



ENO 2023 Macrowine

BOOK OF ABSTRACTS



10-13
July 2023

Eno Macrowine 2023

Bordeaux KEDGE Business School
680 cours de la Libération
33405 Talence

IV.P.37

MODULATION OF YEAST-DERIVED AROMA COMPOUNDS IN CHARDONNAY WINES USING ENCAPSULATED DIAMMONIUM PHOSPHATE TO CONTROL NUTRIENT RELEASETomas ROMAN¹

Email: tomas.roman@fmach.it

*Tomas Roman¹, Mauro Paolini¹, Adelaide Gallo^{1,2}, Laura Barp^{1,3}, Luigino Bortolotto⁴, Nicola Cappello¹, Roberto Larcher¹**1. Fondazione Edmund Mach—Technology Transfer Center, via Edmund Mach 1, 38010 San Michele all' Adige, Italy**2. C3A - Università degli Studi di Trento, via Edmund Mach 1, 38010 San Michele all' Adige, Italy**3. Department of Agricultural, Food, Environmental and Animal Sciences, University of Udine, via Sondrio 2/A, 33100 Udine, Italy**4. Sintal Srl. Via dell'Artigianato n. 9/11, 36033, Isola Vicentina (VI), Italia***Keywords: yeast nutrients, diammonium phosphate, aroma compounds, continuous supplementation**

Yeast-derived aroma compounds are the result of different and complex biochemical pathways that mainly occur during alcoholic fermentation. Many of them are related -but not limited- to the availability of nutrients in the fermentation medium and linked to nitrogen metabolism and biomass produced. Besides, the metabolic phase of yeast also regulates the expression of many enzymes involved in the formation of aroma active compounds. The work investigates the overall effect of continuous supplementation of nutrients during alcoholic fermentation of a grape must on the volatile composition of wines. To this aim, diammonium phosphate was encapsulated mixed with a hydrophobic lipid matrix in two different supports designed to continuously release the salt for a final addition of 400 mg/L: a tablet-shaped support (Tb) of ~4 cm diameter and spherical microcapsules of ~0.2-1 mm diameter (Mc) obtained through spray cooling. The alcoholic fermentation was performed in triplicate at semi-industrial scale standardised conditions of turbidity (~100 NTU), yeast inoculum (200 mg/L) and fermentation temperature (19°C). Results were compared to those of wines fermented in absence of ammonium addition or supplemented with the same dose at the beginning of the alcoholic fermentation.

Among the metabolic compounds studied by GC-MS/MS, the production of acetate esters of higher alcohols was favoured by the Mc continuous ammonium release. This protocol almost doubled the total acetates formed in the untreated wines and increased ~33% and ~40% of those obtained with the one-shot supplementation and the Tb protocol respectively. Among alcohols, 2-phenylethanol and 2-methylbutanol were higher in the untreated wines and 1-propanol in the Mc protocol compared to others, even if the total amount of alcohols was not differentiated. Neither total fatty acids nor the corresponding ethyl esters were influenced by the nutrition protocol, even if some compounds were affected: ethyl hexanoate and ethyl octanoate were higher in the Mc protocol, differentiated from the Tb and one-shot protocols. Overall, nitrogen supplementation increased the total amount of esters in wines, being the Mc protocol the most performing, differentiated from the one-shot and Tb protocols that were statistically indistinguishable between them.