What causes apricot aroma in white wines? Unravelling the contribution of multiple volatile compounds

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Background
• The subtle ‘apricot’ note in white wines, especially Viognier, is a desirable indicator of varietal typicity.
• Previous studies at the AWRI identified that a mixture of monoterpenes play an important role in causing this flavour; not a single compound.

The knowledge gap
• Do lactones, potent stone fruit-smelling compounds common to both apricots and wines, also play a role despite their low concentrations?

This study’s main objective was to measure the importance of lactones in the presence of other volatile odour compounds in causing ‘apricot’ aroma

Experimental design
• A 3^3 full factorial experimental design approach was used (absent, low, high^monoterpenes, lactones, aldehydes).
• Measured volatile data from high ‘apricot’ Viognier wines was used to reconstruct the model wines and factors.
• A sensory descriptive analysis panel (n=12) rated the aromas of 27 model wines in duplicate.
• Multivariate statistics were used to model and measure the relative importance of each aroma family.

So what were the significant results?
• Five (‘fruity’, ‘citrus’ and ‘floral’) monoterpenes combined were confirmed as the major impact family giving this varietal ‘apricot’ note (F=44.8***)
• Six lactones enhanced the ‘apricot’ intensity when combined with the monoterpenes but did not give stone fruit-like odours alone (F=6.5*)
• ‘Apricot’ odour was strongly suppressed in the presence of aldehyde compounds (F=16.7***)

In summary, for ‘apricot’ aroma in white wine, monoterpenes were genuine impact compounds, lactones enhanced intensity, while aldehydes acted as strong suppressors

In practice
• Monoterpenes can be increased viticulturally by increased fruit exposure and selection of cooler vineyards.
• Additional research on clonal vine selection is currently investigating other factors in Australian vineyards.
• In the winery, fermentation temperature, skin contact, pH and yeast enzymes can all influence the concentration and release of free monoterpenes in a wine.
• Structured and sensory-directed blending practices may provide winemakers with a tool for uncovering the hidden varietal flavours in their blending components.

Further research
• Little is known about fermentation-derived lactones in wine.
• Cognitive effects of aroma mixtures are highly complex and not well understood in a wine context.

Incorporating lactones

Model wine: organic acids, 10% ethanol, SO2, pH 3.33 adjusted, 50 base volatiles

high monoterpenes + high lactones = high ‘apricot’ aroma

wine

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