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Oral communication

Title of the abstract
METAPIWI: unveiling the role of microbial communities in PIWI grapes for sustainable winemaking

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Abstract
The METAPIWI project advances viticulture research by examining microbial communities in PIWI (fungus-resistant) grapevines compared to traditional *Vitis vinifera*. It investigates how these microbes influence spontaneous fermentation and the production of distinct metabolites and aromas. PIWI grapevines, resistant to fungal and oomycete diseases, host specific microbial communities, particularly on berry pruina, crucial for fermentation dynamics and wine aroma profiles [1,2,3].
The project employs chemical analysis, metagenomics, metabolomics, and culturomics to elucidate microbial metabolic pathways contributing to aromatic compound formation during fermentation with indigenous microorganisms [4]. Culturomics enables the isolation and characterization of cultivable microbes, enhancing knowledge of their metabolic potential. Additionally, the development of predictive biomarkers aims to optimize wine quality and fermentation processes, aligning with modern wine science trends emphasizing microbial contributions [1,2].
Preliminary findings from must and fermenting wine samples of conventional and PIWI grapevines (*Chardonnay blanc – Resistant Chardonnay; Pinot noir – Prior; Riesling weiss – Sauvignon gris; Cabernet sauvignon – Cabernet carbon*) reveal notable differences. Except for *Pinot noir – Prior*, PIWI varieties generally show a higher yeast load and greater diversity of non-*Saccharomyces* yeasts (*Starmerella bacillaris, Metschnikowia pulcherrima,* and *Hanseniaspora uvarum*). This diversity correlates with enhanced fermentative vigor, highlighting PIWI's potential for sustainable viticulture [1,2,3,5].
These findings suggest that PIWI grapevines can produce wines with unique sensory attributes shaped by their distinct microbial communities. The research underscores the role of microbial terroir in defining wine characteristics [1,2,3].
In conclusion, the METAPIWI project pioneers the study of microbial-grapevine interactions, particularly in fermentation and aroma production. By integrating advanced metagenomics and metabolomics, it contributes to sustainable winemaking and positions itself at the forefront of viticultural science.

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