Phenolic compounds are an important group of substances that contribute to major wine sensorial characteristics such as colour, flavour, astringency and hardness. The aim of this study is to improve existing technologies for wine production as well as to establish novel enzyme and physical treatments to produce healthier wines enriched in phenolic compounds.

**RESULTS AND DISCUSSION**

Anthocyanins, phenolic acids, flavonols, catechins and proanthocyanidins were identified and quantified in products during the fermentation (musts, wines) with different treatments (control, industrial flash release). The evolution for different classes of polyphenols is shown in Figures 1-5 (D1 : day 1, D2 : day 2, D3 : day 3, D4 : day 4, D5 : day 5, WBM : wine before malolactic fermentation. Values are the average of four replicates).

In summary, the flash release treatment resulted in faster extraction of all classes of phenolic compounds. The differences in flavonols and flavanols concentration were maintained throughout fermentation and in the wines so that the F.R. treated wines contained larger amounts of these compounds than the control. In contrast, F.R. and control wines contained similar amounts of anthocyanins and phenolic acids.

Consequently the tannin to anthocyanin ratio present in wine was modified by the flash release treatment (Table 1). This ratio was increased by 25% for the F.R. treatment compared to the control wine. After the flash release process, catechins were extracted more than in the control. Catechin content increased throughout fermentation in both treatments. At the end, the F.R. treated wine contained 70% more catechins than control wine.

**MATERIALS AND METHOD**

Wines, elaborated from Vitis vinifera var. Grenache harvested in Gruissan (France) in 2003, have been obtained by classical winemaking techniques and with flash release technology. Flash release treatment was used on grapes after harvest. In flash release, the treated material is rapidly heated and then suddenly vacuum chilled. This technique is expected to degrade the cellular structures and to increase phenolic extraction. Changes in polyphenol composition have been monitored during fermentation. Anthocyanins, phenolic acids, catechins, flavonols and flavanol anthocyanin dimer adducts have been characterized in grapes, musts and wines by HPLC analysis coupled to diode-array mass spectrometry detection. Proanthocyanidin composition has been determined by acid-catalyzed depolymerization in the presence of nucleophilic agents and subsequent analysis of the resulting products by reversed-phase HPLC (1).

**Table 1. Tannin to anthocyanin ratio and flavonol anthocyanin dimer adducts in wine**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Tannin to anthocyanin ratio</th>
<th>Flavonol anthocyanin dimer adducts (in mg/l) eq Mv-3gl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.9 ± 0.6</td>
<td>1.6 ± 0.1</td>
</tr>
<tr>
<td>Industrial Flash release</td>
<td>4.9 ± 0.2</td>
<td>1.9 ± 0.2</td>
</tr>
</tbody>
</table>

Acknowledgements

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Reference