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Traditional vs Bioprotection: Comparative Evaluation of Four Metschnikowia pulcherrima Strains in fermentation

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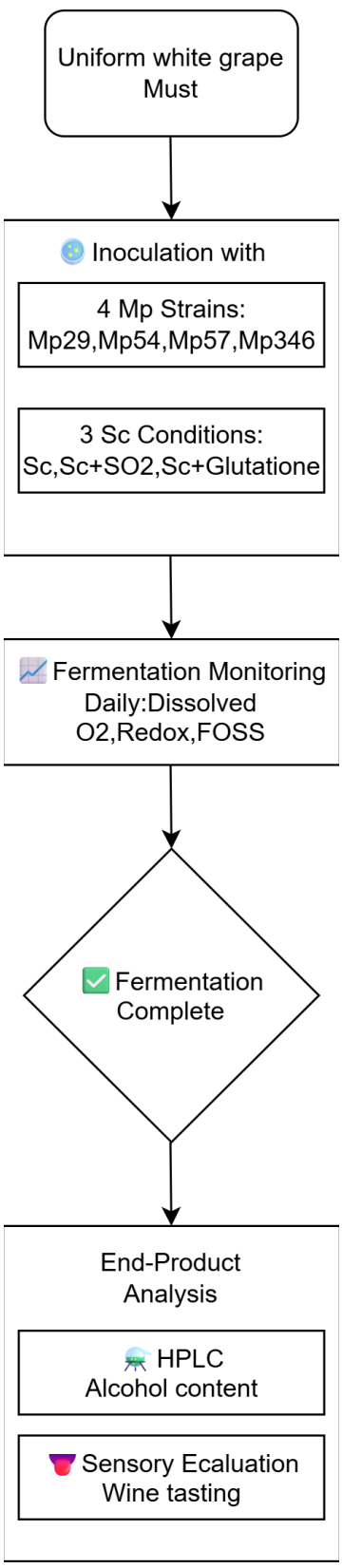
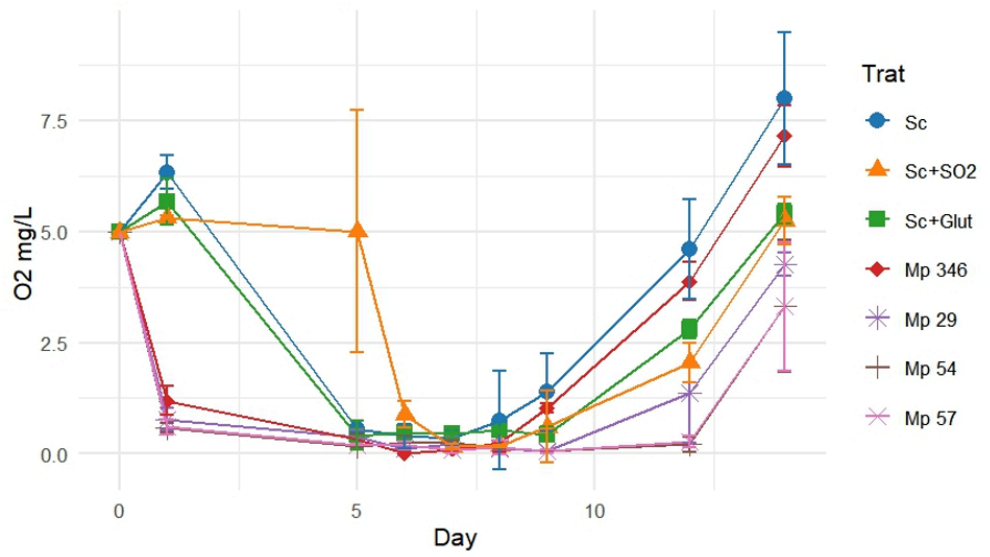
INTRODUCTION & AIM

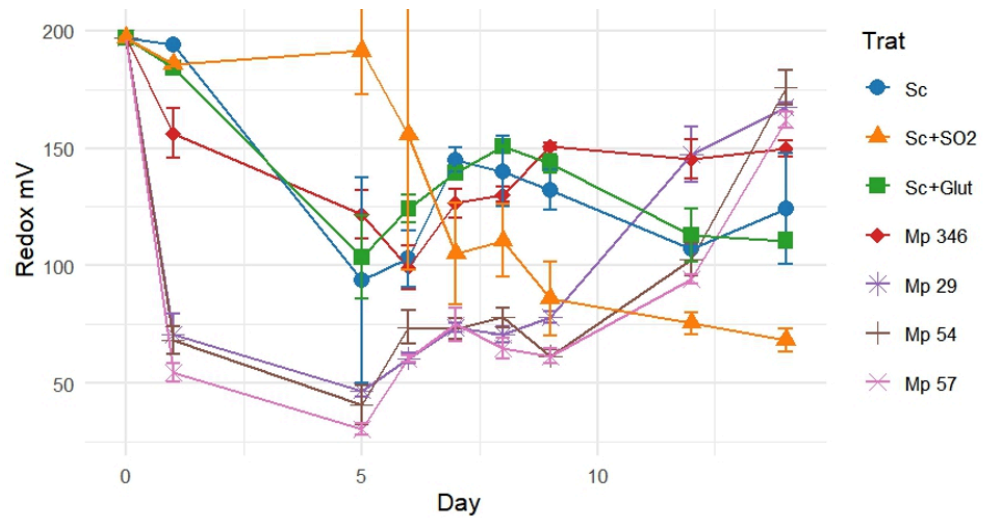
The growing demand for low-sulfur wines underscores the need for effective alternatives. This study evaluated four Metschnikowia pulcherrima strains as bioprotectants, comparing their efficacy against conventional additives—SO_2 and glutathione—in Saccharomyces cerevisiae fermentations. Results demonstrate that M. pulcherrima outperformed traditional methods by delivering superior oxygen management, maintaining lower oxidative stress, and imparting distinct floral notes. This establishes bioprotection yeasts as a viable, sustainable strategy for premium winemaking.

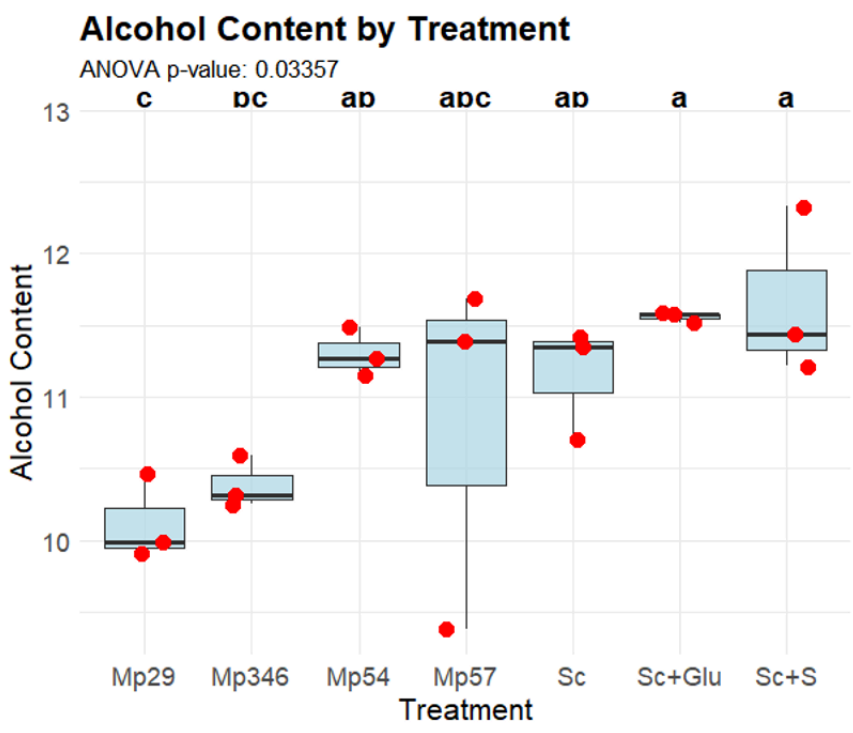
METHOD



RESULTS & DISCUSSION







Rapid Oxygen Depletion: All Mp strains efficiently scavenged dissolved oxygen, dropping it to negligible levels within two days.

Early-Stage Redox Control: Three strains (Mp29, Mp52, Mp54) rapidly lowered the redox potential to ~50 mV shortly after inoculation.

Limited Long-Term Protection: The SO_2 control maintained a more stable redox potential over time, whereas the M. pulcherrima groups showed a gradual increase post-day 9, highlighting a limitation in their endurance.

Significant Alcohol Reduction: Fermentations with M. pulcherrima, particularly Mp29 and Mp346, yielded wine with at least 1.0% v/v lower alcohol content than all S. cerevisiae controls.

CONCLUSION

Bioprotection with **M. pulcherrima** yeasts rapidly depletes oxygen and significantly lowers alcohol content, **offering a promising pathway to reduce global SO_2 usage in winemaking.**

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