

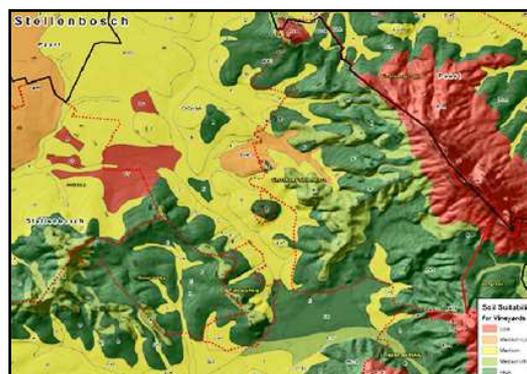


Local Research News

Terroir identification and utilisation in the South African wine regions

A project has produced high resolution, multi-layer, GIS based, detailed soil and climatic data maps for the South African wine regions. By including tasting data, a model has been developed which can be used to identify suitable sites for producing specific wine styles for Sauvignon blanc, Cabernet Sauvignon, Merlot and Chardonnay cultivars. A soil suitability map for the Stellenbosch area is shown at right.

www.sawislibrary.co.za/dbtextimages/SchlomsH.pdf



Low ethanol yielding yeast

The average ethanol content of South African and international wines has increased significantly over the past decade, as grapes are left to ripen for longer periods of time. The higher levels of fermentable sugars in the must are the cause of the higher ethanol levels. In many cases, such high ethanol levels have a negative impact on wine quality and consumer perceptions. Also, high initial sugar concentrations in must can lead to problem fermentations resulting in wines with undesirably high residual sugar concentrations. These are some of the most serious issues affecting the future competitiveness of the SA wine industry.

A project has been undertaken to identify biotechnological targets for yeast strain improvement and to apply these insights to develop yeast strains that have high fermentation efficiency and significantly lower ethanol yields. A fructan is a polymer of fructose molecules, and collectively the different fructans are known as levans. New genes required for levan biosynthesis have been cloned into *S. cerevisiae* expression systems. The new strains were able to synthesise levans at high levels under respiratory conditions. Several constructs combining specific target genes were combined with fermentation phase-specific promoters. These constructs were successfully transformed into industrial wine yeast strains and these strains have been undergoing full assessment of ethanol yields and aroma production. Excellent results have been obtained, with the wine yeast strains producing lower levels of ethanol when trehalose metabolism is adjusted slightly. Trehalose is a nonreducing disaccharide with interesting chemical and biological properties. www.sawislibrary.co.za/dbtextimages/BauerFF7.pdf

International Research News

Genetically edited fruit

Recent advances that allow the precise editing of genomes now raise the possibility that fruit and other crops might be genetically improved without the need to introduce foreign genes. The new biotechnologies of genetically edited fruits might be met with greater acceptance by society than have been genetically modified organisms (GMOs). The simple avoidance of introducing foreign genes makes genetically edited crops more 'natural' than transgenic crops obtained by inserting foreign genes. As yet, however, editing tools have not been applied to the genetic modification of fruit crops, but the availability of genome sequences for many fruit crops has redefined the boundaries of genetic engineering. A paper focuses on recently developed genome-editing tools for fruit crop improvement and their importance from the consumer perspective. Challenges and opportunities for the deployment of new genome-editing tools for fruit plants are also discussed. <http://dx.doi.org/10.1016/j.tibtech.2014.07.003>

Persistence of elemental sulphur spray residue

Various commercial formulations of elemental sulphur are used to control powdery mildew, the most common fungal disease of grapes worldwide. The advantages of sulphur compared to alternatives include its low cost, efficacy, and low risk of resistance development. However, sulphur residues remaining at harvest have long been tied to increased hydrogen sulphide (H_2S) and sulphurous off-aroma formation during fermentation.

As a consequence, sulphur is often used sparingly late in the season, but defining appropriate pre-harvest intervals for sulphur sprays has been challenging due to limited data on sulphur persistence in vineyards and during pre-fermentation operations. Utilizing a new quantification method, sulphur residues were monitored in the vineyard over 3 years. Treatments varied in commercial formulation, application rate, and timing of the last application before harvest. The treatments all affected sulphur concentrations on the fruit at harvest. Residue levels generally were lower for a wettable powder than for a micronized formulation, and increased proportionally to the application rate when timing and formulation were constant. In all years, ceasing application more than 34 days prior to harvest resulted in sulphur residues below the 10 $\mu g/g$ concentration associated with increased H_2S production in several previous studies. It was found that sulphur residues of more than 1 $\mu g/g$ correlated with increased H_2S production and such residues were observed on all fruit sprayed within 56 days of harvest. Furthermore,

fermentation on treated skins (i.e. when utilizing red-winemaking conditions) increased H₂S formation nearly 3 times relative to fermentations without skin contact. Clarification decreased sulphur in must by >95% prior to fermentation in all treatments.

These results indicate that sulphur residues are likely to be of low concern in white winemaking whereas in red fermentations they can lead to increased H₂S production when some sulphur sprays are applied within 8 weeks of harvest. An accurate determination of vineyard residues is best determined by measuring samples from a given site using the new quantification method. This information could also be useful in determining when sulphur needs to be reapplied, or to evaluate the spray pattern of a particular sprayer. <http://dx.doi.org/10.5344/ajev.2014.14027>

Sparkling wine production

A review paper finds that throughout the world there is relatively less intensive viticultural management applied to grapes destined for sparkling wines than to grapes destined for table wines. Given that it is accepted that a low pH, higher titratable acidity and lower soluble sugars than for table wine are considered desirable for sparkling wine production, as well as a balanced and specific phenolic profile, the literature from viticultural studies of fruit production for table wines which influence these desired fruit quality parameters is reported. Factors such as variety, clone, planting density, pruning method, local climate and soils and current and future climate warming are discussed in the context of achieving a desired harvest quality. The review highlights that fruit quality targets are remarkably uniform across international growing regions but that distinct combinations of variety, clone and management are currently employed to arrive at those targets. A current and increasing trend is the diversification of growing regions to cooler regions that enable the production of high acid fruit, and increased exploration of alternative varieties and clones better suited to a warmer climate. <http://dx.doi.org/10.5344/ajev.2014.13099>

Contamination of French wines and spirits by phthalates

Phthalate compounds are present in many plastics and thus are widespread in the environment. The toxicity of these compounds, particularly their carcinogenic potential, is still a controversial issue. Nevertheless, there is general agreement some phthalates have major potential as endocrine (hormone) disruptors.

100 samples of French wines and 30 samples of French grape spirits were analysed to determine the concentrations of various phthalates. Dibutyl phthalate (DBP), diethylhexyl phthalate (DEHP) and butyl benzyl phthalate (BBP) were the most frequently detected compounds in the wines analysed. While only 15% of the samples examined contained quantifiable concentrations of DEHP and BBP, 59% of the wines contained significant quantities of DBP. In the spirits analysed, DBP and DEHP were the substances measured at the highest concentrations, as well as the most frequently detected (90% of samples). BBP was present in 40% of the samples. Di-isobutyl phthalate (DiBP), which is not permitted to be in contact with food, was found in 25% of the spirits tested.

According to the EU specific migration limits (SML) for materials in contact with food, slightly more than 11% of the wines analysed were non-compliant, as they exceeded the SML for DBP, and just under 4% were close to the SML for DEHP. 19% of the spirit samples analysed were considered non-compliant for DBP and nearly 7% were close to the SML for DEHP. The aged grape spirits analysed were often excessively contaminated with DiBP, which is not permitted to be used in contact with food. A study of various materials frequently present in wineries found that epoxy resin coatings used on vats was the major source of phthalate contamination. <http://dx.doi.org/10.1080/19440049.2014.941947>

Wine ages faster at home

A paper delivered earlier this month at the 'Advances in Wine Research' meeting of the American Chemical Society reports dramatic differences in the aging of wine depending on where bottles are stored. 400 bottles from 20 different lots of Sangiovese wine were stored for 24 months either in a professional wine cellar with strictly controlled temperature (15-16.7°C) or in conditions mimicking a dark room in a house (20-26.7°C). The researchers found that a relatively small difference in the temperature sped up several chemical reactions associated with wine aging and promoted new reactions that are not observed at lower temperatures. After six months under domestic conditions, the wine was approximately as 'old' as a bottle stored for two years under cellar conditions, i.e. the house-stored wine was aging four times faster. The wines stored in the house had fewer healthful antioxidants and less red pigmentation than the cellar versions, making them less flavourful. <http://phys.org/news/2014-08-wine-symposium-explores-mighty-grape.html>

Other news

Wine fraudster gets 10 years in jail

Wine fraudster Rudy Kurniawan, 37, has been sentenced to 10 years in jail and ordered to pay \$20m for his role in selling millions of dollars worth of fake wine in the period 2004 to 2012. He has also been ordered to pay \$28m in restitution to his victims. An avid collector himself, Kurniawan was once considered one of the best wine aficionados in the world. He is the first person ever to go to jail for selling fake wine in the US. He was found guilty of mixing old wine with newer vintages in his kitchen and using old bottles and faked labels to fool investors. www.bbc.com/news/business-28697722 For information on another wine fraud (The President Jefferson bottles) see www.npr.org/blogs/thesalt/2014/06/03/318241738/

Winetech Scan is available on the Winetech website www.winetech.co.za

To subscribe please email Gerard Martin: marting@winetech.co.za