

Impact of sequential inoculation with *M. pulcherrima* on wine properties and influence of the main characteristics of the must

Seguinot P.¹, Ortiz-Julien A.², Camarasa C.¹

¹ UMR SPO: INRA, Université Montpellier, Montpellier SupAgro, 34060, Montpellier, France.

² Lallemand SAS, 31700, Blagnac, France.

Over the past 50 years, the use of selected starter cultures of *S. cerevisiae* to control alcoholic fermentation has broadened, as it is the safest way to ensure the completion of fermentation and to avoid the production of undesirable off-compounds. Non-*Saccharomyces* yeasts, naturally predominant in grape must, are thus rapidly outcompeted. Although these species were long viewed as spoilage yeasts, their potential for improving the sensory quality of wines is now acknowledged. However, their use being recent, their behaviour in fermentation and their interactions with *S. cerevisiae* in mixed culture remain ill known.

Therefore, a strain of *M. pulcherrima* was studied in sequential inoculation with *S. cerevisiae*. The impact of the main components of grape, i.e. concentrations of sugars, nitrogen and lipids was tested in synthetic must using a Box-Behnken experimental design. The kinetics of fermentations were monitored and the production of main metabolites and aroma compounds (higher alcohols, acetate and ethyl esters, acids and thiols) was measured at the end of the fermentation. The comparison between sequential inoculation and pure cultures revealed the benefit of using *M. pulcherrima* in fermentation. Thanks to the Box-Behnken model, the impact and interaction of the parameters were assessed, showing that nitrogen was the most influencing nutrient on the sensory and organoleptic profile of wines.

These results are of great interest for the management of *M. pulcherrima* in sequential inoculation in alcoholic fermentation. They pave the way to further investigations on the metabolic and transcriptomic origins of the phenotypic specificities observed, and the interactions taking part between *M. pulcherrima* and *S. cerevisiae*.