



Local Research News

The effect of metal content on the maturation of a white wine

Metals in wine can act as catalysts in oxidation processes, form complexes with various wine constituents, lead to haze formation, clouding and precipitation, cause wine instability at high concentrations, and impact on the organoleptic properties of wine. Some South African white wines show premature aging effects after relatively short bottle aging. To investigate whether the faster maturation of white wine could be attributed to the levels and types of metals that act as catalysts of oxidation, a Chenin Blanc from the Rawsonville area was subjected to metals removing treatment by metal-chelating resins.

The treated wine (with metal concentrations reduced) had significantly better colour, showed less oxidative character, and formed less sediment than the untreated (control) Chenin Blanc wines. However, the resin treatment resulted in the wine showing significantly less persistence and fruity aroma, and a lower overall quality. Differences between the control and treated wine did, however, become less pronounced after 16 months of ageing and at high storage temperatures. Treated wines were also rated as more sulphurous, more astringent, with faulty acid balance, and thinner in consistency and with higher volatile acidity (a vinegar taint or high acetic acidity). Untreated wines stored for shorter storage periods and at lower temperatures gave fruitier aromas, persistence, better overall quality, and generally were associated with higher levels of fructose and total phenols. Untreated wines stored for longer periods of time at higher temperatures had higher oxidative character, sedimentation and insufficient colour and were associated with higher concentrations of a number of metals. A future possibility could be to make recommendations on the optimum degree of reduction of the metal content of specific white wines so as to reduce their tendency to suffer deterioration. www.sawislibrary.co.za/dbtextimages/vanJaarsveld.pdf

Possible health benefits of low alcohol wines

It is not definitely known if it is the phenols or the alcohol in wine that are responsible for its health benefits. Because excessive consumption of alcohol may have adverse health effects such as cardiovascular disease, diabetes and certain cancers, low alcohol wines are possibly a healthier alternative. A project subjected eleven different cultivars (8 red and 3 white) to vacuum extraction to lower the alcohol content to 7% and / or 2%. All the wines (original and low-alcohol) were analysed for total phenol concentration, antioxidant capacity (by ORAC - oxygen radical absorbance capacity), as well as for their protection against lipid peroxidation in erythrocyte membranes (erythrocyte haemolysis assay) and low density lipoproteins (LDL). In addition, 6 of the 11 cultivars of red and white wine samples were analysed by liquid chromatography–mass spectrometry (LC-MS) for their concentrations of small molecular weight phenolic compounds.

The removal of alcohol from the original wines had a small (expected) concentration effect on the antioxidant capacity, the concentration of total phenols, the concentration of specific small molecular weight phenols and the two functional assays. The removal of alcohol did not affect the antioxidant properties of the red and white wines adversely. This is an important message to the wine industry and to the public. www.sawislibrary.co.za/dbtextimages/blackhurstD.pdf

International Research News

Simplified method for free SO₂ measurement

Sulphur dioxide (SO₂) is used in winemaking for preventing wine oxidation and unwanted microbial growth. Winemakers routinely measure free SO₂ to ensure wine stability. A simple and inexpensive method of measuring SO₂ has been developed and evaluated. An acidified wine sample is treated with an antacid tablet to evolve CO₂ in situ and the gas flow is directed to an inexpensive commercial SO₂ detection tube via a pipette which acts as a spray 'filter' (right). The SO₂ detection tubes were originally developed for the mining industry. The length of the tube that changes colour is proportional to the SO₂ concentration.

Accuracy was evaluated by measuring free SO₂ concentrations in 16 wines (7 whites, 9 reds) by the SO₂ tube method and the Aeration-Oxidation A-O reference method. Free SO₂ concentrations for individual wines measured by each method were within ±2 mg/mL. The new method achieves a linear response from 5-40 mg/L with a limit of detection of 3.3 mg/L in wine. The new method has several advantages over A-O, including less time per analysis and requiring no specialized glassware or equipment. The major consumable cost is the detection tubes. <http://dx.doi.org/10.5344/ajev.2013.13003>

Antitranspirant reduces grape sugar content

A steady trend of increased warming, beginning more than 20 years ago, is pushing traditional areas of grape growing toward accelerated ripening, leading to excessive sugar accumulation in the fruit and high alcohol content in the wine. On the other hand an increasing number of consumers in Europe prefer wines with more moderate alcohol content. Using field-grown Sangiovese vines, a two-year study was conducted to test the effectiveness of a post-veraison application of an organic film-

forming antitranspirant at delaying sugar accumulation in the berries, and to evaluate its effects on vine physiology, wine quality and replenishment of the storage of reserves in cane wood and roots.

The study was carried out over two seasons in a non-irrigated vineyard of cv. Sangiovese red grapes in central Italy. The application of the water emulsifiable organic film-forming antitranspirant, Vapor Gard (with active ingredient di-1-p-menthene, a low molecular weight polymer derived from pine oil), was applied at 2% concentration to the upper two-thirds of the canopy (most functional leaves). It significantly lowered leaf assimilation and transpiration rates and increased intrinsic water use efficiency. It reduced both the pace of sugar accumulation in the berry as compared to control vines, scoring a -1.2 Brix at harvest and wine alcohol content at -1% without compromising the recovery of concentrations of carbohydrates and total nitrogen in canes and roots. Organic acids, pH and phenolic richness of grapes and wines were unaffected, whereas a lowering in anthocyanin content in the berry (-19% compared to control vines) and in the wine (-15% compared to control vines) were found. The application of VG at post-veraison above the cluster zone is an effective and easy-to-do viable technique to hinder berry sugaring and obtain less alcoholic wines. <http://dx.doi.org/10.5344/ajev.2013.13015>

Use of zirconium dioxide during fermentation as an alternative to protein fining with bentonite

Hazy wines are perceived as faulty by consumers, and the proteins responsible for wine hazing are usually removed by bentonite fining. Bentonite is extensively used because it is relatively inexpensive and quite effective in protein removal, even if its use has many indirect costs and can negatively affect the sensorial profile of the treated wines. Alternatives to bentonite are being actively investigated. In a study, zirconia pellets (25 g/L) enclosed in a metallic cage were added on the second day to unfined fermenting Riesling, Sauvignon Blanc and Semillon juices. After 48 hours the zirconia treated juices showed a large decrease in protein content, and the resulting wines were heat stable. Compared to control juices the fermentation rate was significantly increased for two juices, and unchanged in the other juice. Reductions in concentration of some elements and tartaric acid, and increases in pH in the resulting wines from the zirconia treated juices were observed.

Thus zirconia in pellet form enclosed in a metallic cage is a viable alternative to bentonite fining for protein removal from juice and wine. No stirring is required as natural mixing takes place during fermentation. Other advantages of using zirconia are that the fermentation rate is increased and that the wines produced are fully heat stable with no loss of wine as lees, since the cage with the pellets can simply be removed and regenerated. However, the status of zirconia dioxide as an allowed winemaking additive remains to be established. The possible presence of residual zirconia in treated wines also requires investigation. <http://dx.doi.org/10.5344/ajev.2013.12143>

Other news

Smartphone app will help improve the yield and quality of wine grapes

A team at the University of Adelaide has developed a smartphone app to characterise temporal and spatial canopy architecture and leaf area index for grapevines. It will help growers, irrigators and scientists to improve the yield and quality of wine grapes. The app consists of a program that can be downloaded to a smartphone or a tablet computer to acquire upward-looking digital images with GPS data which are then analysed by the program. Full details at <http://adelaide.edu.au/wine2030/Fuentes-NovDec12WVJ.pdf>

Australian CliMate app helps with decision making

The free CliMate app allows Australian farmers to quickly interrogate the last 60 years of daily rainfall, temperature and radiation data for their location. Seasonal forecasts are provided and it calculates heat sums and estimates soil water and soil nitrate accumulation. The app was developed by the national Managing Climate Variability programme to help farmers make sense of past climate statistics and forecasts for their own location, so as to better manage their business. It is available for iPhone, iPad and iPod touch devices, or on the web. www.australianclimate.net.au

Remote-controlled helicopter tested for use in vineyard spraying applications

Remote-controlled helicopters have been in use in agriculture in Japan for 20 years. Currently more than 2 500 RMAX motorcycle-sized helicopters (right) are used to spray 40% percent of the fields planted to rice in that country. Now, in a first for the USA, a RMAX, fitted with a spray applicator system, is being field tested over a vineyard in Napa Valley. The Napa Valley's wine-grape vineyards, with their relatively small plantings, adjacent development, and often hilly terrain, are similar to rice fields in Japan. The mini-helicopter can go where piloted helicopters or fixed-wing aircraft cannot, and in some situations, could be safer and more efficient than tractor applications of herbicides and pesticides.



The helicopter is flown using a radio signal from a hand-held controller similar to controllers for miniature hobby aircraft. At present, only water is being sprayed on the vineyards as the researchers explore how well the aerial applicator would cover the vineyard. The helicopter carries 16 litres of liquid spray and has a maximum spraying speed of about 25 km/h. The helicopter could also take aerial pictures of vineyards to identify sites where the vines need special care or to better determine the optimal harvest time. More including a video at http://news.ucdavis.edu/search/news_detail.lasso?id=10623

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