



# Winetech Scan

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

April 2010

## Research News

- Grape acidity in European countries has shown a trend to higher pH levels (less acidic) during recent years. This has led to an increase in the amounts of sulphur dioxide (SO<sub>2</sub>) used in winemaking. The use of recently developed electro dialysis bipolar membranes allow pH regulation (acidification) so as to produce a required pH final value, and thus potentially decreasing the amount of SO<sub>2</sub> required in the wine-making process. Electro dialysis is a process in which ions are transported through ion permeable membranes from one solution to another under the influence of a potential gradient. The membranes (right) are fabricated from ion exchange polymers. Concentration, removal, or separation of electrolytes can be achieved by electro dialysis. In an experiment, acidification by this bipolar process was performed on a red wine (Syrah) with a very high pH (about 4.15). The wine was treated by the bipolar process to various end pH levels in the range of 3.25 to 4.15 and then with the addition of SO<sub>2</sub> at bottling with two levels (no addition and 1 g/hl). Reference acidifications were performed with two levels of tartaric acid (1,5 and 3 g/L) added for comparison. The activity of SO<sub>2</sub> / acidity was tested by growth of contaminant yeast (inoculation by *Brettanomyces*). While the acidification with tartaric acid was more efficient in the inhibition of *Brettanomyces* growth than the bipolar process, nevertheless, the bipolar process was successful at inhibiting *Brettanomyces* growth, notably with no or a very low SO<sub>2</sub> addition when the level of acidification was high. The use of the electro dialysis is not yet permitted in commercial wine production. [www.infowine.com/default.asp?scheda=9191](http://www.infowine.com/default.asp?scheda=9191)  

- The successful control of moulds diseases of fruits or vegetables has been achieved by applications of natural saprophytic yeasts. However, their use is limited because production on an industrial scale is very difficult, or even impossible. A study has now examined the potential reduction of microbial diseases on damaged grape berries by spraying industrial *S. cerevisiae* yeasts (readily available in large amounts) onto the grapes. Two species of fungus diseases were selected: *Botrytis cinerea* (invasive disease fungus) and *Aspergillus carbonarius* (responsible for production of the toxin ochratoxin A), as well as an invasive bacterial species (*Gluconobacter oxydans*). It was demonstrated that the spreading of *S. cerevisiae* 'F' strain at the surface of previously damaged grape berries contaminated with different microbial species was very efficient for reducing fungus mycelium growth after 48 hours of incubation. This was not the case for bacterial *G. oxydans* contamination, where no effect was observed. The yeast spraying should be done about 2-5 days after initial infection by the fungi in order to obtain an optimal antagonistic effect. After this period, the potential of fungi to initiate disease remains. The effect of yeast spraying on *A. carbonarius* development on the grape berries was particularly significant, indicating that yeast spraying before grape harvest could represent a biological alternative for limiting the occurrence of *A. carbonarius* in the vineyard. In subsequent field scale experiments, spraying with the industrial *S. cerevisiae* 'F' strain on an artificially *A. carbonarius* infected vineyard was able to reduce the spread of *A. carbonarius* inside the grape berries, even when the external black mycelia form of *A. carbonarius* was not observed at the grape berry surfaces. The reduction of the spread of *A. carbonarius* was accompanied by a significant reduction in the final level of ochratoxin A in the corresponding wines. The chemical and sensory properties of the final wines were not detrimentally affected by the yeast spraying. [www.infowine.com/default.asp?scheda=9190](http://www.infowine.com/default.asp?scheda=9190)
- Some wine experts estimate that up to 5% of fine wine sold today are fake. Connoisseurs collect vintage wines and prices have soared with 'investment wines' selling for hundreds of thousands of dollars a case at auction. The wine industry is fighting forgeries with special seals and high-tech labels and various authentication methods. Now researchers have found that radioactive carbon dioxide produced from atomic bomb tests in the atmosphere absorbed by grapes can be used to accurately determine wine vintages. The new technique compares the amount of carbon-14, a less common form of atmospheric carbon, to carbon-12, which is more stable and abundant. The ratio of these two carbon isotopes has remained constant in the atmosphere for thousands of years until atmospheric atomic explosions significantly increased the amount of carbon-14 in the atmosphere. When the tests stopped in 1963 a clock was set ticking, as the amount of carbon-14 began to decline. As traces of radioactive carbon are captured by the grape plants through the absorption of carbon dioxide and eventually transformed into alcohol and other carbon-based components of the wine, the carbon-14 isotope ratio of the wine alcohol can therefore be used to determine the vintage of a wine. The alcohol carbon isotope components of 20 Australian red wines with vintages from 1958 to 1997 were measured and compared to the radioactivity levels of known atmospheric samples. They found that the method could reliably determine the vintage of wines to within the vintage year. [www.physorg.com/news188453382.html](http://www.physorg.com/news188453382.html)

## New Technology

- Alcoholic strength by volume is typically determined by distillation followed by densimetric measurements, or by Fourier transform infrared (FTIR) spectroscopy which allows the determination of alcoholic strength in less than 2 minutes without any sample preparation. The first method is labour-intensive and the second requires a relatively large capital investment and calibration. Now a third option is available, the Alcoquick 4000, a patented, spectroscopic multiple beam measuring procedure, which is based on selected wavelengths in the infrared and which directly measures the ethanol content of wine (and other alcoholic beverages) with high levels of accuracy. The ethanol content of a 40 ml sample is simply determined in less than 60 seconds. The new device (which is available in a portable version) has been subjected to extensive tests which are reported in the *Chemistry Central Journal*. The precision of the device was found to be equal to or better than densimetric or FTIR methods. 260 different alcoholic beverages were analyzed and the results compared to the densimetric and FTIR methods. The correlation was linear over the entire range, from alcohol-free beers up to high-proof spirits, and the results from the three methods were in substantial agreement. The applicability of the device was further proven for the analysis of wines during fermentation, and for the determination of non-commercial or illicit products. The flow-through infrared device was found to be much easier to handle than the other reference procedures, with no time-consuming sample preparation steps. [www.journal.chemistrycentral.com/content/4/1/5](http://www.journal.chemistrycentral.com/content/4/1/5)

## Local research news

- A new Act regulating intellectual property from public funded research, which aims to ensure that such research is protected and commercialised for the benefit of the people of South Africa, is expected to come into effect in June or July this year. The final version should be posted on the Department of Science and Technology's (DST) website soon. A spokesperson for the DST said that there was a need to show the socio-economic returns on investment in research, so as to motivate for continued R&D investment in the face of more pressing social issues such as housing and health provision. Criticisms of the draft version of the Act, which moves the ownership of public funded IP from individual researchers up to institution level, and even government level in some instances, included concerns about how it would affect collaborative research, the prescriptive approach of the Act which is seen as discouraging investment, and an erosion of the principles of academic freedom. The Act will reward ingenuity and creativity and entitles inventors in an institution to minimum 20% of the gross revenues accruing to the institution for the first one million rand, and thereafter a minimum of 30% of the net revenues. [www.digitaljournal.com/article/290485](http://www.digitaljournal.com/article/290485)

- 52 antifungal genes have been successfully isolated from grapevine and South Africa flora. Several of these have functionally characterised to assess their suitability for possible use in antifungal strategies. Two classes of antifungal genes were targeted, the polygalacturonase-inhibiting proteins (PGIPs) and antifungal peptide encoding genes, specifically plant defensin genes. PGIPs are typically thought to be involved in induced defence responses, whereas antifungal peptides are potent, broad-spectrum antifungal agents that are part of the pre-formed and innate defence system of plants. Thirty-seven PGIPs were isolated from *Vitis vinifera*, as well as other non-*Vitis* grapevine species. 15 antifungal peptide-encoding genes were isolated using a peptide-enrichment isolation strategy that favoured the isolation of basic, heat-stable peptides; these properties are characteristic features of plant antimicrobial peptides. Functional analyses of some of these genes have shown excellent promise for use in manipulated defence strategies and are being used in a grapevine transformation programme. [www.sawislibrary.co.za/dbtextimages/VivierMA4.pdf](http://www.sawislibrary.co.za/dbtextimages/VivierMA4.pdf)

- Grapevines are a preferred host of vine mealybug and are the most adversely affected by this insect. High reproductive rates and rapid development times promote severe infestations that are difficult to control. Furthermore, the vine mealybug's tendency to feed under the bark and below the soil surface offers a refuge from contact insecticides and natural enemies. *Anagyrus pseudococci* (right) is the most common parasitoid attacking vine mealybug. Another parasitoid is *Coccidoxenoides perminutus* (below right). Both of these are parasitic wasps less than 3mm long. A project to examine the effects of generally used chemicals for ant and mealybug control on these two important parasitoids tested Buprofezin (Applaud), Prev-Am (insecticidal soap), Fipronil (Regent), Mancozeb (Dithane M.45) and alphacypermethrin (Fastac). Buprofezin, Mancozeb and Prev-Am did not impact on the parasitoids within the recommended dose rates. There was relatively high susceptibility towards Regent and Fastac by both the parasitoids. It is thus important that such chemicals be kept away from leaves and bunches, where parasitoid activity is high, or only be applied when parasitoids are not active. Experiments with the systemic pesticide imidacloprid (Confidor) were carried out using vine mealybugs feeding on imidacloprid treated vines. Both parasitoids were equally susceptible to imidacloprid. A number of recommendations regarding the application of the chemicals in the vineyard were made. [www.sawislibrary.co.za/dbtextimages/AddisonP4.pdf](http://www.sawislibrary.co.za/dbtextimages/AddisonP4.pdf)



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