



Master Thesis | 2023 |

Degree programme
Viticulture and enology

Field of application
*Agricultural Microbiology and
Food Technology*

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Yeast interactions between *Starmarella bacillaris* and *Saccharomyces cerevisiae*

Graduate

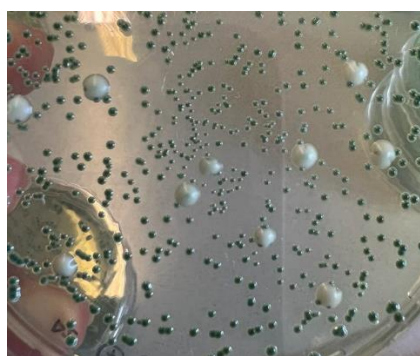
Medawar Natacha

Objectives

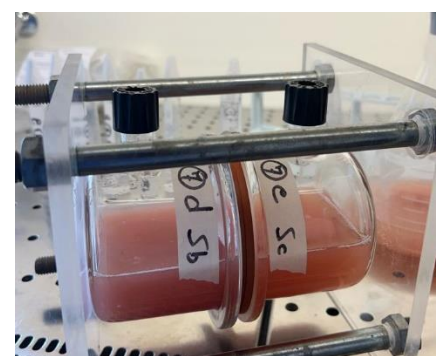
Explore the interaction mechanisms between both yeasts in mixed culture fermentations. Main oenological metabolites were measured at the end of the monitored period to uncover the impact of each inoculation protocol investigated on wine chemical composition.

Methods | Experiences | Results

A double-compartment fermentor was designed to physically separate the two yeast populations and ensure uniformity of the culture medium in both compartments. This tool was utilized in our study to compare mixed inoculations of two yeast strains *Saccharomyces cerevisiae* UVAFERM BC and *Starmarella bacillaris* MUT 5705 with and without physical separation. Microbiological analysis was performed to monitor yeast populations on WLN agar. Chemical analysis using HPLC was conducted to evaluate the main fermentation metabolites. The findings revealed that physical contact between *S. cerevisiae* and *Starm. bacillaris* caused rapid death of *Starm. bacillaris*, a phenomenon recognized to a cell-to-cell contact mechanism. From oenological point of view, *Starm. bacillaris* in pure fermentations showed higher levels of glycerol (16.8 g/L) compared to the pure culture of *S. cerevisiae* (8.4 g/L). Whereas, in mixed fermentations, results showed a reduction in ethanol and higher concentrations of glycerol compared to the pure fermentation of *S. cerevisiae*. Overall, the results highlighted the existence of specific interaction mechanisms that guide mortality of *Starm. bacillaris* in mixed fermentations, as well as the differences in the production of main oenological parameters.



Interactions of colonies of *Starmarella bacillaris* in mixed culture fermentations with *Saccharomyces cerevisiae* conducted in flask on WLN.



Double-compartment fermentation system consists of two glass chambers with loose screw caps, separated by a 0.45 µm membrane filter obtained from VWR in Milan, Italy.