Evolution of Volatile Compounds in Beers Fermented with *Metschnikowia pulcherrima* over a Storage Period of Two Years

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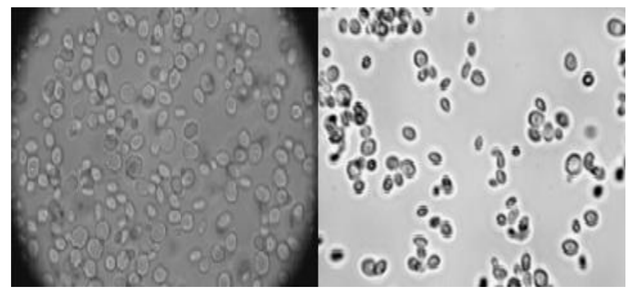
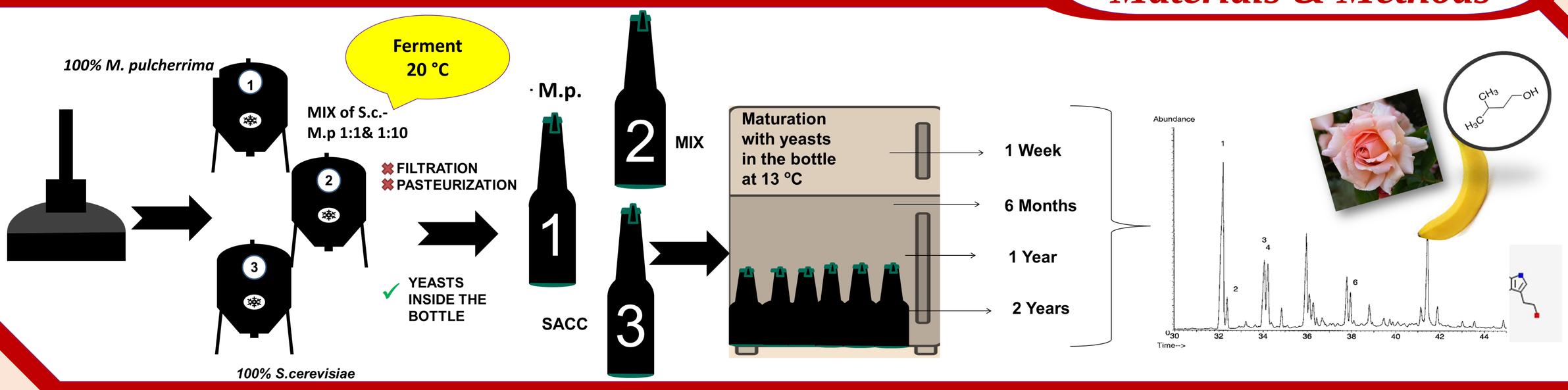
Introduction

In the last decades, the rapid growth of craft brewing gave rise to the experimental use of non-*Saccharomyces* yeasts. However, it's been very difficult to find maltose-positive strains, in order to produce a normal gravity beer with desirable features. *Metschnikowia pulcherrima* (M. p.) is a non-*Saccharomyces* yeast, well known from the wine industry, as it is presently used in sequential or co-fermentation with *S. cerevisiae* (S. c.). *M. pulcherrima* is used for its ability to produce high amounts of the fruity ester ethyl octanoate and phenyl ethyl alcohol (known for the rose-like contribution). Thus, in this study we examined the potential application of a commercial M. p. strain in the brew industry, after studying its fermentation dynamics.



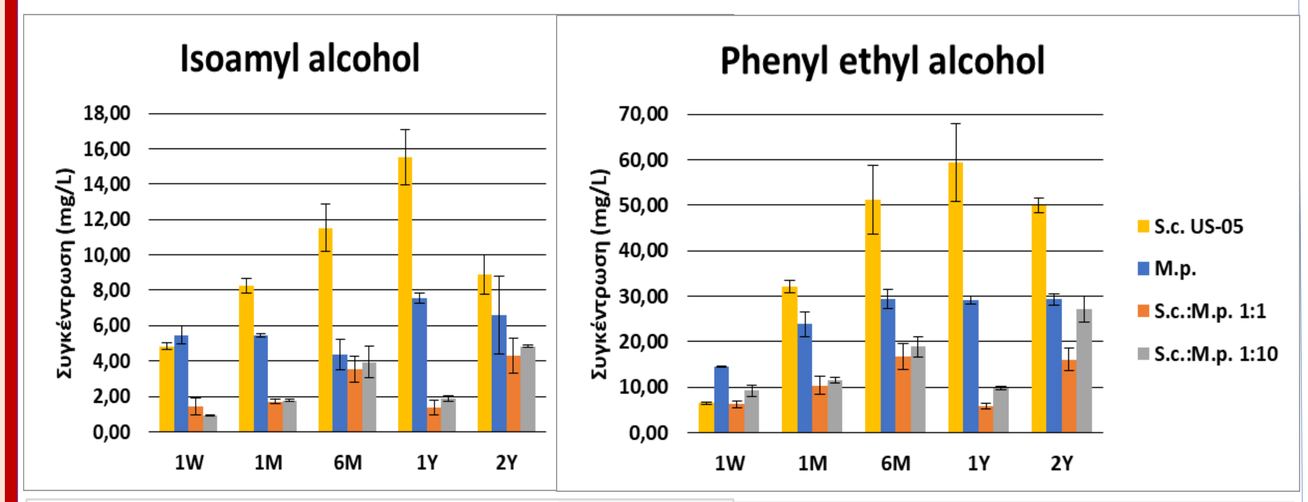
M. pulcherrima

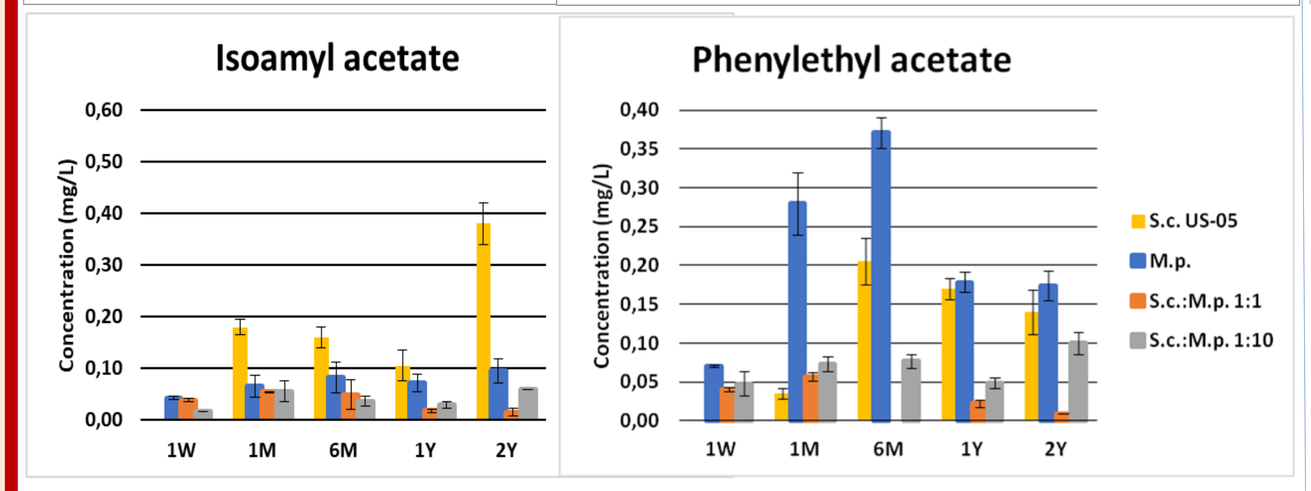
Materials & Methods



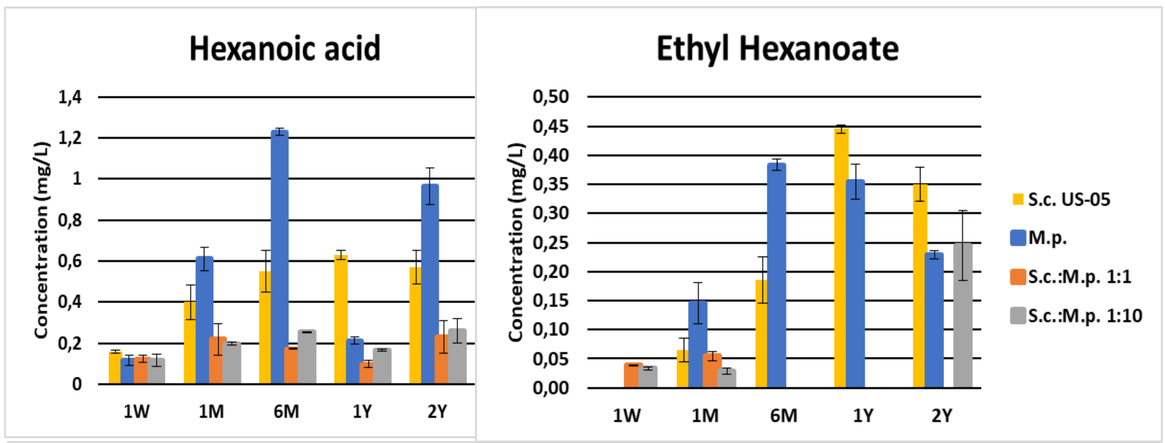
Results & Discussions

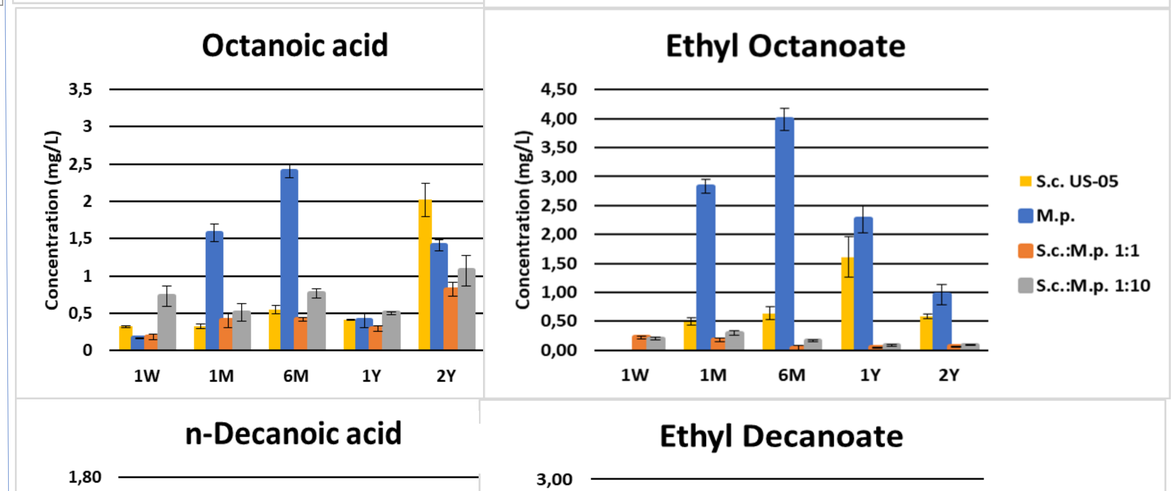
- Higher alcohols and Acetate Esters

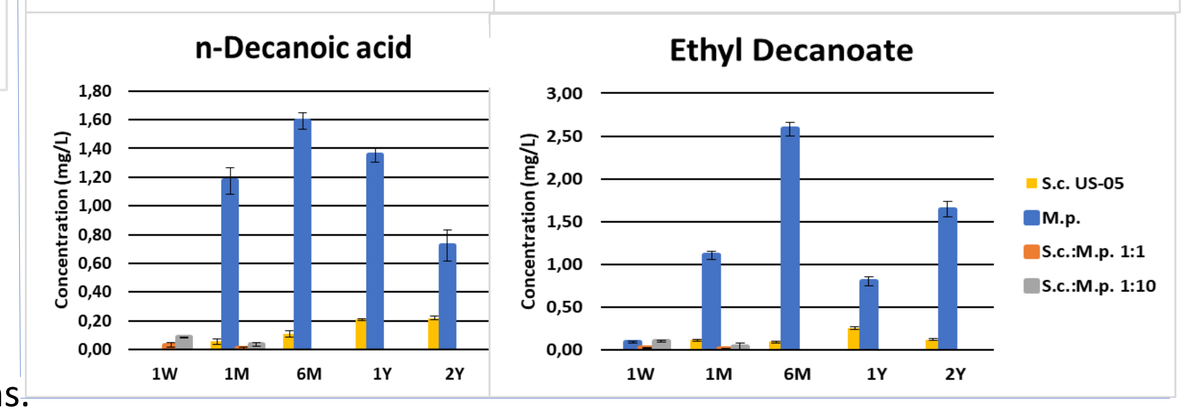




- MCF Acids and MCF Acids Esters







- ***Volatiles' Evolution***
- Highest concentrations after 6 months.
- Higher alcohols were ↑ at pure cultures, esp. phenyl ethyl alcohol.
- All MCFA and their esters were detected ↑ with the greatest values observed in pure culture.
- Tryptophol and tyrosol were not detected in mixed cultures, after 6 months.
- ↑ concentrations of 4-VG in pure culture of *M.pulcherrima* in 6 months (1mg/L)→ The beer was enhanced with phenolic notes

Conclusions

The beer produced by pure culture enhanced by ageing with more fruity (i.e. pineapple, peach) and estery notes, whereas the mixed cultures showed more stability in flavor during the two years evolution. In order to enhance the aromatic profile of the produced beers, the selection of yeast (pure *M. pulcherrima* culture or co-cultures with *S. cerevisiae* at different ratios) should be taken under consideration. Last but not least, this strain can be used in monoculture fermentations as to enhance the phenolic notes.

References

1. Holt S, Miks MH, De Carvalho BT, Foulquié-Moreno MR,Thevelein JM. 2019. The molecular biology of fruity and floral aromas in beer and other alcoholic beverages. *FEMS Microbiol Rev* 43: 193–222.
2. Jolly NP, Augustyn O.P.H., Pretorius IS. 2017. The role and use of non-*Saccharomyces* yeasts in wine production. *South African J Enol Vitic* 27: 15–39

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