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

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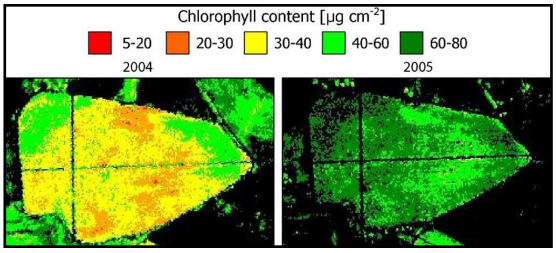
Research News

- An important biological effect of wine is its potent antimicrobial activity. It has been shown that wine consumption may be protective against food-borne illness as well as against infection by *Helicobacter pylori*, which is a bacterium that causes a chronic low-level inflammation of the stomach lining and is strongly linked to the development of duodenal and gastric ulcers and stomach cancer. The exact mechanisms responsible for the antimicrobial activity and the relative contributions of wine components to this activity are not at all well understood. A study compared the antimicrobial effects of wine to that of phenol-stripped wine, de-alcoholised wine, ethanol, and low pH, applied separately and in combination, against 2 common food-borne pathogens, *Salmonella enterica* and *Escherichia coli*. It was found that the order of antibacterial activity of the samples was: wine > phenol-stripped wine > de-alcoholised wine > combination of ethanol and low pH > low pH > ethanol. Separate application of ethanol or low pH showed negligible antibacterial activity while their combination showed a synergistic effect. Antibacterial activity of the samples could not be related to their total phenolics and resveratrol content, antioxidant capacity, ethanol content or pH. The study indicates that antimicrobial activity of complex solutions such as wine cannot be exclusively attributed to its phenolic or non-phenolic constituents, nor can the antimicrobial activity of wine be predicted on the basis of its particular components. http://dx.doi.org/10.1111/j.1750-3841.2010.01622.x

- Iron chlorosis or iron deficiency is a plant disorder caused by the soil being too alkaline, waterlogged or over-fertilised. The resulting insufficient chlorophyll causes leaves to turn yellow or brown, and the fruit is of poor quality and quantity. A study involving seven full production vineyards in northern Spain investigated the use of physiological indices calculated from hyperspectral remote sensing imagery as potential indicators of wine grape quality assessment in vineyards affected by iron deficiency chlorosis. Airborne campaigns imaged study areas using a hyperspectral sensor, which acquired 20 spectral bands in the visible and near-infrared region. Field measurements were conducted to obtain leaf and grape physiological parameters potentially linked to wine quality. In addition to traditional structural vegetation indices (NDVI) and successful canopy-level chlorophyll indices (TCARI/OSAVI), other innovative physiological indices sensitive to changes in carotenoid and anthocyanin content in leaves were assessed from the imagery. The results suggest that the increase in carotenes and anthocyanins due to micronutrient deficiencies drought, or thermal damage is a better indicator of potential phenolic ripening difficulties for vines affected by iron chlorosis than is direct chlorosis detection. The physiological hyperspectral remote sensing indices gave superior results to traditional vegetation indices. http://dx.doi.org/10.1016/j.rse.2010.04.004



- Apomictically produced offspring are genetically identical to the parent plant, and cloning through seeds (apomixis) in food crops would revolutionize agriculture by fixing hybrid vigour and allowing the perpetuation of any elite heterozygous genotype. Up to now this has not been possible, but now the production of exact genetic replicas of important food crops has come a step closer. By combining mutations that abolish the shuffling of genes during sexual reproduction researchers have found a way to force sexually reproducing plants to clone themselves through seeds. This was done by manipulating two to four conserved genes controlling meiosis and chromosome segregation. The method has so far only been tested in the model plant *Arabidopsis thaliana* (thale cress), but work is being done to extend the findings to other crops. Such an advance could allow farmers to propagate their own crops, rather than having to buy seed each year. It would also shorten the time it takes to generate new plant breeds. http://dx.doi.org/10.1126/science.1199682

- 'Aficionado' consumers are defined as those who consume and enjoy a hedonic product regularly but have failed to obtain product expertise from their many experiences. They have not formed meaningful experiential memories and are easily swayed by marketing information. A study has shown that if such persons are provided with accurate sensory descriptors in the form of a wine aroma wheel while wine-tasting, and thus forming a sensory consumption vocabulary, they formed stronger and accurate experiential memories and were better able to withstand persuasion from misleading advertising. The authors of the study explained that wine is a complex, sensory-driven product, which is difficult to master based on regular consumption alone. It is different from many other products, where most brands perform about the same. The study's conclusions may also have implications for marketing music, gourmet food or movies. See the article 'Bridging Aficionados' Perceptual and Conceptual Knowledge to Enhance How They Learn from Experience' on pp. 688-697 at www.jstor.org/stable/10.1086/653510

- **An exploratory survey used toasted woods other than oak to flavour wine. Eleven different woods and oak were cut into chips 20 × 10 × 2.5 mm and toasted at 200ºC for 2 hours (light toast) or 210ºC for 3 hours (dark). The toasted chips were infused in un-oaked chardonnay (5gms per litre) for 2 weeks. Infusions were also done with model wine (water, ethanol, tartaric acid) adjusted to pH 3.5. Weight losses on light and dark toasting were highly variable between species as were colour changes, suggesting potential for different flavour outcomes from chemical changes. Ultraviolet absorbance curves were also highly variable showing that different species yielded different quantities of potentially flavour-active phenolic compounds in real and model wine. In an informal sensory trial with the 24 species/toast combinations infused in chardonnay all but one of the woods resulted in flavours reminiscent of oaked wines. A hedonic consumer trial with 4 species and oak compared with un-infused chardonnay showed that all had potential as a flavouring. Thus, woods unsuited to barrel construction could provide unrealized flavour opportunities in the wine industry, and could also extend to flavouring spirits. http://dx.doi.org/10.1111/j.1750-3841.2010.01829.x**

Local Research News

- **Vine mealybug (VMB) infestation is one of the most serious problems for vine growers. It is considered to be the major vector of grapevine leafroll virus and also causes damage by its feeding and by honeydew secretions. It has the potential to become resistant to conventional sprays. Four vineyards with a history of mealybug infestation in Constantia, Stellenbosch, Paarl and Franschhoek were chosen to study infestation by the VMB. There were slight peaks of mealybug numbers in November and December, with the major peak occurring between December and January at all four farms. Greater proportions of VMBs were found on the stem and lateral branches. The most notable aspect of the within-vine distribution was that there were VMBs on lateral branches on all sampling dates. The proportion of the mealybug population on the stems was smallest in January, when grape bunches were maturing. Late in the season VMB numbers on the stem increased as the matured grapes were harvested. This suggested that the VMB was seeking protection, probably from oncoming adverse winter conditions, and was moving closer to the ground. This behaviour could have a direct impact on the ability of any parasitoid to effectively control mealybug numbers. The next stage of the project was to study how mass releases of *Anagyrus* sp. (parasitic wasps) could be used as a biological control agent on VMB under South African conditions. But because of the collapse of both the VMB and *Anagyrus* sp. colonies as a result of contamination by *Coccidoxenoides perminutus* the project was suspended in 2010. *C. perminutus* (often referred to as Cocci's) are small wasps (3mm long) which originate from Hawaii and are extremely effective parasites of the VMB. www.sawislibrary.co.za/dbtextimages/Winetech2010_08.pdf**

- **Some trends in management practices for vineyards have emerged over the past 5 years which are based on unsubstantiated evidence. These are the belief that small berries resulting from water stressed vines produce a higher concentration of red-coloured compounds and thus higher quality wines, and that the irrigation of grapevines results in a proportional decrease in wine quality. To probe these beliefs, a study was undertaken to track changes in the fruit phenolic composition of *Vitis vinifera* cv. Merlot in response to water deficit, all the way to wine phenolic composition over two consecutive seasons. Irrigation treatments were applied which produced seasonal average stem water potentials ranging between -0.7 MPa and -1.4 MPa. Berry fresh weight was significantly reduced in response to water deficit, primarily due to decreases in pericarp weight (the edible tissue around the seeds). Increases in the concentration of grape anthocyanins and flavonols in response to water deficit were found when expressed per unit grape berry fresh weight. Skin-derived proanthocyanidin concentration was not affected by the irrigation treatments. During fermentation, the concentration of anthocyanins and flavonols in wine closely approximated the levels found in grape berries, with the non-irrigated and minimally irrigated treatments producing musts highest in both measures, which was reflected in changes in the wine colour of ferments. The wines from non-irrigated and minimally irrigated treatments had higher levels of bisulphite-resistant pigments compared to the highly irrigated treatments, but differences in phenolic composition were minor. This has implications for the promotion of the long-term stability of colour in aged wines. www.sawislibrary.co.za/dbtextimages/Winetech2010_01.pdf**

Innovations

- **A Spanish company is distributing an all-glass wine bottle which prevents wine sediments from reaching the wine glass. The bottle design consists of a double base. The lower base has two perpendicular ledges that create a narrowing that traps sediments and impurities in the bottle. It is claimed that the bottle offers the winemaker the option of eliminating clarification treatments, cold stabilization and filtration. The elimination of these treatments should allow optimal wine sensory characteristics to be maintained, while at the same time reducing labour and material costs. www.martinberasateguisystem.com/blog/acerca-de (in Spanish)**

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