Experimental description

Australian winemakers have embraced new legislation that water may be added to grape must before fermentation, as long as must is not diluted below 13.5 Bé. It is assumed that these additions will have little impact on dynamics of alcoholic fermentation by yeast, as found for wine composition (see poster Schelezki et al. ARC Training Centre Innovative Wine Production), however, no research has specifically addressed this. We analysed fermentation dynamics of two commercial (Lallemand) wine yeast; EC1118 (aromatically neutral) and Lalvin R2 (aromatic) over a range of juice dilutions (16 to 12.5 Bé). Nitrogen was ameliorated to ensure this was not impacting fermentation dynamics. Yeast nutrient (organic complex nutrient, Lallemand) was also added to examine if any negative effects, potentially due to the dilution of micronutrients, could be reduced. The effect of juice dilution on malolactic fermentation was also examined.

Dilution and addition of nutrients reduced alcoholic and malolactic fermentation duration

Both alcoholic and malolactic fermentation duration were shortened, as expected, in juices with reduced sugars (AF, Figure 1; MF, data not shown). In some instances, particularly in fermentations with the yeast Lalvin R2, the addition of nutrient further reduced alcoholic fermentation duration by up to 84 hours (Figure 1C). Dilution to 13.5 Bé or below allowed the completion of malolactic fermentation within 30 days.

Dilution changed the volatile composition of wines

To extend the study we also examined the effect on volatiles (~39) of the resulting wines. Similar to other studies, the dilution of juices marginally reduced final concentrations of many volatiles, presumably by dilution of juice-derived precursors. Sensory analysis is required to determine if there is an overall impact to detectable wine aroma. A small number of interesting changes were noted, for instance isoamyl acetate (banana) could be reduced to below its aroma threshold with dilution (Figure 2). This ester can be overpowering, especially in Riesling, and as such, a dilution strategy (where grapes have an elevated residual sugar) could be reduced to below its aroma threshold with dilution (Figure 2). It is assumed that these additions will have little impact on dynamics of alcoholic fermentation by yeast, as found for wine composition (see poster Schelezki et al. ARC Training Centre Innovative Wine Production).

Depending on the target wine style, these changes may be regarded as a desirable outcome. Winemakers should take into consideration the potential impacts of juice dilution on both processing efficiencies as well as effect on the aroma and flavour of wine.

SUMMARY

Juice dilution and addition of nutrient can result in reduction of both alcoholic and malolactic fermentation duration and change the volatile composition of wines. Depending on the target wine style, these changes may be regarded as a desirable outcome. Winemakers should take into consideration the potential impacts of juice dilution on both processing efficiencies as well as effect on the aroma and flavour of wine.