Grape maturity alters Shiraz wine volatiles: an analytical and sensory approach

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INTRODUCTION

Aim: to investigate alterations in wine volatile (chemical and sensory) composition related to the harvest date.

Figure 1: Evolution of chosen metabolites during the grape green growth and ripening period.

RESULTS

C5, C6 and C9 compounds (derivatives of lipoxigenase pathway) were typically found in higher levels in H2 wines, irrespective of vineyard site. These compounds are often used in the food industry to elevate the perception of freshness and red fruit notes. A similar aromatic role in wine is probable. No specific trends for corresponding esters were observed, indicating that substrate availability (C5, 6, 9 alcohols) was not the limiting factors for their production.

Coherent modifications of yeast sulphur metabolism from methionine were noticed. Methionol, methional and ethyl 3-(methylthio)propionate were significantly lower in wines from H2. Synthesis of these compounds is strongly dependant on juice methionine and yeast assimilable nitrogen concentrations. When present in low levels these compounds contribute to red wine complexity whereas in excessive concentrations can be associated with wine off-flavours (cooked vegetables).

Figure 3: Segment of a wine chromatogram (THC) demonstrating structural organisation of peaks. Higher retention times in second dimension are characterized by the presence of esters and terpenoids whereas lower retention times in the second dimension are dominated by alcohols.

-1240 putative compounds at SN 100 present in at least one of the wine samples.
-240 compounds significantly different according to the harvest date in at least one of the vineyard.
-206 relevant compounds present in wines.

Figure 6: Effect of grape harvest date on chosen wine compounds derived from lipoxigenase pathway: 1.2,3,4 refers to Vineyard 1, Vineyard 2, Vineyard 3, Vineyard 4, respectively. H1 refers to Harvest 1 and H2 refers to Harvest 2.

Figure 7: Effect of grape harvest date on chosen wine sulphur compounds. 1,2,3,4 refers to Vineyard 1, Vineyard 2, Vineyard 3, Vineyard 4, respectively. H1 refers to Harvest 1 and H2 refers to Harvest 2.

Figure 8: Description wine sensory analyses. 1,2,3,4 refers to Vineyard 1, Vineyard 2, Vineyard 3, Vineyard 4, respectively. H1 refers to Harvest 1 and H2 to Harvest 2.

Significant differences in wine sensory perception according to the harvest date were noticed. Wines from H2 were ranked higher in perception of dark fruit, plum and in some occasions black cherry sensory attributes. These wines were also perceived as more alcoholic. Wines from H1 were characterised with higher perception of red fruit notes and acidity.

HOW DIFFERENT ARE THEY???

1. Significant modifications of more than 200 wine volatiles according to the harvest date, irrespective of the vineyard management within the same macroclimate.
2. Alterations in wine chemical composition were also perceived sensorially.

REFERENCES

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