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LE SCIENZE AGRARIE NELL'ANTROPOCENE:
DALLA PRODUTTIVITÀ ALLA TUTELA
DEL PATRIMONIO MATERIALE E CULTURALE

BOOK OF ABSTRACTS

26-27 GIUGNO 2024

UNIVERSITÀ DI FIRENZE,
CAMPUS DI NOVOLI, EDIFICIO D6

110 anni di Agraria

Il futuro è nell'agrAria

Con il patrocinio di:

agritech
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COMUNE DI FIRENZE

Organizzato da:

UNIVERSITÀ DEGLI STUDI FIRENZE
DAGRI
DIPARTIMENTO DI SCIENZE E TECNOLOGIE AGRARIE, ALIMENTARI, AMBIENTALI E FORESTALI

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S5 - P06

Technological affinity index for interaction between lactic acid bacteria and *Saccharomyces cerevisiae* strains to modulate the fruity and floreal aroma of Catarratto wine

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Abstract

The sensory quality of wine is significantly influenced by microbial interactions. Specifically, the time (t), rate (m), and volatile organic compounds (VOC) associated with malolactic fermentation are linked to the interaction between yeast and lactic acid bacteria. The study investigated the interactions between *Lactiplantibacillus plantarum* or *Oenococcus oeni* and *Saccharomyces cerevisiae* by using the Technological Affinity Index (TAIndex) to assess these interactions. Interestingly, the parameter "m" exhibited a negative correlation with both TAIndex values and the duration of malolactic fermentation. The microbial associations observed in different trials were as follows: in the CO5 trial, where L. *plantarum* MLPK45H was coupled with S. *cerevisiae* NF213, the TAIndex value was 0.351, and the 'm' value was -0.65 ($g/L \times d^{-1}$), while in the CO10 trial, the combination of L. *plantarum* MLPK45H and S. cerevisiae QA23 resulted in a TAIndex value of 0.348 and an 'm' value of -0.66 ($g/L \times d^{-1}$). Under the provided conditions, malolactic fermentation occurred within two days. Furthermore, the CO1 trial involved consociations between the O. *oeni* MLB6 and S. cerevisiae NF213. In this case, the TAIndex value was 0.009, the "m" value of -0.0781 ($g/L \times d^{-1}$), and the malolactic fermentation process extended over 44 days. This prolonged fermentation produced increased levels of ethyl octanoate and ethyl decanoate. The fruity and floral sensory perceptions were increased in CO1, probably due to lower concentrations of 3-methyl-1-butanol, hexanoic acid, octanoic acid and decanoic acid compared to the CONT A1 study, as evaluated by the panel.
In conclusion, the LAB-S. *cerevisiae* microbial consociation offers a valuable microbial approach to produce wines that are highly appreciated by panelists. The time and rate of malolactic fermentation significantly influence the synthesis of VOC with a pronounced olfactory impact. Consequently, knowledge of TAIndex could prove pivotal in enhancing oenological planning to produce wines with exceptionally intense fruity and floral characteristics.

Keywords

Lactic acid bacteria, Saccharomyces cerevisiae, malolactic fermentation, wine, technological affinity index