Innovative maceration for fine, fast Pinot noir wines

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Rationale
Innovative maceration can increase the efficiency of red wine production. For Pinot noir wines, increased efficiency of production needs to be complemented by maintenance of, or improvement in, wine quality.

The opportunity to more accurately manage phenolics extraction could also support style differentiation, based on:

• Greater control over rate and extent of extraction for colour compounds
• Manipulation of tannin concentration, and tannin origin (e.g. skin vs. seed)
• Control over extraction of compounds that aid tannin polymerisation, with potential effects on wine mouthfeel and colour stability

This study compared four novel maceration treatments with three standard maceration treatments for Pinot noir

Methods
Pinot noir fruit from Northern Tasmania was harvested at commercial ripeness and subjected to replicated 10L vinification (Fig. 1).

Wines were examined at 6 and 12 months’ bottle age for phenolics by modified Somers method, and at 12 months for tannin composition. Data was analysed using two-way ANOVA and Principal Component Analysis.

Seven treatments were applied:

1. Control – alcoholic fermentation (AF) on skins for 8 days at 28°C
2. Cold soak – grape must stored at 4°C for 4 days before 8 day AF
3. Extended maceration – wine left on skins 4 days after 8 day AF
4. CPR on skins – solids microwaved to 70°C, then chilled before 8 day AF
5. CPR early press – solids microwaved 70°C, then chilled before 2 day AF, and 6 day AF in carboy (Fig. 1)
6. In-line CO₂ – grapes chilled to 10°C using powdered CO₂, stored at 4°C for 4 days before 8 day AF
7. Ultrasound – grape must subjected to 10 minutes treatment with Branson 450 Sonifier (90%, amplitude 7), before 8 day AF

Findings
Several treatments were clearly discernible on the basis of ‘phenolic fingerprint’ (Figs. 3&4). PC1 explained 95% of the separation and CPR-skins, extended maceration and CPR-press wines were distinct from control. By 12 months (Fig. 4), the apparent subtle separation between In-line CO₂ and control and cold soak treatments was maintained.

Conclusions
Innovative maceration can increase the efficiency of red wine production by reducing skin contact time, and provide winemakers with options to vary style.

In this study, extended maceration and the two CPR treatments generated distinct clustering by PCA which indicated strong differentiation of wine ‘phenolic fingerprint’.

The CPR press treatment had two days skin contact but similar phenolics concentration to control wines. In-line CO₂ wines were higher in tannin than cold soak, but with equivalent contact time. Ultrasound treatment wines had higher % catechin than same skin contact time control.

Novel maceration processes allowed distinctive phenolic outcomes without the need for long skin contact