Can enzyme ‘replace’ cold soak for cool climate Cabernet Sauvignon?

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Rationale

Cool climate winemakers need options to optimise red wine phenolics, particularly for varieties like Cabernet Sauvignon that can be challenging to ripen in cool conditions.

As vintage compression bites, long skin contact regimes like cold soak and post-ferment maceration may further strain winery capacity. It is important to assess their value.

Research findings have been inconclusive about whether cold soak is reliable and consistent for managing wine phenolics, and cold soak mechanisms remain speculative.

Enzyme treatment has been shown to increase phenolics extraction in red wine making, but its impact on cool climate fruit and interactions with cold soaking, have received limited attention.

This study compared cold soak with enzyme treatment, and interactions between those two treatments.

Methods

Cabernet Sauvignon from Northern Tasmania harvested at 12.5° Baume was subject to replicated microvinification (Fig. 1). Four maceration and fermentation treatments were applied:

1. Control – Saccharomyces cerevisiae (RC212) inoculation, 8 days AF at 28°C
2. Cold Soak – 4 days at 4°C, then alcoholic fermentation as per control
3. Enzyme – treatment with 3g/L Rohavin® Color (Fig. 2), then alcoholic fermentation as per control
4. Enzyme + Cold Soak – treatment with Rohavin® Color, 4 days at 4°C, then alcoholic fermentation as per control

Wines were analysed at 4 and 8 months post-bottling by the modified Somers method, and mean phenolics concentrations were compared by two-way ANOVA, and Principle Component Analysis.

Findings

In young wines, both cold soaking and enzyme treatment were main effects with significantly higher average wine total pigment and total phenolics concentration in enzyme treated wines (P<0.05), whereas cold soaked young wines were lower in total pigment (P<0.001) (e.g. Fig. 3). These effects however were no longer apparent as wines aged (e.g. Fig.4). Analysis of wine tannin, anthocyanin and non-bloemach pigment concentration in wines at both bottle ages showed no significant differences between treatments for these indicators of wine phenolic character.

Discussion

This trial supported previous findings of variable impacts on red wine phenolics concentration from the use of cold soaking. We also found no significant difference in wine phenolics in aged wine from the enzyme applied to this fruit, under the winemaking conditions of the trial.

As a small-scale trial, these findings suggest the need for additional experimental work on the relative benefits of cold soaking and enzyme treatment on other varieties, or with a focus on other wine quality objectives (e.g. aroma modification, impact on longer term colour stability and tannin polymerisation).

This study showed only short-term impacts on phenolics concentration from the use of cold soaking and enzyme treatment in cool climate Cabernet Sauvignon.

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