



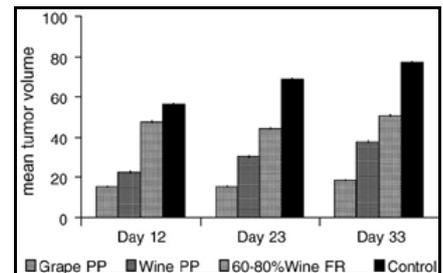
Winetech Scan

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

October 2008

Research outputs

- A study in which Merlot grape and wine polyphenols were fed to mice suggests strongly that such polyphenols may exert a broad range of effects on breast cancer cells at the gene-expression level. Groups of mice with breast cancer tumours were fed polyphenols from either Merlot grapes, Merlot wine or extracted from Merlot wine, every 3 days for 33 days. The polyphenol components significantly inhibited breast tumour cell proliferation in mice. The degree of tumour growth inhibition by grape polyphenols was more than that of the wine polyphenols and the extracted wine fraction. As the total polyphenol concentrations used in all treatments were similar, the differences in the degree of inhibition may be related to the compositional differences of the grape and wine extracts and the metabolism of the respective polyphenol component in the body. After 33 days of tumour growth, the tumours were isolated, and gene expression profiles analyzed using signal transduction and cell cycle arrays. The development of tumours was almost totally arrested in grape polyphenol-treated mice. Total polyphenols isolated from the wine were more effective in reducing tumour growth than a polyphenol fraction extracted from the wine, showing a 50% and 60% reduction in tumour growth on day 33, respectively. Analysis of gene expression showed that a number of genes, belonging to the NF κ B, phospholipase C and calcium signalling pathways, were down-regulated in tumours that developed in the polyphenol-treated mice. The study also showed the importance of consuming food ingredients in their natural form and the beneficial effects these could have in preventing chronic diseases. [www.nrjournal.com/article/S0271-5317\(08\)00157-7/abstract](http://www.nrjournal.com/article/S0271-5317(08)00157-7/abstract)
- The slow formation of protein hazes is a common instability in white wines. Methods of standard protein (bovine serum albumin – BSA) stabilization to deal with this problem include ultrafiltration, heat denaturation, tannin or silicon dioxide (Kieselsool), haze protective mannoproteins, and enzymes; however, the most common treatment is bentonite fining. Some of these treatments can affect wine sensory attributes negatively. Ultrafiltration undesirably removes phenolic components and flavour, while bentonite has the potential to reduce wine colour, aroma, and flavour components. A researcher in Texas has investigated using phytic acid, a form of phosphorus storage in plants, at laboratory scale. It resulted in significant BSA reductions or complete removal without changing the pH. Preliminary sensory tests did not detect differences in a red or a white commercial grape wine treated with similar amounts of phytic acid as used in the study, compared with the respective untreated red or white wine. The method binds and precipitates BSA, does not affect wine pH, and produces no toxic products. However, phytic acid is not currently approved for use in wine. www.ajeonline.org/cgi/content/abstract/59/3/312
- Destemming (DS) is the method most extensively used worldwide to make wine, whereby the stems are removed and the grapes crushed. On the other hand, carbonic maceration (CM) is a winemaking technique in which whole grapes are fermented in a carbon dioxide rich environment prior to crushing. CM ferments most of the juice while it is still inside the grape. A study in the Rioja Alavesa area in Spain compared the two methods, as well as the practice of adding white grapes, by investigating 24 sensory attributes and 15 physicochemical parameters of comparable DS and CM wines, with and without white grapes added. Tempranillo red grapes were used, and the white grapes added were Viura (between 5% and 15% by total grape weight). CM wines were higher in red berry aroma and flavour, alcoholic flavour and acidity, and lower in liquorice and tree fruit aroma. CM wines were higher in ethanol, and lower in glycerol, reducing sugars, total acidity, relative density, total dry extract and colour intensity. Wines with Viura addition were scored higher in acidity and lower in colour intensity and purple hue. Wines with Viura also had lower values for anthocyanins, total polyphenol index, colour intensity, total dry extract, tannins and pH. Although some differences were found when adding the white grape, this factor did not prove to be so decisive. <http://dx.doi.org/10.1111/j.1755-0238.2008.00024.x>
- The mechanical behaviour of winegrapes under compression loading has been examined to determine the ability of this technique to better understand ripening and to differentiate winegrapes. The tests were done at ripeness on seven grapevine varieties (Barbera, Brachetto, Cabernet Sauvignon, Dolcetto, Freisa, Nebbiolo, and Pinot noir) collected during the 2004 and 2005 seasons in Piedmont, north-western Italy. A number of parameters relating to the whole berry, skin, and seed were measured using different compression tests. These parameters included, for the berries: hardness, cohesiveness, gumminess, springiness, chewiness and resilience; for the berry skin: thickness, hardness, break force and break energy; and for the seeds: hardness, break force and break energy. It was found, inter alia, that that climatic differences between the two years influenced the parameters. It was



concluded that texture profile analysis (TPA) was the most appropriate test for grape differentiation. www.ajevonline.org/cgi/content/abstract/59/3/323

Local research results

- A trial to evaluate different cover crop species and cover crop management practices according to the physical and chemical qualities of the soil, water consumption and performance of vines in sandy soil in a Sauvignon blanc/Ramsey vineyard in Lutzville in the semi-arid Olifants River Valley was conducted over a period of 11 years. Twenty four treatments were applied. The findings were that cover crops should preferably be sown in early April as available irrigation water plays a vital role in the successful cultivation of the cover crops. Rye and pink Seradella were found to be the preferred species for cover crop management, while 'Paraggio' medic, 'Saia' oats and grazing vetch did not perform as well, but could also be considered. The performance of the fully grown grapevines was not affected negatively if the cover crops were controlled chemically during mid-October. If, however, the cover crops were allowed to complete their life cycle up to the berry set stage of the grapevines, the performance of both young and fully grown grapevines were negatively affected. The cover crops, irrespective of the management practice applied, increased the soil organic matter of the top soil over both the medium and long term. www.sawislibrary.co.za/dbtextimages/FinalReport134.pdf
- The effective operation of the anaerobic digestion process in an upflow anaerobic sludge blanket (UASB) bioreactor is dependent on the microbial composition of the UASB granules. The granules contain a consortium of bacteria, with a specific metabolic function for each group, contributing to the overall efficiency and stability of the bioreactor. A study examined the bacteria present in UASB granules that are used to treat winery, brewery, distillery and peach-lye canning wastewaters. In total 68 different bacteria (40 pure isolates and 28 clones) were identified. 35% of the identified bacteria represented unculturable bacteria and 65% represented culturable bacteria. While some bacteria found to be present in more than one granule, the different bacteria that were isolated and identified from the different granules emphasise the fact that the composition of each type of wastewater has a major impact on the microbial species present in the granules. Fingerprinting and identification of the complex microbial bacterial community in UASB granules may lead to a better understanding of the influence that the treatment of various wastewaters may have on the structure of the different populations present in the UASB granules, while a better understanding of the diversity of bacteria in different UASB granules could improve the stability of the anaerobic process and the performance of the bioreactor, including a reduction of the start-up period. [www.sasev.org/journal/sajev-articles/volume-28-1/Vol%2028%20\(1\)%20Paper%2011.pdf/view](http://www.sasev.org/journal/sajev-articles/volume-28-1/Vol%2028%20(1)%20Paper%2011.pdf/view)
- Macrophytes are aquatic plants, growing in or near water, that are either emergent, submergent, or floating, and are beneficial to the water. A constructed wetland trial to investigate the role of macrophytes during cellar wastewater treatment from a distillery and a winery studied two plant species, *Typha latifolia* and *Phragmites australis* (bulrush), and three retention periods (4.5, 9 and 18 days). The plant species used are known to be tolerant to pollutants and have the ability to remove nutrients from polluted waters (phytoremediation). Samples were taken monthly for a period of two years and analysed for the elements phosphorous, nitrogen, potassium, calcium, magnesium and sodium. The effects of the source of effluent (distillery or winery), species comparison, organs of accumulation, season of growth, wetland retention period and position in the wetland were all studied. Plants growing on distillery effluent had higher element concentrations than those growing in winery effluent. *T. latifolia* accumulated higher element concentrations than *P. australis* although the latter was more tolerant to effluent. Most nutrients were concentrated in below-ground tissues, whilst cations accumulated mostly in harvestable above-ground tissues. Over the growing season it was found that element accumulation increased due to exposure to effluent and that there were significant differences in the element concentrations of newly growing shoots and adult plants. Wetland retention period and the plants' position in the wetland did not have an effect on the accumulation of nutrients. It was noted that constructed wetlands have the advantage that they do not require intensive management. www.sawislibrary.co.za/dbtextimages/FinalReport141.pdf

Biofuels and Biotechnology

- The large-scale cultivation of crops for production of liquid biofuels has become a reality, and is forecast to increase, driven by the issues of climate change and increasing oil prices. The potential social, economic, environmental and human rights impacts have been much debated with concerns such as 'biofuels will bring hunger in their wake' and 'the sudden, ill-conceived, rush to convert food into fuels is a recipe for disaster'. The Food and Agriculture Organisation of the United Nations (FAO) is to host an e-mail conference the topic from 10 November to 7 December 2008. Conference 15 of the FAO Forum is considering the potential role that agricultural biotechnologies can play for production of liquid biofuels in developing countries. See www.fao.org/biotech/Conf15.htm The FAO has published a background document which provides relevant information on bioenergy for participants. It is available as a web page at www.fao.org/biotech/C15doc.htm

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