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Analytical Chemistry for Wine, Brandy and Spirits

29 June – 3 July 2026 • Dijon (France)

Book of Abstracts

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POSTER – P095

Non-*Saccharomyces* yeasts as bio-tools for modulating wine aroma and acidity in warm-climate regions

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ABSTRACT

Climate change is increasingly disrupting the compositional balance of Mediterranean wines. Rising temperatures accelerate grape ripening, resulting in excessive sugar accumulation, lower total acidity, and diminished aromatic expression. Conventional corrective practices often face technological limitations and may compromise sensory quality. In this context, non-*Saccharomyces* yeasts represent a sustainable strategy to modulate fermentation under warm and arid environments. This study applied an integrated experimental approach to assess the technological, metabolic and volatilome contribution of Starmerella lactis-condensi MN412 and 4 strains of Lachancea thermotolerans (coded as LT-A, LT-B, LT-C, LT-D) inoculated with *Oenococcus oeni* and *Saccharomyces cerevisiae* in Catarratto and Syrah winemaking. The MN412 strain rapidly colonised the must (6.74–6.88 Log CFU/mL), reached a peak of 7.34 Log CFU/mL on day three, and maintained activity until day six. The MN412 fermentations showed increased glycerol production (up to +2.4 g/L vs control), reaching 9.2 g/L, alongside a reduction in ethanol content (up to −0.55% v/v), indicating partial carbon flux redirection.. Volatilome analysis revealed enhanced ester formation modulated by microbial consortia: ethyl esters increased by 38 % in St. lactis-condensi MN412-*O. oeni*-*S. cerevisiae* fermentation while acetate esters increased by 81% in St. lactis-condensi MN412-*S. cerevisiae* trials. 3D-plot surface highlighted synergistic volatile interactions associated with pear and lavender perceptions. Non-target metabolomic showed that MN412 strain preserved bioactive compounds. In Syrah fermentations, *L. thermotolerans* exhibited strong bioacidifying potential. The LT-D strain achieved a pH reduction of 0.68, higher than chemical acidification, accompanied by L-lactic acid production ranging from 5.96 to 12.10 g/L. The LT-B strain stood out for its increase in fruity esters synthesis, while LT-A strain promoted increased shikimic acid levels, suggesting the release of floral aroma precursors into the medium. Overall, St. lactis-condensi MN412 emerges as a highly effective aromatic bio-tool, while L. thermotolerans LT-D strain confirmed its role as a precision biological acidification modulator. Their combined application outlines an advanced microbial strategy to enhance oenological resilience and maintain wine quality under warm-arid climatic conditions.

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