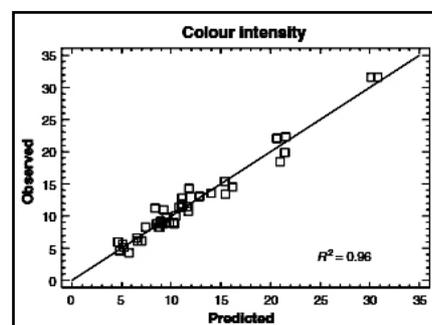




## Research News

- The possibility of using Spanish oak (*Q. pyrenaica*) for aging wine has been studied. The chemical composition of its heartwood (ellagitannins, low-molecular-weight phenolics, and volatile compounds) is similar to that of other species that are of recognized oenological quality for barrel-making, showing only quantitative differences to French (*Q. petraea*) and American (*Q. alba*) oaks. The effect of the three species on a red, single-variety wine (Tinta del País) has been carried out in Spain. Staves of *Q. petraea* from the central region of France, *Q. alba* from Missouri (United States), and from *Q. pyrenaica* from Salamanca (Spain) were seasoned in open air for three years. After seasoning, the wood was cut into chips or fine staves and toasted at a medium intensity level. Volatile compounds were then extracted from samples of the woods and analysed by gas chromatography-mass spectrometry (GC-MS). It was noted that the chips and staves had responded differently to heating, implying that different heating treatments might be necessary to produce the same effect in wine. The wines were aged at the same winery in stainless-steel tanks, with Spanish staves, with Spanish chips, with French staves, with French chips, with American staves, with American chips and without wood (control). Analyses of volatiles was performed at intervals over 180 days. The wine was then bottled and analysed once more after a total of 300 days aging. Wood piece size appeared to influence wine volatile composition more than the oak species used. In general, the differences found among wines were those to be expected, taking into account the original volatile composition of the different woods. This confirmed the importance of analyzing the volatile composition of the oak before contact with the wine so as to anticipate their effect on chemical and sensory characteristics. In general the wines all showed a similar volatile composition, indicating the suitability of Spanish oak for aging. In the wine treated with Spanish oak staves, there were higher concentrations of eugenol than in the other wines. The wine aged on French oak had significantly lower concentrations of both isomers of Whisky lactone (*cis*- and *trans*- $\beta$ -Methyl- $\gamma$ -octalactone). [www.ajevonline.org.ez.sun.ac.za/cgi/content/abstract/61/2/157](http://www.ajevonline.org.ez.sun.ac.za/cgi/content/abstract/61/2/157)
- A study of the main red varieties cultivated in Uruguay (Tannat, Cabernet Sauvignon and Merlot) has found an excellent correlation between the phenolic potential of the grapes and the colour, total polyphenol contents and anthocyanin contents of the wines. For four vintages (2001-2004), the potential in total anthocyanins, the potential in extractable anthocyanins and the phenolic richness of the grapes were measured spectrophotometrically. The phenolic richness and anthocyanin contents of the grapes of the three varieties were significantly different. Tannat had the highest total phenolic richness, total anthocyanin potential and extractable anthocyanin potential. The contents of anthocyanins were significantly higher in the Cabernet Sauvignon grapes than that in Merlot grapes. The colour of the wines was evaluated by measuring colour intensity, brightness ( $L^*$ ) and a number of other standard parameters. Overall there was a good correspondence between the phenolic potential of the grapes and the polyphenolic composition and some chromatic attributes of the wines. The high statistical significance of the regression models shows that some characteristics of the young red wines may be usefully forecast by measuring the phenolic potential of the grapes. <http://dx.doi.org/10.1111/j.1365-2621.2010.02343.x>
- The effect of UV-visible light on some volatile compounds in two Southern Italian wines, Fiano di Avellino (white) and Aglianico del Vulture (red), is to induce a rapid photodegradation of the volatile compounds in both wines. Most of the wine in question is sold in supermarkets where the wine bottles are exposed to artificial fluorescent light for long periods. This implies that the nature of the glass bottles can influence the organoleptic properties of wine. The wines were analysed before and after irradiation with a 15 watt low pressure mercury arc, using high speed solid phase microextraction gas chromatography-mass spectrometry (HS-SPME-GC-MS). The analysis prior to irradiation showed the presence of the volatiles ethyl acetate, 2-methyl-1-propanol, 2-methyl-1-butanol, 2-methylbutyl acetate, ethyl hexanoate, diethyl butanedioate, ethyl octanoate and ethyl decanoate. UV irradiation of the wines in a Pyrex vial led to an extensive degradation of all the compounds. For example, 24 hours of irradiation of the red wine resulted in ethyl acetate decreasing from 208  $\text{mg}\cdot\text{L}^{-1}$  to 58  $\text{mg}\cdot\text{L}^{-1}$ , diethyl butanedioate from 16.7 to 4  $\text{mg}\cdot\text{L}^{-1}$ , 2-methylbutyl acetate from 19 to 3  $\text{mg}\cdot\text{L}^{-1}$ , 2-methyl-1-propanol disappeared altogether and 2-methyl-1-butanol decreased from 796 to 92.5  $\text{mg}\cdot\text{L}^{-1}$ . The irradiation of both the wines in the original bottles (white in clear bottles and red in yellow-brown bottles) for 7 days led to an extensive degradation of all the volatile compounds already mentioned. 2-Methyl-1-propanol disappeared completely, while 90% of 2-methyl-1-butanol disappeared. The amount of the esters decreased in the range 65%–91%. This shows that UV irradiation can act



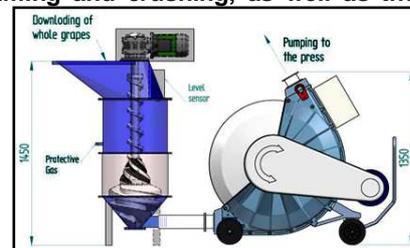
on bottled wine, and that the use of coloured bottles does not protect the red wine against photodegradation. <http://dx.doi.org/10.1111/j.1365-2621.2008.01723.x>

## Local research news

- As part of a overall project which is investigating the development of grapevines with enhanced capabilities for growing under adverse conditions, central metabolic pathways in grapevine that either produce metabolites or compounds involved in environmental stress-management in the plants or are linked to quality parameters of grapes were studied. Two of the most important quality characteristics are excellent colour development and optimal sugar levels. Colour development was studied through the unravelling of the carotenoid (tetra-terpenoid organic pigments) biosynthetic pathway of grapes and the analysis of sugar transport in grapevine. Carotenoid encoding genes and promoters were selected and their encoded products subjected to functional analyses with regard to possible roles in stress-management and so as to ultimately evaluate their usefulness in possible future transgenic approaches aimed at enhancing these factors. The other aspect targeted was sugar transport. Sugar metabolism and transport are considered critical processes in the growth and development of plants and their derived fruits. The mechanism of sugar transport and translocation into the berries was examined by constructing heterologous expression-cassettes containing a yeast-derived invertase targeted to the symplast, vacuole or apoplast. Their functionality was verified through the transformation and analysis of transgenic tobacco plants. It was decided, however, not to continue with this approach as a means of manipulating sugar metabolism in grapevines. <http://www.sawislibrary.co.za/dbtextimages/VivierMA1.pdf>

## Innovation

- The Wine and Spirit Board recently approved the bottling of certified natural wine in polyethylene terephthalate (PET) bottles, and such plastic bottles are starting to appear on South African supermarket shelves. PET bottles are in widespread use as containers for bottled water, soda beverages, sports drinks, and condiments such as vinegar and salad dressing, and for the packaging of cosmetic products, such as shampoos. Advantages of bottling wine in PET include reduced weight (a 750ml glass bottle weighs 400gm; a PET bottle 54 gm) thus reducing the carbon footprint through savings in the transport chain, robustness (they are unbreakable), overall size so that more fit into the same storage space, and they are recyclable. The potential disadvantages are; the possible adverse effect on wine quality as PET allows more oxygen ingress than glass, leading to a shorter shelf-life; plastics have an increasingly negative image in the eyes of consumers; and there are possible negative health implications. The last point is a particularly controversial one ([www.wineanorak.com/wine\\_in\\_pet\\_bottles.htm](http://www.wineanorak.com/wine_in_pet_bottles.htm)). A recent review suggests that PET might yield endocrine disruptors under conditions of common use and recommended further research into the matter <http://dx.doi.org/10.1289/ehp.0901253>. An ongoing study at Bordeaux's Institute of Vine and Wine Sciences (ISVV) has found that PET bottles and bag-in-box packaging (which utilises polyethylene - PE), may not be as good for storing wine as originally thought. White wine was significantly altered after just six months in bag-in-box and in PET mono- and multi-layer bottles. After 12 months the white wine was fully oxidised, while a glass bottle preserved the white wine's original characteristics with stability. For red wine in plastic, the study has found changes after 12 months, but as yet significant conclusions could not be drawn. The results of the study's first year may be viewed at or downloaded from <http://www.slideshare.net/scmgreen/issv-wine-study>
- A recent development is reductive wine-making in an inert environment, particularly in the production of quality white wines. Blanketing the juice with inert gas, such as nitrogen, carbon dioxide or argon, during pressing limits oxidative degradation which is a factor of significant commercial importance for certain cultivars. Reducing the addition of antioxidants (sulphur dioxide in particular), and fully exploiting the natural antioxidants found in grapes, such as glutathione, allows for the making of the most fragrant and terroir driven white wines. During such oxygen free production, the most critical stages are those of destemming and crushing, as well as the transfer of the juice into the press in an inert environment. Ideally, whole and not crushed grapes should be loaded into the inert press in order to completely minimize contact with oxygen. Up to now this process (of using whole grapes) has been complex and slow. Now an inert gas grape feeder, combined with a peristaltic pump, ideal for a soft pumping, is available for this application. Tests carried out on the 2009 vintage of the white grape varieties Traminer aromatic, Muller Thurgau and Sauvignon blanc, showed that the Rotho-Noxys system dramatically improves the efficiency of operating an inert press and allows a better control of the critical process of juice extraction. The new system's effect on the must produced was shown by increased concentrations of cinnamic acids, total polyphenols, the antioxidant glutathione, and free and total sulphur when compared with the must obtained from a control whole-grape inert processing system. <http://www.infowine.com/default.asp?scheda=9306>



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