



# Winetech Scan

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

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## Research outputs

- As tannins contribute to many of the quality indicators of red wine including wine colour and mouthfeel, researchers are seeking analytical methods that will enable rapid analysis of tannin levels grape and wine samples. The most widely used methods are high performance liquid chromatography (HPLC) and the Harbertson-Adams spectrophotometric method involving precipitation. Recently a more simple method using methyl cellulose to precipitate tannins and a spectrophotometer at 280nm has been developed (the MCP method) (Australian J of Grape and Wine Research **12**, 39-49, 2006). The developers found that there was good correlation between the HPLC and MPC method for 121 Australian red wines ( $r=0.74$ ) and 54 grape extracts ( $r=0.79$ ). However, a subsequent comparative study of all three methods which measured the tannin in the skin of 38 different grape cultivars found that, while there were certainly similarities between all three methods and perhaps more so between the two precipitation methods, these methods did not gave comparable results across the whole range of grape cultivars studied. The study concluded that 'we are no closer to deciding which analytical method should be used to measure tannin in grapes' (The Australian & New Zealand Grapegrower & Winemaker **523**, 54-56, 2007).
  - Researchers in the United States are intensifying their scrutiny of fluoride, which is added to most public water systems in that country. Some recent studies suggest that overconsumption of fluoride can raise the risks of disorders affecting teeth, bones, the brain and the thyroid gland. The National Research Council recommended that the US government lower its current limit for fluoride in drinking water because of health risks to both children and adults. Fluoride appears to alter the crystalline structure of bone and the strength of the bone apparently declines. Studies suggest that high fluoride exposure increases the risk of bone fracture, especially in the elderly and diabetics. The Iowa Fluoride Study, the longest-running investigation of the effects of fluoride and fluoridation in the US has found that the concentration of fluoride in white wine is 2.02 ppm, the third highest of the many foods and drinks they have tested, and three times the average level (0.71 ppm) in tap water in the US. The high level of fluoride in white wines was attributed to the use of pesticides. [www.sciam.com/article.cfm?id=second-thoughts-on-fluoride](http://www.sciam.com/article.cfm?id=second-thoughts-on-fluoride)
- Fluoride levels in drinks and foods**

  - 3.73 ppm Brewed black tea
  - 2.34 ppm Raisins
  - 2.02 ppm White wine
  - 1.09 ppm Apple flavoured juice drink
  - 0.91 ppm Brewed coffee
  - 0.71 ppm Tap water (US average)
  - 0.60 ppm Diet Coke (US average)
  - 0.48 ppm Hot dog
  - 0.46 ppm Grapefruit juice
  - 0.45 ppm Beer
  - 0.35 ppm Cheddar cheese
  - 0.32 ppm Creamed corn (baby food)
  - 0.23 ppm Chocolate ice cream
  - 0.13 ppm Brewed chamomile tea
  - 0.03 ppm Milk (2%)
- A study of 20 volunteers between the ages of 21 and 30 who were familiar with red wine has found that if people are told a wine is expensive while they are drinking it, they really do think it tastes nicer than a cheap one. The volunteers' brains were scanned using functional magnetic-resonance imaging while they were given 1ml sips of wine. The medial orbitofrontal cortex area of the brain that is responsible for registering pleasant experiences was monitored for increased mental activity. Subjects were told they were sampling five different Cabernet Sauvignons, that the purpose of the experiment was to study the effect of degustation time on perceived flavors, and that the different wines would be identified by their retail prices. However, unbeknown to the subjects, the critical manipulation was that there were only three different wines, and two of them were administered twice, one identified at a high price and one at a low price. Thus, the task consisted of six trial types: \$5 wine (wine 1), \$10 wine (wine 2), \$35 wine (wine 3), \$45 wine (wine 1), \$90 wine (wine 2), and neutral solution. Subjects were asked to focus on the flavor of the wine during the degustation period and recorded taste pleasantness or taste intensity ratings. The scanner showed that the activity of the medial orbitofrontal cortices of the volunteers increased in line with the stated price of the wine. For example, when one of the wines was said to cost \$10 a bottle it was rated less than half as good as when people were told it cost \$90 a bottle, its true retail price. When a follow-up blind tasting *without* price information was carried out, the volunteers reported differences between the three 'real' wines but not between the same wines when served twice. The study results contradict a basic assumption in economics, *viz.* that the experienced pleasantness (EP) from consuming a good depends only on its intrinsic properties and on the state of the individual. The findings have implications for marketing and economic theory. [www.pnas.org/cgi/content/abstract/0706929105v1](http://www.pnas.org/cgi/content/abstract/0706929105v1)
  - Researchers in Italy have presented their version of a high-quality draft of the genome sequence of a cultivated clone of *V. vinifera* Pinot Noir. They found that homologous chromosomes of Pinot Noir differ by 11.2% of their DNA (far more than the genetic variation that exists between a chimpanzee and a human). The researchers found hundreds of genes that encode enzymes which produce flavourings and aromatic compounds. This could lead the way to more consistent flavours or added novelty. Gene clusters were identified that can be associated with

disease resistance or tolerance behaviour of grape varieties. This large and underexploited reservoir of resistance genes could be easily moved in clusters across genomes by choosing appropriate molecular markers to selectively introgress only the resistance traits. This opens the possibility of developing Pinot Noir, either by selective breeding or GM, which would grow in places now off-limits, either for climatic or local disease reasons. [www.plosone.org/article/fetchArticle.action?articleURI=info:doi/10.1371/journal.pone.0001326](http://www.plosone.org/article/fetchArticle.action?articleURI=info:doi/10.1371/journal.pone.0001326)

- Red wine was made from the same batch of Cabernet Sauvignon grapes but with two different yeasts, *Saccharomyces cerevisiae* (SC) or *Saccharomyces bayanus* (SB). Subsequent examination and evaluation of the two batches at 8 days and 387 days after yeast inoculation found that grape anthocyanin concentration was lower in SB wines than in SC wines, but SB wine exhibited greater wine colour density. The data demonstrated that the formation of acetaldehyde-mediated pigments was enhanced by the use of the SB yeast, and that these pigments were largely responsible for the differences in the colour properties and pigment profiles of SC and SB wines. [www.asvo.com.au/ajgwr/archives/index.asp?action=view&id=283](http://www.asvo.com.au/ajgwr/archives/index.asp?action=view&id=283)

## Local research results

- A local study examined samples of rootstock cuttings that were collected during the harvesting and preparation of rootstock cuttings. Fungi isolated from the samples that had external and internal symptoms were mainly *Botryosphaeriaceae* and *Phomopsis* spp., with *Phaeoacremonium* spp. and *Phaeomoniella chlamydospora* isolated at much lower frequencies. These genera have all been shown to be important grapevine trunk pathogens, infecting pruning wounds and other mechanical wounds, ultimately causing decline and dieback of nursery and mature grapevines. *Phoma* and *Acremonium* spp., were also to be present in some cases, although these are not recognised as grapevine pathogens. Management strategies aimed at preventing wound infection of rootstock canes by the abovementioned pathogens are recommended. These include treatment of pruning wounds on mother vines with pruning wound protecting agents, trellising of mother vines to prevent injury of the rootstock canes, and careful inspection and selection of canes prior to grafting. Project USPP07/2006 at [www.sawislibrary.co.za/dbtextimages/FinalReport145.pdf](http://www.sawislibrary.co.za/dbtextimages/FinalReport145.pdf)
- An evaluation of the antioxidant potential of the major South African red and white wine types found that the total antioxidant activity of Ruby Cabernet wines was lower than that of other red cultivar wines, in spite of the highest monomeric anthocyanin content, while Chardonnay and Chenin blanc wines had the highest and lowest total antioxidant activity of white cultivar wines respectively. However, wines made from different wine grape cultivars could not be totally differentiated on the basis of their phenolic composition or antioxidant activity. The phenolic composition of both red and white wines changed considerably during storage after bottling, resulting in a decrease of antioxidant activity. Wine-making techniques affected individual phenolic compounds in Pinotage wine to varying degrees and depending on the treatment, the total antioxidant activity (TAC) of Pinotage wines could be increased without being detrimental to sensory quality. The addition of tannin improved both the TAC and sensory properties of Pinotage. By using Pinotage grapes from bush vines in a cool climate the TAC of wines could be substantially increased, without being detrimental to quality. The TAC of Chenin Blanc wines could be improved by skin contact, with no detriment to sensory quality, depending on the fermentation temperature. Yeast lees and enzyme treatments gave wines with improved TAC without loss of sensory acceptability. Grapes grown in sunlight and harvested at 21°B produced wines with higher TAC than those grown in the shade and harvested at 24°B. [www.sawislibrary.co.za/dbtextimages/FinalReport128.pdf](http://www.sawislibrary.co.za/dbtextimages/FinalReport128.pdf)

## Applications of technology

- New Vine Logistics has announced WineAssure, which it claims is the first eco-friendly packaging solution to keep wine within an optimal temperature range during shipment. WineAssure guarantees that the temperature of wine will not exceed 70°F (21°C) or fall below 35°F (2°C) over a five day shipping period, regardless of exterior temperatures. The WineAssure packaging and insulation are made from 100% recyclable and degradable materials. The packs contain a water and salt-based solution that is completely non-toxic, non-caustic and degradable. The insulation is mineral-based and breaks down to its original minerals within hours of being composted or buried. The packs and insulation in the WineAssure solution can be reused by the recipient, disposed of at home with other recyclable materials or returned to New Vine Logistics at no cost. New Vine Logistics claims that its packaging greatly outperforms other unsuccessful options such as dry ice and gel packs which cool packaging containers for one to two days and contain hazardous materials and/or emit greenhouse gases. Initially, two-bottle packages will be available at a price of \$15. Larger packages will be available later this year. [www.wineassure.com](http://www.wineassure.com)



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