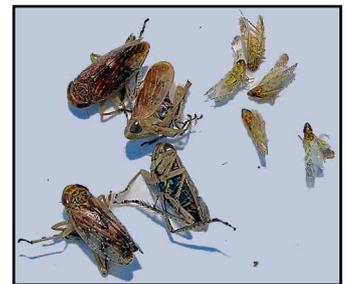




Local Research News

Asters Yellow: appearance, distribution, symptoms and control

Aster Yellows is a phytoplasma disease which was recently and for first time in South Africa found attacking and killing vines in the Vredendal, Wabooms River and Robertson areas. Serious damage is caused because the clusters wither and cause major crop losses. It is a quarantine disease and has serious adverse implications for the entire vineyard industry, including wine, table and dried grapes. The abortion of young clusters is characteristic of Aster Yellow infected vines (right top). Globally Asters Yellow is spread through several leafhopper species. It was established that in the affected areas in South Africa the leafhopper *Megania fuscovaria* was the disease carrier (right below). A number of pesticides for the control of leaf hoppers were tested in field trials. Stewart, Dursban, Mospilan, Confidor and KOHINOR gave excellent control. As a result of the trials, Stewart, Dursban and KOHINOR are now registered for the control of leaf hoppers in South Africa. www.sawislibrary.co.za/dbtextimages/DeKlerkA1.pdf



International Research News

The reuse of winery wastewater in California

For the first time a survey has characterized winery wastewater for wine regions in California. Monthly samples were obtained over a 20-month period from 18 wineries. Samples collected before and after physicochemical and biological treatment were analysed for pH, electrical conductivity, cation and anion concentrations, specific ultraviolet absorbance, dissolved organic carbon, and biological oxygen demand. Dissolved organic carbon and biological oxygen demand were both effectively reduced by treatment, indicating that the wastewater would not overload soils with organic carbon. Although total phosphorus may also be of concern from a regulatory standpoint, it too can be effectively reduced by treatment. Elevated salt concentrations are difficult to remove and present the greatest challenge to reuse of wastewater. However, the salinity of wastewater samples from the 18 participating wineries was mostly acceptable for irrigation, and the observed chloride concentrations should not negatively impact vine growth. The variable impact of wastewater sodium and potassium cations on soils of differing mineralogy was highlighted as an area in need of further research – see next article. It was concluded that reuse of treated winery wastewater is possible and should be pursued in California. <http://dx.doi.org/10.5344/ajev.2015.14110>

The effect of wastewater salts on soil hydraulic conductivity

Ubiquitous in cleaning agents used in the wine industry, potassium and sodium salts are not removed by typical or affordable wastewater treatment. A study examined the effect of such salts on the hydraulic conductivity (HC) of three different soils. HC describes the ease with which a fluid (usually water) can move through pore spaces or fractures. Sodium salts reduced HC in the 2:1 clay soils (montmorillonite and vermiculite) and the vermiculite and the kaolinite rich soils exhibited equal or greater reductions in HC for potassium salts. It was found that the reuse of wastewater with increasing potassium content was least problematic for montmorillonite dominated soils and most detrimental to vermiculite dominated soils. A full analysis of soil and wastewater is recommended prior to application of wastewater in the vineyard. <http://dx.doi.org/10.1016/j.agwat.2015.01.015>

Grape marc as a source of biofuel

Global wine production results in an annual estimated 13 million tonnes of grape marc waste (the leftover skins, stalks and seeds from wine-making). Now Australian researchers have shown that there is a potentially economic use for the waste product. They analysed the composition of grape marc from two grape varieties, Cabernet Sauvignon and Sauvignon blanc, and also investigated pre-treatment of the grape marc with acid and enzymes. Grape marc is rich in carbohydrates. The majority of these carbohydrates are soluble monosaccharides (glucose and fructose) and structurally complex polysaccharides (pectins, heteroxylans, xyloglucan and cellulose). The soluble carbohydrates can be directly converted to ethanol through fermentation with a yield of up to 270 litres per tonne of grape marc. The leftover product was suitable for use as an animal feed or fertiliser. Ethanol yields could be increased by pre-treatment with acid and enzymes up to 400 litres a tonne. The ethanol could make a competitively priced biofuel. <http://dx.doi.org/10.1016/j.biortech.2015.06.030>

Evidence for a microbial aspect to terroir

A study in New Zealand has found that differences in flavour and aroma of wine from different areas may depend on microbes (specifically yeast) more than was previously thought. The study investigated whether genetically different types of yeasts from six different areas made any difference to a range of wine compounds known to affect aroma and flavour. Ferments were

conducted with Sauvignon blanc juice. Six individual *S. cerevisiae* genotypes from each region, and co-inoculations of all six genotypes representing regional populations, were fermented in triplicate across three separate batches. The concentrations of 39 volatile aroma and flavour compounds in each ferment were analysed and it was found that the concentrations of 29 of the 39 compounds varied with respect to the region of origin of the yeast genotype. Statistical analysis showed that there was a significant correlation between the six regional yeast genotypes and the aroma profiles of the wines as measured by the 39 compounds. Moreover, no one class of chemical compound was exclusively responsible for the regional signal for wine phenotypes. This finding indicates the importance of characterizing and understanding biodiversity, and that maintaining biodiversity may have tangible economic benefits. <http://dx.doi.org/10.1038/srep14233>

Evaluation of sensors for in-line monitoring of Baume levels.

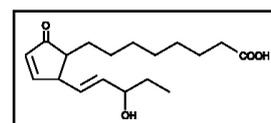
Since more than 90% of all the dissolved solids in grape juice are sugars, measuring the must weight is a good indicator of the amount of sugars in the wine. This is done by measuring the density or specific gravity of the juice (the Baume level). Current fermentation management practices are resource intensive and have significant sampling and analysis requirements across the vintage period. In general, this involves at least daily monitoring of Baume levels and subsequent testing and/or tasting of samples. In-line sensors offer a significant opportunity for the wine industry to reduce labour and analysis costs and exert greater control of ferments, by having immediate access to more ferment data in a more effective manner and in a more accessible form. This should result in improved product consistency, better resource utilisation, greater throughput, reduced risk of quality downgrades and lower costs. A study investigated viable and commercially available sensor options for wine fermentation, and the most promising technologies were evaluated through vintage 2015 field trials to assess accuracy, reliability and robustness. Study results showed that there is currently no single sensor technology that can provide reliable and accurate Baume data for monitoring both white and red ferments on a commercial scale. It was noted that the time and effort required to install and commission these sensor technologies should not be underestimated, especially when they are to be integrated with existing process control systems. The full 38 page report may be downloaded from this website: http://research.wineaustralia.com/completed_projects/evaluating-the-viability-of-process-sensor-technologies-for-measurement-of-sugar-levels-during-fermentation/

A new and rapid method for the determination of antioxidant capacity

Wine possesses antioxidant properties which are associated with positive health benefits. Thus the investigation of wine antioxidant properties and the evaluation of antioxidant capacity (AOC) is important. AOC characterizes the overall content of antioxidants and its straightforward measurement would remove the need for the time-consuming and relatively expensive determination of the individual phenolic components. Now a new method for the rapid and reliable AOC assay of wine based on chronocoulometric measurements using a multi-walled carbon nanotube modified electrode has been developed. Coulometry is a technique that determines the amount of matter transformed during an electrolysis reaction by measuring the amount of electricity consumed or produced, and the prefix chrono relates to the time taken. For the evaluation of AOC, 50 μ L of wine was inserted into the electrochemical cell containing 9.95 mL of 0.1M phosphate buffer, and chronocoulograms recorded at 0.83V and 1.18V for red and white wines, respectively. The electrolysis time was 100 seconds. The approach is rapid, simple, reproducible and reliable and has the important advantage of no sample pre-treatment, as pre-treatment can cause the undesirable oxidation of the phenols. <http://dx.doi.org/10.1016/j.foodchem.2015.09.075>

The phytoprostane content of red wine

Red wine has demonstrated several benefits for health maintenance. One group of potential anti-inflammatory compounds is the phytoprostanes (see right), nonenzymatic oxidation products of linolenic acid. A study has, for the first time, measured the phytoprostane content in red wine and must. Two predominant classes of phytoprostanes, the F1- and D1-phytoprostane series, were found. In wines, the total phytoprostane concentration ranged from 134 to 216 ng/mL and in musts between 21 and 447 ng/mL. The high concentrations observed and previous reports of anti-inflammatory effects of phytoprostanes make further research on the benefits of phytoprostanes, especially in wine, very relevant. <http://dx.doi.org/10.1021/acs.jafc.5b03365>



Other News

VitiCanopy, a free app for measuring leaf area index

A free phone app, developed by University of Adelaide researchers, will help grapegrowers and viticulturists manage their vines by giving a quick measure of vine canopy size and density. Overcropped vines, or vines with excessive canopy, are referred to as 'out-of-balance', and such vines are associated with lower quality fruit. Vine balance can be measured as a ratio of leaf area to fruit yield. Traditional ways of measuring leaf area are time-consuming or expensive. The app measures the leaf area index (LAI) which can then be related to fruit yield for an assessment of vine balance as well as capturing canopy variation across a vineyard via GPS. To use the app, a grower takes a standardised image of the vine canopy. The app then analyses the image and calculates the LAI, and records time and location. VitiCanopy is available from Apple's app store. An Android version is being developed. See <https://www.youtube.com/watch?v=Eqzmuubm8> for a five minute video on using the app. <http://phys.org/news/2015-10-app-grapevines.html>

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