



Winetech Scan

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

August 2009

Local research results

- A study to ascertain further the role that oxygen (O₂) plays in South African wines, both white and red, has been undertaken. A novel Liquid Chromatography Tandem Mass Spectrometry (LCMSMS) method was developed to analyse for glutathione concentrations in white Sauvignon Blanc must and wine. It was found that low concentrations (between 0.5 and 2 mg of O₂/L) of oxygen added to the must can drastically influence the glutathione (a potent anti-oxidant) and phenolic composition of the must and wine, with glutathione and phenolic compounds being retained, sometimes leading to the enhancement of tropical fruit flavours in the Sauvignon Blanc. If the conditions become too reductive (< .05 mg of O₂/L in the must), this can lead to the formation of sulphur aromas in the resulting wines. Anthocyanin to tannin ratios and the effect of oxygen addition on the composition of red wine were also investigated. This was achieved by adding different ratios of white grape seeds with skins during red wine fermentations. Higher tannin concentrations originating from the seeds sometimes led to higher colour densities and this was also enhanced by the addition of oxygen before malolactic fermentation. Analyses showed some differences between the oxygen and control treatments, with the concentration of some compound being influenced more than others by the addition of oxygen addition. It was also established that Fourier Transform Infrared Spectroscopy could distinguish between control and oxygen treated Pinotage wines. An electronic tongue could also do this and was used in combination with tasting data. The electronic tongue detected an increase in oxidized aromas, which was not always accompanied by an increase in brown colour. www.sawislibrary.co.za/dbtextimages/DuToitWJ2.pdf
- The industry feels a strong need for *S. cerevisiae* strains that are better adapted to the conditions found in specific wine-producing regions, while also better expressing and typifying terroir and regional flavour and aroma characteristics. *S. cerevisiae* VIN13 strain, which is currently the most preferred commercially available wine yeast in South Africa, could certainly be improved to better respond to some specific needs e.g. better fermentation capacity in musts with high sugar-low nitrogen content to prevent sluggish or stuck fermentations, especially for red wine production, reduced fermentation speed to avoid the occurrence of extremely fast alcoholic fermentations, and different aroma and flavour profiles. A study was conducted to improve VIN13 by hybridisation, which allows the incorporation of favourable phenotypical characteristics into new wine yeast, while circumventing the issue of genetic engineering. Five interspecies hybrid yeasts were constructed by mating VIN13 and *S. paradoxus* strain RO88. VIN13 is known for its fast onset and completion of fermentation and good potential for aroma production. *S. paradoxus* strain RO88 has the ability to degrade malic acid and it also displays strong pectinolytic activity. Two of the 5 hybrids displayed unique characteristics. Both were killer positive and had pectinolytic activity. They were also capable of biological deacidification, to a minimal degree. Clairette Blanche and Cinsaut wine was made with the hybrids and yielded positive results in terms of fermentation rate and principal chemical constituents of the wine. There were significant alterations in the ester, higher alcohol and volatile fatty acid profiles for the Cinsaut wine produced by fermenting with the hybrids. Very positive feedback from a tasting panel also indicated the potential of these two hybrids. One of the Vin13/*S.paradoxus* hybrids was selected for commercial scale testing (PVR PR7). This yeast ferments slower than normal Anchor yeast but is sensitive for low temperatures. The optimum temperature for white wines using (PVR PR7) seems to be 15 - 16°C. The best results were obtained on Chenin Blanc. PVR PR7 performed well on red wines and seemed to be alcohol tolerant. It also appears to produce less ethanol. www.sawislibrary.co.za/dbtextimages/VanRensburgP4.pdf

Research news

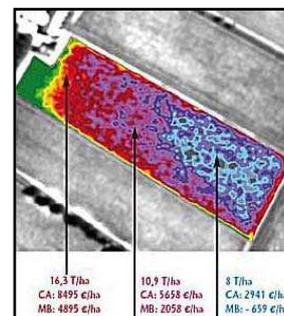
- Microbial activity during fermentation can be negatively affected by factors such as high initial sugar content, high acidity (low pH) and the inhibiting effects of ethanol and SO₂. These obstacles can lead to sluggish fermentations and to the production of secondary metabolites that could reduce the quality and safety of the wine. To overcome these problems, Italian researchers have immobilised yeast (*S.cerevisiae*) and separately, malolactic bacteria (*O. oeni*) in an alginate matrix in silica-coated microspheres 0.45mm in diameter. They demonstrated that the immobilization treatment does not interfere with cellular activity, and that the fermenting substances are transported through the microspheres. For immobilised yeast, the maximum fermentation rate was reduced by about 30% when compared to free yeast cells, while for immobilized *O. oeni* cells there was no reduction. If the cell immobilization within the solid substrate is efficient, cells will not be released into the fermentation medium. For *O. oeni* there was a low release of cells into the wine, less than 105 cell/ml. This guarantees strict control over the microbial development in the wine. The cells can be removed immediately at the end of the process, hence reducing the risk of fermentation deviations and improving the overall wine quality, as well facilitating an easier

biomass removal, thus lowering process costs. The study reused immobilized *O. oeni* cells in three serial fermentations for a total of 48 consecutive fermentation days, hence fermenting 3 times the amount of wine as with the free culture. This resulted in a significant cost saving in the amount of bacterial starter required. www.infowine.com/default.asp?scheda=8431

- The interspecific hybrid Traminette is a result of the cross Joannes Seyve 23-416 x Gewürztraminer, released by Cornell University in 1996. Traminette is cold hardy in much of the midwestern and eastern United States where Gewürztraminer, like many other *Vitis vinifera* cultivars, cannot be grown because of the cold winters. A comparison of monoterpene constituents in Traminette, Gewürztraminer, and Riesling winegrapes was undertaken to determine the similarities in aromatic profile and determine a basis for further research with Traminette as a quality white hybrid winegrape. Sensory results of Traminette wine indicate a very fruity, floral, and spicy aromatic wine. Monoterpenes are the important cultivar-characterizing aroma compounds produced in varieties such as Gewürztraminer and Muscat. It was likely that Traminette would have some of the same aromatic monoterpenes that are important in Gewürztraminer, and indeed they do have similar monoterpene constituents, with the very potent floral odorant, cis-rose oxide comprising 13% to 35% of the total monoterpenes in Gewürztraminer and Traminette respectively. Traminette was found to have nearly twice the concentration of monoterpenes as Gewürztraminer and Riesling that were grown in the same vineyard. While Riesling volatiles consisted of many of the same monoterpenes as Gewürztraminer and Traminette, however, the Riesling fruit aroma profile was dominated by norisoprenoids. The results of this work provide background information for further oenological studies investigating the extent to which these aroma compounds can be extracted for optimal wine quality and style. Winemaking techniques could then be used to modify this reservoir of aroma compounds in Traminette to make different wine styles, ranging from exceptionally aromatic to more dilute or refined. <http://ajevonline.org/cgi/content/abstract/59/4/440>
- As has been reported in past issues of Winetech Scan, different methods of determining tannin levels give inconsistent results. A recent study has concluded that two different published methods for determining condensed tannin levels in grapes using protein (BSA) and methylcellulose precipitation have led to inconsistent results because of the differences in the methodologies. The published protocols were modified to use the same extraction solvent, the precipitant was re-suspended, and the tannin concentration quantified by reaction with ferric chloride. Pellets of Shiraz and Cabernet Sauvignon grape skin tannin precipitated with both protein and methylcellulose were readily re-suspended in an aqueous buffer containing triethanolamine (5% v/v) and sodium dodecyl sulphate (10% w/v) adjusted to pH 9.4. Consistent with previous research, 50% ethanol in water (v/v) was a less effective extraction solvent than 70% acetone. In all instances, the calculated tannin concentration in grape skin was lower using methylcellulose as a precipitant and the proportional difference between methylcellulose and protein as a precipitant was not consistent across samples, extraction solvents, or methods of quantification. The results suggest that there are significant differences in the nature of the tannins precipitated by methylcellulose and protein, although the nature of these differences has yet to be fully explored. <http://ajevonline.org/cgi/content/abstract/60/2/246>

Technological Developments

- Researchers at Cornell University are developing a microsensors that can be embedded directly into a grapevine to measure water stress in real-time. The sensor is being tested using a recently developed synthetic tree that mimics the flow of water inside plants using a slab of hydrogel with nanometre-scale pores. The team hopes to design a sensor that will transmit field readings wirelessly to a central server, whereupon the data will then be summarized online for the grower. The concept has already received attention from E. & J. Gallo Winery in California as well as researchers and industry leaders from Australia, Spain and Italy. www.news.cornell.edu/stories/July09/plantWaterStress.html
- Oenoview is an innovative service available to the French winegrower to better optimise the new vineyard selection process and to reduce variations within established fields and increase overall quality. Based on aerial and satellite imagery analysis that gives a spatial view and helps in characterizing in-field variations, Oenoview precisely maps vineyard vigour and provides indications of bunch and grape weight, soil water-retention and grape composition at different points within a field. The detailed maps provided for each field allow growers to adjust pruning and fertilizer inputs as well as organize maturity checking and harvesting to obtain the required grape quality. They also help to make irrigation more efficient, thereby reducing annual water costs. For wine making organisations obtaining grapes from a large number of fields, the precise characterization of the estimated vine vigour and in-field variability for each field over large regions enables winemakers to better manage grape harvesting, that is to harvest the best grapes at the same time and put them in the same vat to improve wine quality. www.infoterra-global.com/oenoview.php



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