



Winetech Scan

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

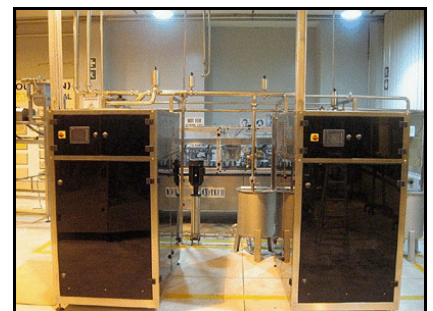
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Research outputs

- Researchers in China have integrated a novel stilbene synthase gene (STS), cloned from Chinese wild *Vitis pseudoreticulata*, into a normal vine. The wild Chinese vine has an unusual variant of the STS gene which triggers resveratrol production. Expression of the STS gene was detected by high performance liquid chromatography, which showed that the resveratrol concentration in the transgenic plants was 5.5 times higher than that in control plants. The team plans to make wine from the GM vine, though their main goal is to make grapevines more resistant to fungus, which is kept in check by resveratrol. <http://dx.doi.org/10.1007/s11240-007-9324-2>
- A study on the effect of paclobutrazol and gibberellic acid on the incidence of primary bud necrosis (PBN) in Shiraz vines suggests a strong relationship between shoot vigour, gibberellins and PBN. PBN is attributed to impaired physiological or developmental processes and may be associated with a growth surge of the bud. Levels greater than 20% in a vineyard are considered to have a significant impact on fruitfulness and thus the final yield. Despite the widespread occurrence of PBN, its principal cause is uncertain. Gibberellins are naturally produced plant-growth hormones that affect cell division and cell elongation in stems and leaves, while paclobutrazol is a plant growth retardant and triazole fungicide. It is a known opponent of gibberellin. In the study, the application of gibberellic acid significantly increased the incidence of PBN (from 42% of buds to 60%) when applied before flowering, with lesser but still significant effects if applied at flowering or after flowering. Shoot length and cane diameter were significantly greater than controls following application of gibberellic acid. Paclobutrazol significantly decreased PBN when applied in drop form before flowering (from 42% to 27%) and to a lesser extent if applied by brush after flowering. www.ajevonline.org/cgi/content/abstract/59/1/83
- Knowledge of the spatial variability of grapevine canopy density is useful in managing the variability of grape composition and yield. Rapid assessment of the characteristics of vineyards by remote (aerial) sensing offers distinct advantages over ground-based measurements. However a recent study warns about the mis-interpretation of such data in arriving at a measure of canopy density which can be used to assess prospective wine quality for a vineyard. The study concluded that low-spatial-resolution NDVI (Normalised Difference Vegetation Index) imagery of minimally pruned, unconfined vineyards measures spatial variability in planimetric canopy area, rather than as generally assumed, grapevine canopy density as measured by LAI (Leaf Area Index). <http://dx.doi.org/10.1111/j.1755-0238.2008.00002.x>
- A measure of the ratio of the oxygen isotopes O^{18} and O^{16} isotopes is denoted as $\delta^{18}O$ and is well established for origin assignment of wines, and as proof for the dilution of wines with water, particularly in the European Union. Since $\delta^{18}O$ values vary widely between vintages, the data bank of these values has to be updated annually, a laborious and demanding task. Up to now, models or empirical relations which allow for an independent estimation on the isotope signature of wine water, have not existed. Now a model which uses the meteorological parameters relative humidity and mean temperature to compute an estimate for the $\delta^{18}O$ values of wine water has been developed. The performance of the model was tested on 775 German wines from six successive vintages. At most the differences between the calculated $\delta^{18}O$ values and the average $\delta^{18}O$ values for wines of a certain region and vintage were $\leq 0.4\%$. www.ajevonline.org/cgi/content/abstract/59/2/194
- A statistical review of the wine quality scores from 571 experienced Australian wine tasters collected over a 15-year period has found that the ability of experienced wine tasters to consistently rate wines for overall quality varied greatly between individuals, but was generally better for red wines than for whites. Their ability to consistently score one wine type was a poor predictor of their consistency in scoring another type. The study demonstrates the need to conduct replicate tastings when assessing wines for quality as adequate taster repeatability cannot be guaranteed. Furthermore, using the combined score of a small team of tasters generally results in more consistent quality assessments. <http://dx.doi.org/10.1111/j.1755-0238.2008.00001.x>

Local research results

- A few winemakers in the Western Cape are experimenting with ultra-violet (UV) irradiation of wine so as to remove micro-organisms, thus reducing or eliminating the use of sulphur. The wine is processed at 3 000 to 4 000 litres per hour in 'reactors' (see picture) designed by Surepure www.surepure.net The process is non-thermal and exposes the wine to UV light in the UVC



range (254-260 nm), which has a germicidal effect on a variety of micro-organisms, including pathogens, by damaging the DNA of exposed cells. While there are as yet no independent studies of the effectiveness of this process on wine, research carried out locally found the use of the UV Surepure process successfully and significantly reduced the microbial load in a number of different fruit juices and nectars. The study found clear juices such as apple needed a lower UV dose to achieve effective reduction (as was to be expected), whereas juices with cells and suspended fibre required higher UV dosage levels. This was because the suspended matter acted as a protective barrier for the microorganisms against the UV radiation. It was concluded that UV technology could well be an alternative to thermal treatments or application of antimicrobial chemicals. <http://dx.doi.org/10.1016/j.ifset.2007.09.002>

- A mycorrhiza is a symbiotic association between a fungus and the roots of a plant. The fungus is provided with access to carbohydrates, such as glucose and sucrose, from the plant, while the plant gains the use of the very large surface area of the fungus to absorb water and mineral nutrients from the soil. Grapevine nursery mycorrhizas should be an integral part of proactive disease and pest control measures. An investigation of 15 such nurseries in the Western Cape found 12 different mycorrhizal fungi. All nurseries had four species in common and Nuweland in Montagu had the most different species (7 species). The number of spores at the earlier stages of nursery growth ranged between 150 and 1000 spores/100g dry soil, and just prior to the removal of the vines, an increase in spore number was noted, which ranged between 200 and 1600 spores/100g dry soil. The spore count included both dead and live spores, and was relatively low in comparison to vineyard mycorrhizal spore concentrations, which range between 1000 and 3779 spores/100g dry soil. Thus for most of the nurseries studied, artificial inoculation by mycorrhizal fungi could be considered. There is also great potential for such fungi be managed in a more sustainable manner, so as to encourage them as an integral part of nursery production systems, which could help ensure production of healthy, strong growing, pathogen-free vines upon transplantation. www.sawislibrary.co.za/dbtextimages/FinalReport136.pdf
- Glucose to fructose imbalances during wine fermentation with associated fermentation problems are prevalent in the South African wine industry. During fermentation the glucophilic yeast *S. cerevisiae* preferentially uses glucose over fructose and if the glucose / fructose ratio (GFR) drops to below 0.1, fermentation can stop. It can be surmised that if a fermentation starts with a GFR below one, then that fermentation is at a greater risk for getting stuck towards the end of fermentation. To investigate this further, 196 samples, including 52 Chardonnay samples, were collected from various Western Cape wineries for the 2006 harvest. The GFR values of the must samples were mostly in the range 0.8 to 1.2, with approximately half the samples having a GFR below one. Preliminary findings were that low initial GFR values were not always linked to high ripeness levels; as regards the red grape must samples, no particular red cultivar stood out as potentially problematic; and in contrast, the white cultivar data indicated that Chardonnay may be a potential problem cultivar regarding stuck fermentations as all Chardonnay GFR was, on average, slightly below 1. Robertson was the area most affected by grape must GFR values below one. www.sawislibrary.co.za/dbtextimages/FinalReport137.pdf

Technology developments

- To remove compounds that cause cork taint and cellar taint, mainly 2,4,6-Trichloroanisole (TCA), and also 2,4,6-Tribromoanisole (TBA) and 2,3,4,6-Tetrachloroanisole (TeCA), G3, a company owned by members of the Gallo family, has developed filter modules and sheets that can be used to remove TCA in one pass. The main ingredient is inorganic sodium aluminosilicate which binds TCA, TCB and TeCA. The filter sheets cost \$35 each, compared to \$1.50 for similar-sized 40 x 40 centimetre standard filter sheets. The filters are also claimed to introduce lower levels of trace contaminants than some other filtering materials. www.filtrox.ch/en/news/press-releases/
- Vinpro Nelson in New Zealand provides a mobile bottling service to winemakers. Set up in the back of a semi-trailer, the bottling plant is fully self-contained from wine tank to sealed carton, apart from the provision of water and power by the client on-site. The bottling plant is able to apply either screw cap or cork closures, complete with heat shrink and spin on capsules. Bottle labels are applied by a 10-head rotary labeller from rolled stock, and the mobile bottling unit carries changeable parts to accommodate differing bottle sizes and shapes. Throughput is up to three thousand bottles an hour, or 1500 to 1600 cases a day. The unit operates a GAI 16 head monoblock filler unit with associated bottle rinser, sparger and leveller, and takes half an hour to position and set up. The sterilisation process involves steaming via an on-board steam generator and takes approximately an hour prior to the start of bottling each day. The plant is washed out with hot water (heated by an on-board burner unit) and cold water at the end of each day. The company concentrates on the smaller wineries. www.winetech.co.nz/vinpro_nelson.htm



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