



## Local Research News

### Determination of the incidence and distribution of GVE in Western Cape vineyards

A study has investigated the incidence and distribution of the newly identified virus, Grapevine virus E (GVE), in South African vineyards. A survey was performed to determine the incidence of GVE in the Merlot vineyard where GVE was first detected in Stellenbosch. A sufficient sample of 139 plants was randomly selected for testing. A RT-PCR diagnostic assay was developed and used to screen the samples to determine the incidence of GVE. The incidence in this vineyard was low, with only 3% of the surveyed vineyard positive for GVE infection. All the GVE positive vines were also infected with grapevine leafroll-associated virus 3 (GLRaV-3) and displayed typical grapevine leafroll disease (GLD) symptoms, including down-rolling of leaf margins and reddened interveinal leaf areas. Because of the low incidence of GVE and the presence of GLRaV-3 no disease association could be made with GVE infection and no clear distribution pattern could be described. GVE was only detected in co-infections with GLRaV-3 so that the role of GVE in disease symptom expression and severity is unknown. The possibility that GVE requires GLRaV-3 for systemic infection seems likely but remains to be proven.

A further survey was conducted to determine the incidence of GVE in GLRaV-3 infected vines sampled across the Western Cape. The incidence of co-infection of GVE with GLRaV-3 was 20% with values ranging from 0% to 55% for different regions. GVE was always found in association with GLRaV-3. A further survey was performed on nuclear material from Vititec, which aims to supply the best available viticulturally and oenologically selected clonal material, free from known harmful viruses and virus-like diseases. One hundred and seventy-eight samples were screened, and as expected, all tested negative for GVE. [www.sawislibrary.co.za/dbtextimages/BurgerJT3.pdf](http://www.sawislibrary.co.za/dbtextimages/BurgerJT3.pdf)

### Genetic identification of the leafhopper *Mgenia fuscovaria*

Up to now identification of the leafhopper *Mgenia fuscovaria*, a vector of aster yellows phytoplasma (AY), has been based on time-consuming morphology, especially of the male genitalia, by a highly experienced taxonomist. This meant that female leafhopper, nymphs, and deposited eggs could not be identified by this means and controlled transmissions with nymphs confirmed as *M. fuscovaria* could not be done. Now a technique for identifying *M. fuscovaria* by determining the sequence of the mitochondrial cytochrome oxidase I (mtCOI) gene has been developed. This will allow researchers to identify large numbers of individual males, females and nymphs, allowing transmission studies and biological studies to be conducted. An additional *Mgenia* species, found in grapevines from Robertson in the Western Cape, was shown to have a mtCOI sequence differing from that of *M. fuscovaria* and was identified as *M. angusta*. Phylogenetic trees, based on the mtCOI sequence of various leafhoppers show that the mtCOI sequence separates the two *Mgenia* species will be useful for identification of individuals. While sequences from *M. fuscovaria* females and *M. angusta* nymphs are still lacking, identity within *M. fuscovaria* males and nymphs, and *M. angusta* males and females suggest that the sequences generated can be used to identify *M. fuscovaria* and *M. angusta* males, females and nymphs. [www.sawislibrary.co.za/dbtextimages/PietersenG4.pdf](http://www.sawislibrary.co.za/dbtextimages/PietersenG4.pdf)

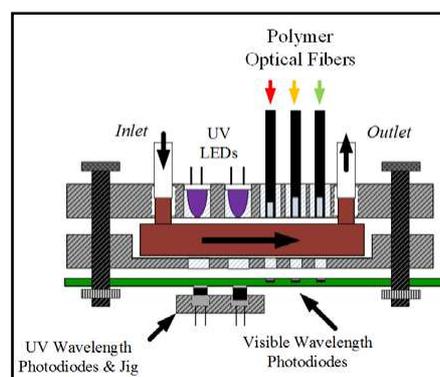
## International Research News

### In-line measurement of colour and total phenolics

In red wine fermentations, colour and phenolic compounds are extracted from the grape skins and additional phenolic components are extracted from the seeds into the must. These compounds determine the colour and mouth-feel of the wine. It is of interest to measure these compounds in real-time and to follow the extraction pattern in all stages of contacting and fermentation. At present the measurement of phenolics during fermentation involves regular manual sampling, storing in a refrigerator, and at later stage completing the analysis. This approach is slow and the information is delayed. An inline sensor that monitors phenolic information in real-time is the preferable alternative for following and making skin contact decisions in an ongoing fermentation.

An in-line colour and total phenolic sensor has been developed to track colour and total phenol evolution during red wine fermentations. The sensor uses multiple light emitting diodes (LEDs) spanning the ultraviolet and visible spectrum, in particular 280 and 525 nm. The performance of the phenolic sensor was evaluated by analysing fermentation samples collected from multiple red wine fermentations. The study confirmed the LED phenolic sensor measurements strongly correlate with measurements performed with a reference UV-Vis spectrophotometer and that inline measurements can be made in a practical manner after removal of yeast and pulp with a 2.0 micron filter. The use of a 100 micron path-length flow cell avoids the need for dilution, making in-line measurements possible.

<http://dx.doi.org/10.5344/ajev.2014.14023>



## Probiotic properties found in lactic acid bacteria isolated from wine

Probiotics are live microorganisms which, when administered in adequate amounts, confer a health benefit on the host. Up to now, many studies have reported that the best source of probiotics are dairy fermented products. However there is a need for novel and non-dairy probiotics because of the increasing number of lactose-intolerance individuals and the unfavourable effect of cholesterol in fermented dairy products. Researchers isolated 11 strains of bacteria from wine, including strains of *Lactobacillus*, which are also found in yogurt, as well as *Oenococcus* and *Pediococcus* bacteria, which are associated with the wine-making process. The researchers exposed the 11 strains to simulated gastric juice, bile and lysozyme, an enzyme that is highly concentrated in human saliva that can damage bacterial cell walls. They found that the bacteria could survive in such conditions, and their survival was comparable to or even better than the survival of several strains of bacteria known to be beneficial to human health.

They found the bacteria did stick to the walls of the human intestine, and therefore the bacteria may provide beneficial effects, such as the exclusion of harmful bacteria, from the intestine. In particular, one strain of bacteria found in wine, called *P. pentosaceus* CIAL-86, had an excellent ability to stick to the intestinal wall and had a 'good' activity against *E. coli*. Wine itself does not provide a sufficient amount of probiotics to be beneficial, because many of the bacteria are eliminated when sulphites are added to stabilize the wine. However, probiotics could be isolated from wine in order to be commercialized, or to be added to functional foods. <http://dx.doi.org/10.1016/j.fm.2014.06.015>

## An artificial mouth for estimating astringency

An important parameter in the evaluation of red wine quality is called astringency, which can be estimated by the binding affinity of polyphenols present in wine with salivary proteins. Researchers have developed a nanosensor that acts as an artificial mouth and is capable of measuring the effect of astringency by measuring small molecule and protein interactions. The optical sensor is a small plate coated with nanoscale gold particles and the technique is based on localized surface plasmon resonance (LSPR). The interaction between the most common enzyme/protein found in saliva, R-amylase (AMY) and a small molecule pentagalloyl glucose (PGG), a polyphenol which consists of a glucose molecule linked to five gallic acids was investigated. The results were used to calculate the polyphenol concentration expressed in PGG equivalents which correlated well with the astringency levels provided by a sensorial panel. The estimation of polyphenol concentration and its correlation with astringency levels can be extremely useful as a process control parameter during wine production. LSPR sensors have the potential to provide rapid and valuable information on astringency in wine. <http://dx.doi.org/10.1021/nn501962y>

## Degradation of winery-derived biomass waste by Ascomycetes fungi

Winery waste has limited use as animal feed due to its poor nutrient value and digestibility. It is also not suitable as compost because it doesn't degrade. Thus most of this grape waste ends up as toxic landfill. It has been classified as a pollutant by the European Union. So further processing is required to lower its hazardous nature. Various fungi are known to degrade this waste by generating an array of enzymes which convert the waste to soluble sugars which can then be converted into other products. However, individual fungal enzymes have limited capacity to break down the cellulose, pectins and lignins in the waste. A study has found that mixed fungal degradation combined with pre-treatment can decrease biomass recalcitrance for more efficient breakdown. A series of experiments were performed to obtain an optimized protocol for degrading winery biomass waste. The best results were obtained by a 30-minute heat activated pre-treatment followed by the addition of a 'cocktail' of four fungi – *Trichoderma harzianum*, *Aspergillus niger*, *Penicillium chrysogenum* and *Penicillium citrinum*. There noticeable increases in enzyme activity and lignin degradation. The fermentation process took one to three weeks and produced 78 significant metabolites of industrial and medicinal interest. The process can be scaled up to an industrial level. <http://dx.doi.org/10.1002/jctb.4486>

## The genetic blueprint of grape crown gall tumour disease

Researchers are about six months away from having the data to completely describe the bacterial microbiome of grape crown gall tumour disease. Grape crown gall is a chronic disease that lacks effective treatment and is difficult to eradicate. The researchers are using 52 tissue samples of the disease taken from 16 grapevine species. <http://phys.org/news/2014-10-grapes-wrath-stomping-grape-disease.html>

## Other news

### Rooibos wine (and beer and cider)

A local company has trademarked the terms Rooibos Wine, Rooibos Beer and Rooibos Cider, and says that a patent is about to be granted to it which covers the making of all wine, beer and cider products by adding rooibos and honeybush plant material during manufacturing. The wood from rooibos and honeybush is said to be unique in that it has high levels of antioxidants, no caffeine and low tannin levels when compared to other wood sources used in winemaking. It also contains a number of phenolic compounds and many flavonoids. The addition of the plant material in both a natural and toasted format is said to improve and enhance aroma, taste and/or mouth-feel of wine, beer and cider. Because of its anti-oxidant properties the plant material also eliminates the use of sulphites. The process is subject to a further 83 pending patent applications worldwide. [www.timeslive.co.za/local/2014/10/20/south-african-company-creates-alcoholic-rooibos-drinks](http://www.timeslive.co.za/local/2014/10/20/south-african-company-creates-alcoholic-rooibos-drinks)

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