Inhibition of *Oenococcus oeni* during alcoholic fermentation by a selected *Lactiplantibacillus plantarum* strain

Andrew Davey[1], Thomas Houghton[1], Andrea Manzotti[2] and Duncan Hamm[2]

[1]Melbourne Polytechnic, Melbourne, Australia

[2]Chr. Hansen A/S, Hørsholm, Denmark

Presenting author: gbdha@chr-hansen.com

Introduction

The use of selected cultures of the species *Lactiplantibacillus plantarum* in Oenology has grown in prominence in recent years. While initial applications of this species centered around malolactic fermentation (MLF), it has been suggested that some strains can be harnessed for their bio-protective effects (Rubio-Bretón et al 2018). As little scientific literature exists on biological protection from this species in winemaking, the following work set out to investigate the effects of *Lactiplantibacillus plantarum* DSM27565 (trade name Viniflora® NoVA™ Protect) on adventitious *Oenococcus oeni*, which can lead to unwanted MLF during alcoholic fermentation.

Methodology

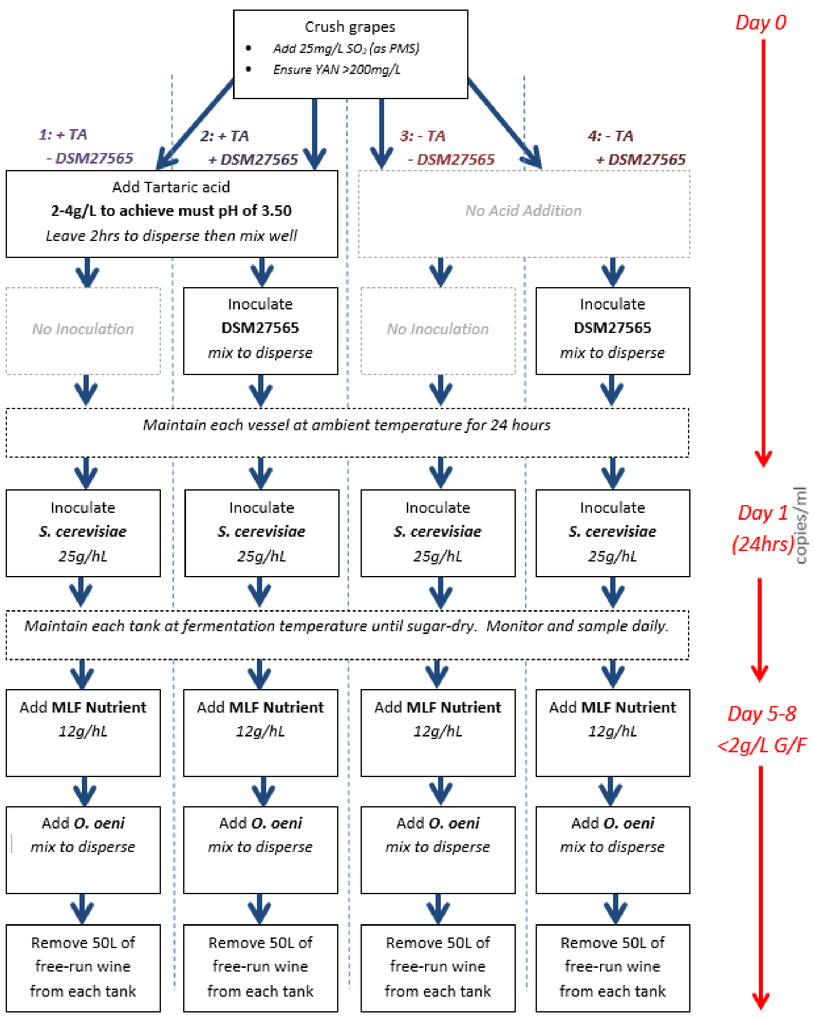
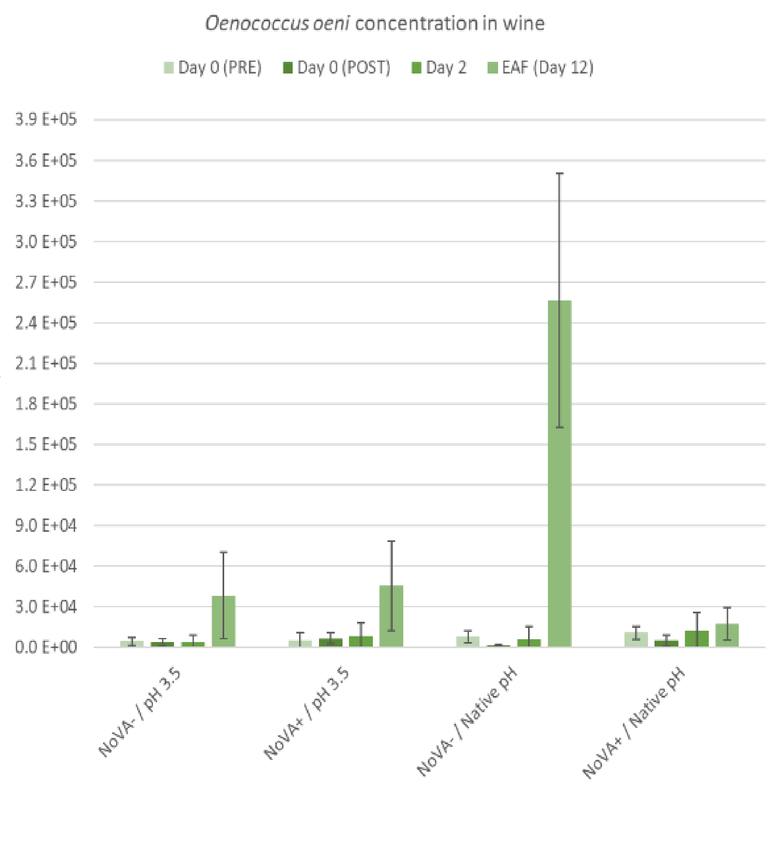


Figure 1. Winemaking Methodology.
1700kg of Cabernet Sauvignon (Grampians Region, Australia) was crushed and evenly distributed across eight fermentation vessels. Treatments were dosed with either 2g/L Tartaric Acid and/or DSM27565 at 2.0E+6 CFU/mL. The must had a native pH of 3.70 and 25mg/L of SO_2 was added at crushing.

Results

Samples of each vessel were taken and concentrations (copies/ml) of DSM27565 and *Oenococcus oeni* were measured by qPCR (Fig. 2).



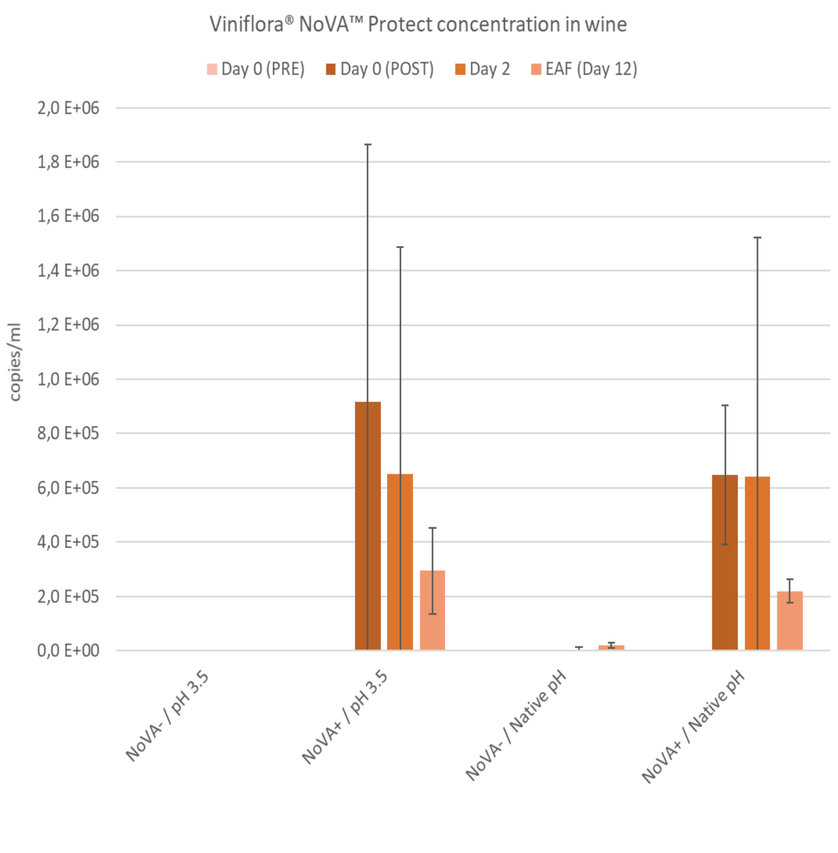


Figure 2. Quantification of *O. oeni* and Viniflora® NoVA™ Protect by qPCR. DNA was extracted from cells obtained by centrifugation from the grape must and used for quantification of the total *O. oeni* population and Viniflora® NoVA™ Protect by qPCR. The qPCR results are shown as average of genome copies per ml of wine (copies/ml) calculated between the replicates of each treatment and the error bars represent the standard deviation between replicates (the DNA was extracted and quantified separately for each replicate). The different stages of alcoholic fermentation (AF) are indicated as: Day 0 (PRE) = beginning of AF before NoVA addition; Day 0 (POST) = beginning of AF after NoVA addition; Day 2 = two days after start of AF; EAF (Day 12) = End of AF (12 days after AF start).

Conclusions

- *Lactiplantibacillus plantarum* DSM27565 implants well into red wine grape must, even with moderate levels of SO_2 and dominates red grape must at inoculation
- Excessive growth of adventitious *Oenococcus oeni* is suppressed in the presence of DSM27565
- Using *Lactiplantibacillus plantarum* DSM27565 shows an alternative to using tartaric acid as a biological control agent
- Further work is suggested to investigate the effects of DSM27565 on other spoilage organisms such as Acetobacter spp., and *Hanseniaspora uvarum*

References
Rubio-Bretón, P., Gonzalo-Diago, A., Iribarren, M., Garde-Cerdán, T., Pérez-Alvarez, E.P., 2018. Bioprotection as a tool to free additives winemaking: effect on sensorial, anthocyanic and aromatic profile of young red wines. LWT- Food Sci. Technol. 98,458–464.