



Winetech Scan

Wine Industry Network of Expertise and Technology
Netwerk van Kundigheid en Technologie vir die Wynbedryf

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Research News

- While DNA-based technologies are extremely powerful tools for classifying plant varieties, an emerging complementary approach is to use proteomics. However, little is known about the proteins present in grape berries. Generally, protein analysis requires large samples and is time-consuming and expensive. A new technique, surface-enhanced laser desorption - ionization (SELDI) is a method typically used with time-of-flight (TOF) mass spectrometers for the analysis of protein mixtures. A study evaluated the ability of SELDI-TOF-based ProteinChips (right), which combines selective capture of proteins with SELDI, to discriminate among grapevine varieties and to determine whether this technique can identify protein markers specific to a grapevine variety and to a group of grapevine varieties. Four different Italian grapevine varieties were selected, two whites and two black. Each grapevine variety analyzed displayed a protein pattern that distinguished it from the others - there was a protein pattern common to white grapes that distinguished them from black grapes among the four varieties tested, and a series of SELDI mass clusters associated with each variety could be identified. Several protein signals were differentially expressed in the varieties used, suggesting that the technology could be used to identify cultivar-specific biomarkers in grapevines. It could thus be a valuable tool for the identification of grape varieties using their protein profiles. The technique is ideal for the analysis of small sample volumes, the screening of low-molecular-weight proteins, and it has a high-throughput capacity. www.ajevonline.org/cgi/content/abstract/61/4/492
- It has been observed that wine proteins are responsible for instability, giving rise to haze formation, while glycoproteins, in particular the mannose rich ones derived from yeast lyses, appear to prevent protein aggregation and thus precipitation, playing an anti-hazing effect. Most of the procedures for measuring protein concentrations in wine are cumbersome and time-consuming. Now, using a recently developed method to precipitate proteins from wine, a study of five different unclarified white wines from the north of Italy was undertaken. The concentration of proteins and glycoproteins was measured, and the haze tendency of the wines was established by a heat test. The results showed a strong positive linear correlation between haze tendency and both protein concentration and protein/glycoprotein ratio. There was a strong negative linear correlation between haze tendency and glycoprotein concentration. An inverse correlation between protein and glycoprotein concentrations was noted. Protein and glycoprotein concentrations could thus represent a haze-formation predictive factor. <http://dx.doi.org/10.1016/j.foodcont.2009.11.009>
- The effect of microoxygenation on the composition of a 2008 Cabernet Sauvignon wine was investigated. After fermentation, oxygen was applied at both low and high rates (5 and 20 mg/L/month) through diffusers in stainless-steel tanks or via permeation in polyethylene Flextank maturation vessels at about 2mg/L/month (about the same as a new oak barrel). In the Flextank, oxygen enters the wine continuously by diffusion/permeation through the specially formulated polyethylene walls, driven by the difference in oxygen pressure between the outside and inside of the vessel. The results indicated that microoxygenation enhanced wine colour development, in which effects on pigments resistant to SO₂ were more marked in the first half of the trial, and more obvious influences on colour density were seen during the second half of the trial. The microoxygenation did not show any effect on the desirable varietal thiol 3-mercaptohexanol, but led to decreases in the concentrations of undesirable off-odours, including methanethiol, without an increase in the concentration of dimethyl disulfide. Concentrations of other reductive sulphur compounds, except the thioesters, decreased as they were also affected by oxygen and further by the influence of spontaneous malolactic fermentation, indicating the complicated interactions of these compounds in the wine matrix. These losses have the potential to impact favourably on the removal of unwanted reductive odours from red wines. The wines stored in the polyethylene Flextanks had a consistently higher colour density than the control wine at every observation date. The removal of reductive aromas was also as effective in the Flextank as in the higher microoxygenation (20 mg/L/month) treated wines. The impact of the Flextank on colour and aroma could involve oxygen permeation through the tank walls, combined with a small interaction with the polyethylene surface. www.ajevonline.org/cgi/content/abstract/61/4/457
- In the United States, sustainability practices are gaining momentum as consumers spent \$2.2 billion on Fairtrade certified products in 2006, up 42% in one year, and \$16.7 billion on organic foods, quadrupling demand from 10 years ago (Fairtrade is an organized social movement and market-based approach that aims to help producers in developing countries obtain better trading conditions and promote sustainability). This growth is not lost on the wine industry, which has focused on environmental issues. However, firms must also address social sustainability to be



considered a 'sustainable' company. Overall sustainability integrates profit, people, and the planet into the culture, strategy, and operations of companies. A study compared sustainability practice adoption of wine and other food producers. The results suggest that wineries are ahead of food processors in addressing environmental growing (land) sustainability practices. For both sectors, land environmental practices drive improved product quality, but they see very different results from their social practices. Food processors experience reduced overall costs from social practices, while wineries perceive better market and quality performance. Wineries consider it too soon to heavily market sustainability because what constitutes sustainable practices has not been well specified, and sustainable process and practices are not yet fully in place on the vineyard and production side. To move prematurely would open the industry to claims of 'greenwashing', which could have devastating consequences. On the other hand, many food producers indicate that sustainability efforts are getting attention in the market place, and thus they do not share the same cautious perspectives as wineries. <http://dx.doi.org/10.1080/09571264.2010.495853>

- The effects of different irrigation treatments on leaf turgor pressure of grapevines were studied using the novel leaf patch clamp pressure (LPCP) probe (right). Turgor pressure is a force per unit area exerted outward on a plant cell wall by the water contained in the cell vacuole. The LPCP probe (with a small telemetric transmitter for convenient data acquisition) measures leaf water status by monitoring the attenuation of an external pressure applied magnetically to a leaf patch. The output pressure signals are inversely correlated with cell turgor pressure (Pp). The measurements were performed on grapevines growing in a vineyard in Israel over the entire vegetation period. The grapevines were subjected to four different irrigation treatments including different beginnings of irrigation and different amounts of water. Changes in transpiration and stomatal conductance induced by environmental parameters were reflected nearly immediately in Pp. Ongoing non-irrigation resulted in a continuous increase of Pp, in the occurrence of stomatal oscillations and in an increased turgor pressure recovery phase during the afternoon. Interestingly, analysis of the numerous diurnal Pp data sets showed that east-directed leaves responded more sensitively to water stress than did west-directed leaves. It was concluded that for the cultivar and conditions used in this study, the probe data as well as the crop yield data supported irrigation on a 3-day cycle with relatively small amounts of water. The results show that the LPCP probe is a user-friendly, high precision instrument for online-monitoring of leaf turgor pressure in dependency on changes in microclimate and irrigation, thus helping growers to increase yield while simultaneously saving water. <http://dx.doi.org/10.1111/j.1755-0238.2010.00101.x>



Local research news

- Many soils in the Western Cape are sufficiently acidic so that grapevine growth and quality is detrimentally affected. This acidity is usually considered to have been sufficiently reduced when enough agricultural lime (an alkaline material containing calcium carbonate, and usually calcium oxide, magnesium oxide and/or magnesium carbonate) has been added to the soil during preparation, and as top-dressing thereafter. The addition usually results in a soil pH of between 5.0 and 5.5. The effect of pre-plant liming was investigated on a soil with a pH of 5.05 (unlimed control, treatment L0), and with liming resulting in a pH of 5.64 (L1) and 6.56 (L2), in two wine grape varieties (Chardonnay and Pinot Noir) and four rootstocks, five years after planting over six seasons. Yields decreased in the sequence: L0 > L1 > L2, while cane masses increased with lime application rate, with L1 exceeding L0 by 11.0% and L2 exceeding L1 by 13.0%. The concentrations of the main nutrient elements in all treatments remained within acceptable limits, with the exception of petiole nitrogen concentrations which were above normal in all treatments. Wine quality was significantly better from L0 grapes than L2. Suppressed yields and lower wine quality were attributed to a lime-induced imbalance between vegetative and reproductive growth, possibly exacerbated by increased Ca:Mg ratios and excess nitrogen. Nevertheless, the results confirmed the desirability of liming vineyard soils. Underliming merely leaves the root system under conditions of avoidable stress. Rather, liming should be carried out to the point where the vigour of the scion/rootstock combination in question just ceases to show further benefit. The imbalance should be controlled by canopy management practices, such as reduced nitrogen applications and irrigation scheduling. www.sasev.org/journal-sajev/sajev-articles/volume-31-1/Effects%20of%20liming%20to%20near-netrul%20pH.pdf/view

Other News

- Five Southern African countries will gain research centres for adaptation to climate change and sustainable use of soils as from 2011. The centres will focus on use of soils, water, biodiversity, climate change, training, information and services, with a view to regional integration. The researchers at the centres will include technicians from the ministries of Higher Education, Science and Technology, Environment, Agriculture, Rural Development and Fisheries from the five countries. The centres are part of the Regional Centre on Science and Services (RSSC), sponsored by Germany with a funding of 50 million Euros. <http://allafrica.com/stories/201011250971.html>

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