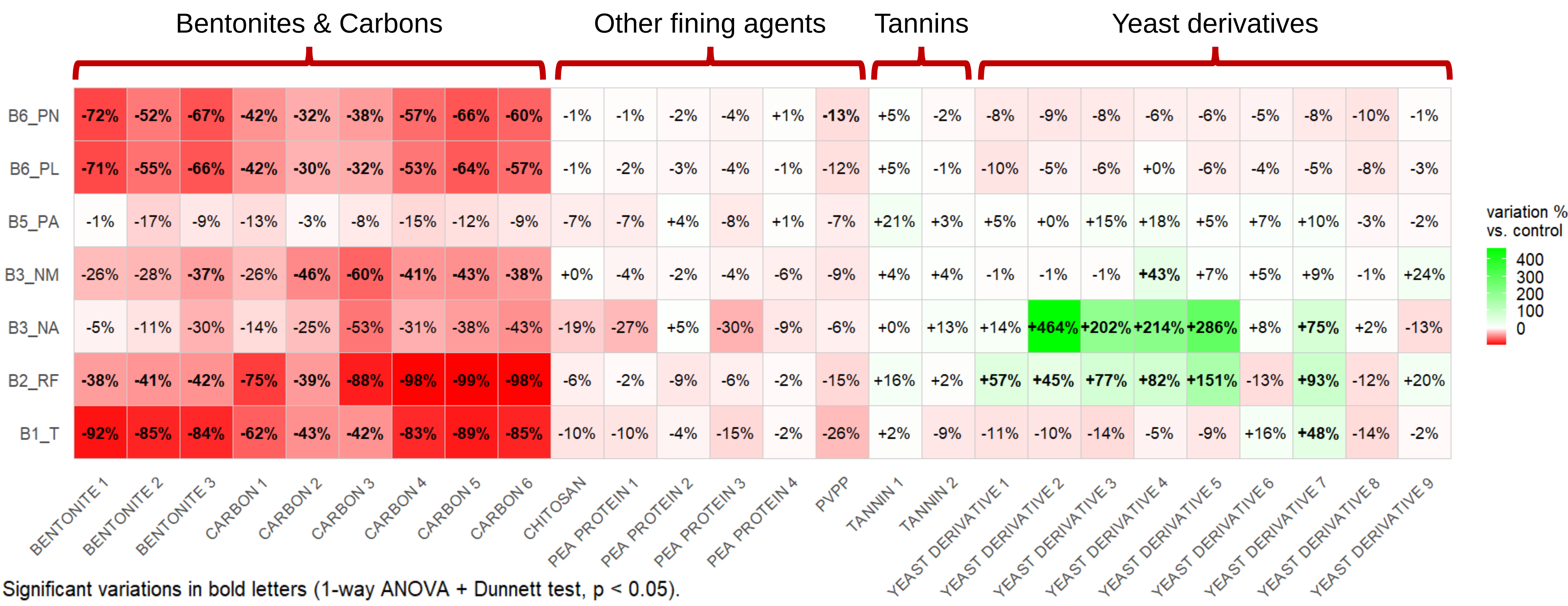
ASSAYS FOR 26 OENOLOGICAL TREATMENTS

Methodology: Assays & analysis of vitamins by LC-MS/MS



Results: B group vitamins modulation

Vitamer evolution vs control for each treatment
Values expressed in percentage of variation



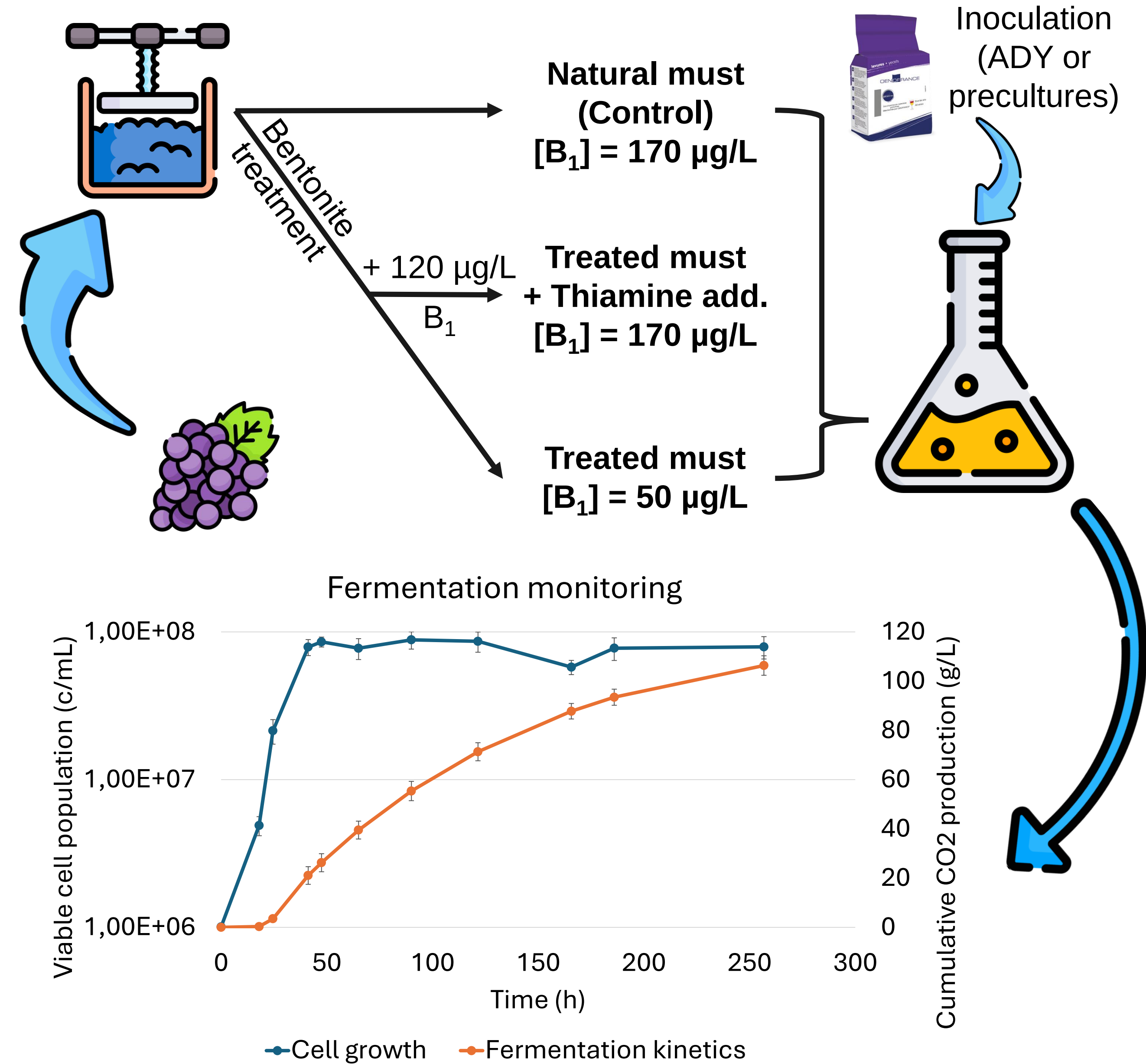
• **Valuable data for the industry**
Strong vitamin depletion by some fining agents, especially bentonites and carbons
→ Could induce vitamin deficiencies in grape must and then impair fermentation or wine quality

Significant vitamin enrichment by some yeast derivatives
→ Could compensate vitamin deficiencies.

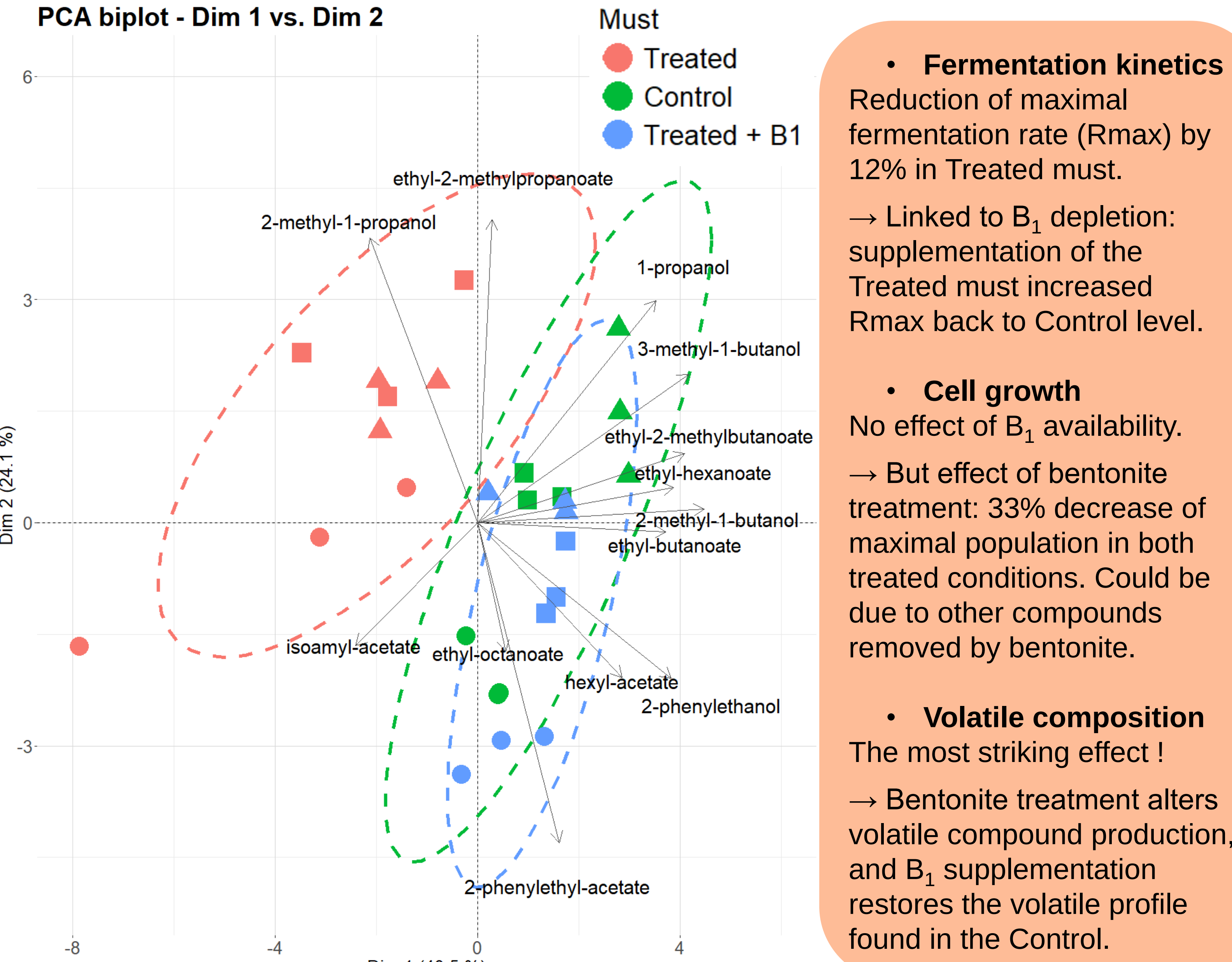
• **But what interest for research ?**
Most studies on yeast micronutrition in oenology relied on synthetic media...
→ We could use those products to finely adjust vitamin contents directly in natural grape must matrix.

EFFECTS OF INITIAL B₁ AVAILABILITY IN NATURAL GRAPE MUST

Methodology: musts & fermentation monitoring



Results: impact of wine fermentation & volatile composition



• **Fermentation kinetics**
Reduction of maximal fermentation rate (Rmax) by 12% in Treated must.
→ Linked to B₁ depletion: supplementation of the Treated must increased Rmax back to Control level.

• **Cell growth**
No effect of B₁ availability.
→ But effect of bentonite treatment: 33% decrease of maximal population in both treated conditions. Could be due to other compounds removed by bentonite.

• **Volatile composition**
The most striking effect !
→ Bentonite treatment alters volatile compound production, and B₁ supplementation restores the volatile profile found in the Control.

CONCLUSION

Using the ability of bentonite to adsorb thiamine in a natural grape must, we could demonstrate a significant impact of initial vitamin B₁ availability on fermentation kinetics. This also allowed us to demonstrate thiamine depletion seems to be the main factor underlying bentonite's effect on wine volatile composition. This work sets the bases for further research to better understand the role of thiamine and other vitamins in oenology, providing new useful insights for the wine industry.

Do you want to know more ?



REFERENCES & ACKNOWLEDGEMENTS

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[3] L. Ramousse, F. Garces, S. Vichi, C. Morge, J.-P. de Barros, C. Roullier-Gall, H. Alexandre, From Must to Wine: How Winemaking Choices Influence Lipid, Vitamin, Nitrogen, and Volatile Profiles, Journal of Agriculture and Food Research (2026) 102778.

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