



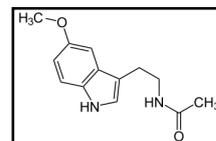
## International Research News

### The yeast *Dekkera/Brettanomyces bruxellensis* is sequenced

The wine industry has become increasingly interested in the properties of yeasts because they influence the character of wine. The genome sequence of the *D. bruxellensis* strain Y879 (CBS2499) has been determined and the evolutionary history and genetic background of several 'food-relevant' properties of this yeast have been deduced. *D. bruxellensis*, which is a distant relative of baker's yeast (*Saccharomyces cerevisiae*), can cause enormous economic losses in the wine industry as it can produce phenolic off-flavour compounds. The two yeasts are often found in the same habitats and share several food-related traits, such as production of high ethanol levels and ability to grow without oxygen. The availability of the whole genome sequence now provides a tool for deducing the enzymatic background of the off-flavour compounds and will, in future, assist wine producers to take control of flavour development. <http://dx.doi.org/10.1016/j.ijfoodmicro.2012.05.008>

### Bioactive compounds in wine: Resveratrol, hydroxytyrosol and melatonin - a review

As regular moderate wine consumption is often associated with reduced morbidity and mortality from a variety of chronic diseases of which inflammation is the root cause, a review has focused on three of the many bioactive compounds present in wine: resveratrol, hydroxytyrosol and melatonin. Resveratrol and hydroxytyrosol are polyphenols. Melatonin (right), an indoleamine, has been recently found in wine at low concentrations. The average glass of red wine (200 ml) contains 0.38 mg of resveratrol, 0.45 mg of hydroxytyrosol and 61.4 µg of melatonin. The structures, concentrations in wine, bioavailability, pharmacokinetic and health promoting properties of the three compounds were reviewed.



Resveratrol seems to be one of the most promising compounds due to its bioactivity. Hydroxytyrosol, which occurs in olive oil, has been found in both red and white wine in considerable amounts. The high bioactivity and bioavailability of melatonin is the reason for its inclusion in the review. Melatonin is linked to the regulation of circadian rhythms in animals and is a pervasive and powerful antioxidant with a particular role in the protection of nuclear and mitochondrial DNA. The review found that all 3 compounds show antioxidant, cardioprotective, anti-cancer, anti-diabetic, neuroprotective and anti-aging activities. They could act synergically to ensure a higher cytoprotective effect against oxidative stress. However, human studies are still in the initial stages and therefore further studies are needed. The review recommended a moderate, regular consumption of wine (two glasses of red wine per day). It concluded that while these molecules look promising in the field of medicine, there are still questions to be addressed, such as how much resveratrol, hydroxytyrosol and melatonin should be taken, how active are the metabolites derived from them, and how does the type of meal consumed in association with the ingestion of red wine influence their bioavailability in humans? <http://dx.doi.org/10.1016/j.foodchem.2011.08.023>

### Fresh or frozen grapes for small-scale fermentation?

The proof of the benefits of winemaking or viticultural treatments is generally obtained through comparison of the resulting wines. However, in making these test wines as a proof-of-concept, financial and practical considerations often dictate that small-lot fermentations are carried out before the commitment to assessments on a larger or commercial scale. The approach to such scaled-down trials can be highly variable, and the accuracy with which they model the industrial situation is rarely defined. A further limitation of oenological research, particularly using red grapes, is that any winemaking is predominantly restricted to the vintage period when grapes are available. This project explored the possibility of using frozen whole grapes to take full advantage of research equipment outside of the busy vintage period.

Red must fermentations were compared at the laboratory 80 kg scale with the more industrially representative 500 kg pilot scale. Fermentation profiles and duration for both scales were found to be very similar for fermentations from fresh grapes. Whole bunches were either slow/conventionally frozen (-20°C), or quickly/blast-frozen (-25°C). Small-scale fermentations using fresh, frozen, and blast-frozen red grapes showed marked similarity in terms of fermentation kinetics, metabolite profile, and colour analysis. Wines made from frozen grapes compared well with the wine made from the fresh must. Colour and chemical analyses of the wines revealed few differences. A duo-trio sensory evaluation showed that wine from blast-frozen grapes was more similar to the fresh wines than wines from conventional frozen grapes.

The ability to extend vintage, reduce the volume, and therefore the demand and cost of grapes offered by this approach conveys significant advantages for research fermentations. Beyond this, recent developments suggest that cold and frozen storage of grapes may also have a role in commercial wine production, particularly for niche or small volume producers. [www.dovepress.com/use-of-fresh-versus-frozen-or-blast-frozen-grapes-for-small-scale-ferm-peer-reviewed-article-IJWR](http://www.dovepress.com/use-of-fresh-versus-frozen-or-blast-frozen-grapes-for-small-scale-ferm-peer-reviewed-article-IJWR)

### Earlier wine-grape ripening driven by climatic warming and drying and management practices

Trends associated with climate change are widely reported, yet attribution (the underlying causes) remains rare. Attribution research in biological systems is critical in assisting stakeholders to develop adaptation strategies. By using up to 64 years of

vineyard berry-sugar concentration records in southern Australia to detect the trends to earlier wine grape ripening, scientists have for the first time been able to attribute early ripening of wine grapes specifically to climate warming and declines in soil water content. Grape maturation dates have advanced about eight days per decade, with earlier maturing potentially impacting wine-grape quality and regional branding. The study reveals that evolving management practices have probably also contributed to earlier ripening, offering hope of adaptation strategies. Such potential adaptation options are identified, such as managing soil moisture content by increasing irrigation or mulching, vine rootstock choice and crop yield. [www.nature.com/nclimate/journal/v2/n4/full/nclimate1417.html](http://www.nature.com/nclimate/journal/v2/n4/full/nclimate1417.html)

### **Fine wine investors should diversify**

The rapid global expansion of the wine industry and investment community has increased the need to understand wine price risk along with ways to mitigate it. Although fine wine investments are dominated by French wines, a study shows that significant international diversification benefits into Italian, Australian and Portuguese fine wines exist for investors [South African wines are not mentioned]. The study also recommends the development of derivatives such as options on wine futures or wine swaps on standardised baskets of wine prices, so as to satisfy the needs of market participants and enhance the completeness of the market. <http://dx.doi.org/10.1016/j.irfa.2012.02.001>

## **Local Research News**

### **Effect of phenolic characteristics of red grapes on resulting wines**

Parameters other than sugar and acid concentrations are now being more used as a measurement of grape quality, and the phenolic composition of red grapes is considered a good indicator of resulting wine characteristics. The Iland, Glories and BSA (bovine serum albumin) are all methods for measuring anthocyanin, tannin and total phenolic concentrations. An extensive study investigated the suitability of these methods for correlating certain phenolic characteristics in South African red grapes with their corresponding wines. Pinotage, Merlot, Shiraz and Cabernet Sauvignon of the 2010 vintage were used.

Phenolic and colour analyses showed that Merlot tended to associate more with seed tannins than the other cultivars tested. Relatively good correlations were found between certain grape colour characteristics with the Glories method and especially the Iland method. Significant correlations were also found between grape and wine tannins as determined with the BSA method. These findings should assist researchers and wine producers in choosing the best method for correlating grapes with wines in future. [www.sawislibrary.co.za/dbtextimages/DuToitWJ4.pdf](http://www.sawislibrary.co.za/dbtextimages/DuToitWJ4.pdf)

### **Protection of nursery plants and young vines against virus transmission by mealybugs**

Vineyard nurseries in South Africa provide more than 8 million young vines annually. Mealybugs are a vector for the leafroll virus, which is the most significant virus disease found in vineyards all over the world. A project was undertaken to determine if better protection against virus transmission by mealybugs can be achieved by using systemic insecticides (insecticides that are absorbed by plants and transported to all parts of the plant, acting as a deterrent to insect feeding) in the nursery, followed up by treatment in the vineyard. Application of two insecticides (Actara and Confidor) in the nursery (right) did not result in signs of toxicity, and there was no difference in growth between the control vines and the treated vines. However, it was found that the insecticide treatments in the nursery did not add to the efficacy of the insecticides in controlling mealybugs in the vineyard.



In the vineyard the insecticides were applied soon after planting, and annually thereafter. The vines were exposed to mealybugs. Control of the mealybugs achieved by the treatment in the vineyard was significantly higher than where no treatment was provided. [www.sawislibrary.co.za/dbtextimages/CarstensR1.pdf](http://www.sawislibrary.co.za/dbtextimages/CarstensR1.pdf)

## **Other News**

### **Stamp a leaf with a colour-changing biosensor**

The Bill and Melinda Gates Foundation has awarded \$100 000 to a researcher at the University of California to develop an early warning system for crop diseases. He plans to print biosensors directly onto maize leaves to detect pathogens such as aflatoxin by means of a self-inking stamp that delivers the chemicals that detect the toxins directly into plant leaf veins, possibly via fine needles incorporated into the stamp to ensure the reagents get inside. The long-term goal is to detect multiple plant pathogens or their markers by chemical reactions that turn areas of leaves into different colours. Paper-based colorimetric tests already exist, but they can be used only once.

Initially the focus will be on maize, which is one of the most widely grown staple crops in Sub-Saharan Africa. The veins in its leaves run in parallel, and it is therefore especially suitable for simultaneous monitoring of different pathogens in adjacent veins. He estimates that a stamp that can be used 200 times might cost US\$10. The Gates Foundation's Grand Challenges Explorations fund provides grants of \$100 000 for innovative 18-month projects. About 10% of phase one grant recipients are sufficiently successful to receive further funding of \$1million. [www.scidev.net/en/agriculture-and-environment/food-security/news/leaf-stamp-could-detect-crop-diseases.html](http://www.scidev.net/en/agriculture-and-environment/food-security/news/leaf-stamp-could-detect-crop-diseases.html)

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