



Local Research News

Effect of soil mineralogy and potassium buffer capacity on Merlot wine quality

A project has investigated, under semi-controlled conditions in a lysimeter, whether Coastal Region soils that are derived mainly from granite, or from shale, promote different vine performance and wine style/quality responses in Merlot, and whether such responses differ between the rootstocks 101-14Mgt and R110. A lysimeter is a measuring device which can be used to measure the amount of actual evapotranspiration which is released by plants. It was concluded that Merlot wine quality will probably be better when made from grapes grown on 101-14Mgt on granite than from Merlot vines on R110 growing in shale-derived soils. Granite soils are likely to sustain slow rates of potassium (K) supply from minerals in the non-clay fraction better than shale soils. www.sawislibrary.co.za/dbtextimages/Woolldridge.pdf

Enhancing grapevine abiotic stress resistance

Abiotic stress is defined as the negative impact of non-living factors on the living organisms in a specific environment. Stressors include high winds, extreme temperatures, poor soil, drought and flood. A project with the aim of understanding and manipulating core metabolic pathways in grapevine, not only to provide insight into how grapevine deals with abiotic stresses, but also to provide alternative strategies and/or novel plant material more resistant to these stresses has been undertaken. The project delivered fundamental research information regarding the carotenoid metabolic pathway of grapevine and provided significant momentum for the application of molecular biology studies to vineyard settings. Methodologies to profile carotenoid and chlorophyll pigments, as well as to profile sugar and organic acid for grape berries in all stages of development, were optimised and tested. Berry suspension cultures were obtained and analysed for their growth kinetics. The results provided proof-of-concept that these berry organ cultures could indeed be used to study berry ripening related processes. <http://www.sawislibrary.co.za/dbtextimages/Vivier.pdf>

International Research News

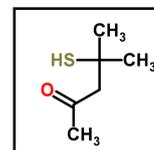
Oldest and largest wine cellar in the Near East discovered

Archaeologists have discovered what is believed to be the oldest and largest wine cellar in the Near East. The cellar was unearthed in the ruined palace of the rulers of Tel Kabri, the capital of a Middle Bronze Age Canaanite kingdom (1 700 BC) near Nahariya in northern Israel. The 40 Canaanite storage jars have a capacity of 2 000 litres, so the cellar could have held the equivalent of nearly 3 000 bottles of reds and whites. On analysing the jar fragments, the researchers found molecular traces of tartaric and syringic acid, both key components in wine, as well as compounds suggesting ingredients popular in ancient wine-making, including honey, mint, cinnamon bark, juniper berries and resins. They also found a remarkable consistency between the contents of the various jars. It is suspected that the palace has other wine cellars, still to be found. www.sci-news.com/archaeology/science-wine-cellar-israel-01568.html



Solving the mystery of the blackcurrant aroma

A recurrent blackcurrant aroma has recently been described in red wines originating from the Languedoc region in France. Depending on its intensity, this aroma can be perceived as pleasant or unpleasant. The aroma has caused problems as consumers do not relate it to the flavour of the region. The suspicion fell on aromatic thiols such as 4-mercapto-4-methyl-2-pentanone (4MMP) (right), 3-(mercapto)-hexyl acetate (3MHA) and 3-mercapto-1-hexanol (3MH). In an analysis of ten red wines from the region, a multiple variable analysis was carried out with thiol concentrations obtained by chemical analysis and blackcurrant aroma intensities obtained by descriptive sensory analysis.



The 4MMP concentration was very well correlated to the blackcurrant aroma, and 3MHA and 3MH present at high concentrations acted as enhancers of the perception of this aroma. Chemical analysis allowed 4MMP to be quantified at concentrations that had never before been reported in red wine. The wines richest in thiols developed a powerful aroma similar to blackcurrant aroma, which can hide other aromas present in the wine. Thus the presence of 4MMP at concentrations higher than 16 ng/L plays a major role in the development of blackcurrant aroma in red wine. <http://dx.doi.org/10.1016/j.foodchem.2013.07.024>

Fruit fibres as fining agents

The process of fining to remove proanthocyanidins (PAs) (condensed tannins) for clarification and astringency reduction in wines traditionally uses protein extracts. These are usually animal-derived, and include gelatine, isinglass, casein and albumin. Alternatives these animal proteins are sought for a number of reasons. A study has compared commercially available proteins and fruit fibres as fining agents for wine PAs. Fibres, derived either from purified cell walls of fresh grapes or apples, or from post-processing as pomace by-products showed a high adsorption affinity for PAs. In general, the removal of PAs per

unit protein addition, which occurs via aggregate formation, followed by precipitation, was greater than for fibres, where it occurs by adsorption. Thus a larger dosage of insoluble fibre material was required to induce equivalent removal to that observed for proteins. It was noted that most fibres selectively removed PAs of higher molecular mass, and this is important, as these PAs are known to be stronger drivers of astringency. <http://dx.doi.org/10.1016/j.foodchem.2012.08.016>

Chelators inhibit oxidation

Oxygen usually enters wine through the cork and interacts with metals, particularly iron, setting off reactions that over time brown the wine and cause an unpleasant taste. A study examined the effect of chelators (binding agents) on reducing oxidation by binding to the iron (Fe) present in the wine. For Fe(II) bipyridine and Ferrozine was used, and for Fe(III) the chelators were ethylenediaminetetraacetic acid (EDTA) and phytic acid. The ability of these chelators to affect the formation of 1-hydroxyethyl radicals (1-HER) and acetaldehyde was measured. The chelators were investigated for their ability to prevent the oxidative loss of an important aroma-active thiol, 3-mercaptohexan-1-ol (3MH).

The Fe(II)-specific chelators were more effective than the Fe(III) chelators with respect to 1-HER inhibition during the early stages of oxidation and significantly reduced oxidation markers compared to a control. However, although the addition of Fe(III) chelators showed an initial pro-oxidant activity, the Fe(III) chelators proved to be more effective antioxidants after 8 days of accelerated oxidation. It was also shown for the first time that Fe(II) and Fe(III) chelators can significantly inhibit the oxidative loss of 3MH in a model wine. <http://dx.doi.org/10.1021/jf4024504>

The use of antimicrobial plant phenolic extracts as preservatives during wine ageing in barrels

Antimicrobial plant extracts rich in polyphenols have been proposed as a total or partial alternative to sulphites during winemaking. A winery-scale trial of the addition of antimicrobial plant extracts during wine ageing in wood has been carried out. A Verdejo (white) wine was treated with a SO₂ regular dose (160 mg/L), a SO₂ half-dose (80 mg/L) with phenolic-rich extracts from eucalyptus leaves (100 mg/L), and a SO₂ half-dose (80 mg/L) with phenolic-rich extracts from almond skins (100 mg/L). Some of the wine was also stored in a stainless steel tank for comparison.

After 6 months of ageing in oak barrels, the wine treated with the phenolic extracts remained microbiologically stable and showed correct enological parameters. The addition of both the eucalyptus and almond extracts led to statistically significant changes in the concentration of several esters, C₁₃ norisoprenoids, volatile phenols and furanic compounds in the wine, and the concentration of some of these compounds was higher than their odour threshold. The addition of both extracts did not significantly modify the phenolic content, except for a lower concentration of hydroxycinnamic acids and esters and flavan-3-ols, which indicates minor changes in wine astringency. In summary, the wines were mainly differentiated by the ageing process itself, and by the addition of the extracts, and even by the barrel used. The results demonstrated that phenolic extracts can be used as partial alternatives to SO₂ during the ageing of white wines in oak barrels. <http://dx.doi.org/10.1016/j.foodcont.2013.03.026>

Other news

Bigger than scarecrows

Trials are underway in New York vineyards and blueberry orchards to see how effective large, inflatable plastic characters called 'scary dancers' or 'air dancers' (see right) can be at scaring birds away. They are upward of 5 metres tall, move randomly with arms flailing and have noisy fans. Their use appears promising, as growers and researchers observed less fruit damage where pilot testing was taking place. <http://phys.org/news/2013-12-inflatable-scary-dancers-birds-fruit.html>



Do you know your champagne?

Champagnes are composed of white and/or red wine grapes. Their relative proportions are thought to contribute to a sparkling wine's distinctive flavour profile, but this has not yet been tested empirically. Now a blind tasting experiment in which the participants had to report the perceived proportion of white grapes in seven sparkling wines has been conducted.

The participants, including four expert, six intermediate, and five novice Champagne tasters, were unable to accurately judge the percentage of white grapes in the wines. Instead, the perceived proportion of white grape was correlated with the dosage and alcohol content of the wines. The hedonic ratings for the Champagnes did not correlate with price. Further, the more expensive Champagnes were only appreciated by the expert tasters. www.flavourjournal.com/content/2/1/25

How to have your wine and drink it

Coravin allows you to pour and enjoy wine without disturbing the natural aging process, and without the need to drink the whole bottle. A thin, hollow needle is inserted through the foil and cork. The bottle is then pressurized with argon, an inert gas. Once the bottle has been pressurized, the wine flows out through the needle and pours into the glass only in the quantity required. On removing the system the cork reseals itself. The remaining wine never comes in contact with oxygen from outside the bottle, and continues to evolve naturally, with the quantity extracted replaced by the inert gas. www.coravin.com



Winetech Scan is available on the Winetech website www.winetech.co.za

To subscribe please email Gerard Martin: marting@winetech.co.za