



Local Research News

The interaction between vine vigour and water stress

Irrigation is usually scheduled at the single vineyard block level and localised soil or plant measurements are mostly used to make decisions on irrigation timing and intensity. Considering the variability in plant water status encountered in blocks where vigour variability occurs, a study examined where and how soil or plant water status should be measured to be representative of the block. The current destructive and laborious nature of plant water status measurements also calls for the development of fast and effective non-destructive measurement strategies. Thus the interaction between vine vigour and water stress incorporating conventional and non-destructive measuring techniques was examined. The project showed clearly that irrigation scheduling technology need to be specially adapted to vineyards with high spatial vigour variability. With regards to non-destructive monitoring of grapevine water status, promising results from leaf-level measurements were found. Results from the project could aid in designing systems and procedures to incorporate aerial imaging as a valuable starting point for vineyard irrigation decision making. <http://www.sawislibrary.co.za/dbtextimages/StreverA3.pdf>

Cardiovascular risk in relation to moderate alcohol consumption

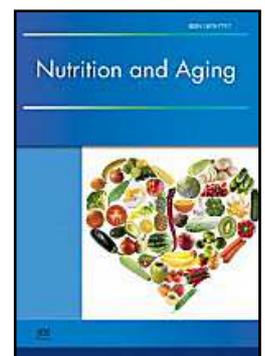
Metabolic syndrome (MetS) is a human disorder of energy utilization and storage, diagnosed by a co-occurrence of three of five of the following conditions: abdominal obesity, elevated blood pressure, elevated fasting plasma glucose, high serum triglycerides and low high-density cholesterol (HDL) levels. MetS is associated with an increased risk of many chronic diseases, including cardiovascular disease (CVD), Alzheimer's disease (AD) and diabetes. A local project has assessed the impact of genetic factors on biochemical parameters of cardiovascular risk in relation to moderate alcohol consumption. In a study of more than 400 participants, it was found that the well-established protective effect of moderate alcohol consumption on CVD risk factors is confirmed in the local population. It was realised that the E4 allele of the apolipoprotein E (ApoE) gene provides a genetic link between CVD and AD and that alcohol interacts with the gene variant to increase the risk of AD, especially when other CVD risk factors such as hypertension or obesity are also present. This highlights the importance of addressing shared disease mechanisms before, or early in, disease development in order to optimize health in later life.

For a subset of 119 patients with non-alcoholic fatty liver disease (NAFLD), which is the hepatic manifestation of the metabolic syndrome, the effect of the tumour necrosis factor-alpha (TNF-a) DNA sequence variation on inflammation and disease progression was studied. The minor allele frequency of TNF-a was significantly higher in the total NAFLD population compared with obese patients without a histologically confirmed NAFLD diagnosis. A significant association was observed between the number of TNF-a minor alleles and increasing C-reactive protein (CRP) levels, with a favourable reduced effect in the presence of low to moderate alcohol intake. CRP levels rise in response to the presence of inflammation. Patients with alcohol intake had on average 70% reduced CRP levels compared with patients who abstained from alcohol drinking. Since the genetic profile influences the effect of alcohol on biochemical parameters of CVD risk, safe limits of wine and brandy consumption may in future be based partly on the genetic profile or knowledge of gene-environment interaction. www.sawislibrary.co.za/dbtextimages/KotzeMJ.pdf

International Research News

WineHealth 2013 proceedings now available

The conference proceedings from the *WineHealth 2013: International Wine and Health Conference* have just been published. The 16 papers in the proceedings are available without charge online in a 'Special issue on Wine Health' of the peer-reviewed journal *Nutrition and Aging*. Topics covered include the impacts of wine consumption on cardiovascular disease, effects on mood, cognitive function and vascular health, a mini-review of proanthocyanidin metabolism and healthy ageing. <http://iospress.metapress.com/content/tm271m267185/>



Diurnal variations of amino acid levels

Diurnal changes in amino acid concentrations in grapes have not been fully studied. For if amino acid concentrations in grapes vary during the day, the time of the harvest during the day would be expected to affect wine quality. A study has now investigated diurnal changes in the amino acid levels of Riesling and Chardonnay grape juices.

The levels of several amino acids changed dramatically throughout the day. Changes in the amino acid concentrations of juices were classified into three patterns. The concentrations of aspartic acid (Asp) and glutamic acid (Glu) decreased during the morning and gradually increased at night-time. Alanine (Ala) concentration increased during the morning and decreased at night-time. The amino acids peak times were 06h00 to 09h00 for Asp, 06h00 to 07h00 for Glu, and 13h00 to 19h00 for Ala. When grape clusters were shaded with aluminium foil, the patterns of these three amino acid levels showed the same

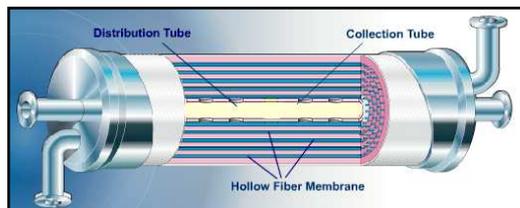
behaviour. This was ascribed to the foil lowering the grape temperature. Other amino acids (such as phenylalanine, serine, proline, and threonine) showed minimal or no diurnal changes in concentration. Yeast assimilable nitrogen (YAN) showed minimal daily changes. Photosynthesis is proposed as the main contributor to these diurnal changes, since minimal changes were observed under cloud cover. <http://dx.doi.org/10.5344/ajev.2014.13144>

Fingerprinting wine

A novel, rapid, affordable and simple liquid fingerprinting technology has been investigated for wine identification and quality control. The wine sample, 14 selected chemical modulators on the surfaces of a microwell array, and a long lifetime luminescent europium compound interact non-specifically providing a unique luminescence fingerprint that is highly wine specific. The technique was successfully applied to 15 red wines of different vintages from four European vineyards. The fingerprint data also showed a significant correlation with the results from existing Fourier transform infrared spectroscopic and spectrophotometric methods of wine analysis. The same principles combined with proper data processing could also be used to monitor other parameters such as the aging of wine. <http://dx.doi.org/10.1111/ajgw.12066>

A new tool for gas management in wines

A membrane contactor (right) is a device in which a gas and a liquid meet at the membrane. The hydrophobic characteristics of the membrane allows the liquid to contact the gas without dispersing into it. Transfers of gases to either side of the membrane are possible, and thus gas may be added to or removed from the liquid. A laboratory experiment was carried out to test the membrane contactor technology in an enological context and to determine the principal factors that influenced CO₂ and O₂ transfer rates. A model was developed and validated which accounted for the principal factors that influenced CO₂ and O₂ transfer rates through the membrane for four different wines.



It was concluded that membrane contactor technology introduces a new tool for gas management in wines. The advantages of this technique are its precision and its versatility. Addition of CO₂ and removal of O₂ can be done at the same time with one single membrane passage during different stages of the winemaking process or directly at the bottling line. It may be considered as being very useful before or after filtration, or during transfer of wine between containers. Since O₂ can be removed any time before bottling, the technique may allow working with low SO₂ concentrations from harvest until bottling. In addition, the technique is non-dispersive which helps to reduce the quantity and therefore the waste of CO₂ during its application. However, partial clogging of the membrane could be a disadvantage. <http://dx.doi.org/10.5344/ajev.2014.13108>

Other news

Natural skin care from pomace

University of Leeds spin-out Keracol Limited has teamed up with UK retail chain Marks & Spencer to produce a new natural skin care range, 'The Pure Super Grape', using the waste products of grapes (pomace). Keracol has found a new way to extract resveratrol, found in the outer skins of red grapes, which is an antioxidant and known to have protective anti-ageing properties. The process uses the skins from English Pinot noir grapes left over from the production of M&S' own English sparkling and rose wines. <http://phys.org/news/2014-07-sustainable-skincare-range-products-grapes.html>

Grapevine leafroll-associated virus 3

Grapevine leafroll-associated virus 3 causes huge economic losses in vineyards world-wide. The virus is transmitted by insects called mealybugs, which spread the disease while feeding on grapevines. Leafroll 3 reduces grapes' sugar content, flavour and yields—particularly for premium red-grape varieties such as Pinot noir. There is no cure for leafroll 3 and, once infected, vines eventually succumb to the disease, leaving growers with no option but to remove them and replant entire vineyards at considerable expense.

Now a PhD candidate in New Zealand has shown that the virus can be accurately diagnosed by visual assessment on red varieties. Growers can then remove individual infected vines annually—a process known as 'roguing'. The research has demonstrated that only infected vines need to be removed, and not the healthy nearest neighbouring vines as well, as was previously assumed. Much-needed clarity has been added to understanding the relationship between the disease and the mealybugs that carry it. So growers must not only manage their infected vines, but also the mealybug populations in their vineyards. <http://phys.org/news/2014-07-costly-grapevine-disease.html>

Grape marc as a livestock feed supplement

The Australian Wine Research Institute (AWRI) is currently in the first year of a project investigating the practicalities of using steam distilled grape marc as a supplement in livestock feed to reduce methane emissions. This work builds on research which has demonstrated a reduction in methane emissions from ruminant animals that were fed grape marc. The new project is working on designing practical solutions for grape marc storage and feeding all year round in order to make the concept feasible in a commercial setting. One of the challenges to be overcome is the tendency for mould to grow on grape marc. www.awri.com.au/information_services/enews/2014/07/08/july-2014/#title3

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