



Local Research News

Energy management guidelines for South African wineries

Opportunities exist within the wine industry for lowering carbon emissions by saving energy through applying the principles of ISO50001 (a technical set of standards) and implementing an Energy Management System. A set of guidelines to achieve these savings has been compiled with winery management in mind and includes principles and suggestions that apply to wineries of all sizes. Although other energy sources are considered, the focus is on electricity.

Presented in a user-friendly format that is jargon free and action orientated, the guidelines are intended to help wineries to: identify opportunities to save energy and money; prioritise and evaluate the feasibility of energy saving projects; understand energy bills; to set goals; measure and improve energy performance in a systematic way; to make good choices for the future; and to provide a framework for continuous improvement. The guidelines are available in two different versions at www.sawislibrary.co.za/dbtextimages/BrentA.pdf and www.sawislibrary.co.za/dbtextimages/BrentA1.pdf

Study of the effect of rootstock water uptake on Pinotage leaf transpiration and grapevine adaptation to drought

Possible water scarcity in the future has increased the interest in drought tolerance conferred by rootstocks on grapevines. It has been postulated that the use of drought tolerant rootstocks can help to minimize the effect of water constraints by improving the water uptake and transport, and by controlling plant transpiration through chemical and hydraulic signalling.

The role of rootstocks in the adaptation of grapevine to drought has been studied. Pinotage was grafted onto 5 rootstocks with different drought tolerances and these were used in field and greenhouse experiments. As expected, water constraints induced a reduction in photosynthesis and stomatal conductance and a reduction of stomatal size. The results showed that leaves growing in an environment with a lower light intensity had a lower stomatal density but bigger pore diameter. In addition, differences in stomatal conductance and plant water status in response to drought among the different rootstocks were detected. Pinotage leaves grafted onto 140 Ruggeri presented lower stomatal density but bigger pore diameter than 110 Richter and 1103 Paulsen. The results confirm that the rootstock is genetically controlling the cultivars' stomatal functioning, number and size. This should be considered when choosing a rootstock for a site. Rootstocks, however, have no effect on the leaf gas exchange under moderate water constraints conditions. www.sawislibrary.co.za/dbtextimages/DeloireA7.pdf

International Research News

Dry-ice blasting of wine barrels

A dry-ice blasting method using a commercial blaster (right) for regenerating wine barrels was evaluated. The treatment was also tested as an alternative to the use of sulphur dioxide for barrel sanitization. Microbiological analyses were carried out using wine contaminated with *Brettanomyces* and *Lactobacillus*; results showed a reduction of contaminant by 98% to 100%. Wine aged in a dry-ice blasted barrel was compared with a wine aged in a barrel treated with sulphur dioxide. The sensory analysis showed that the dry-ice blasting treatment can regenerate the barrels successfully, and compared to the sulphur dioxide method, the dry-ice method conferred increased notes of vanilla and wood to the wine. Thus the dry-ice method is better than using sulphur dioxide and eliminates the use of the environmentally unfriendly chemical. <http://dx.doi.org/10.1051/bioconf/20150502012>



Wine protein haze: a review of mechanisms of formation and advances in prevention

Protein haze in white wines can be prevented by removing the grape proteins that have survived the winemaking process. The haze-forming proteins are grape pathogenesis-related proteins that are highly stable during winemaking, but some of them precipitate over time and with elevated temperatures. Protein removal is currently achieved by bentonite addition, an inefficient process that can lead to higher costs and quality losses. The development of more efficient processes for haze prevention requires an understanding of the main drivers of protein instability and the impacts of various wine matrix components on haze formation. The review covers recent developments in wine protein instability and removal, and proposes a revised mechanism of protein haze formation which is strongly influenced by the presence of sulphates. The most promising strategies for developing bentonite alternatives are stated to be degrading wine proteins with enzymes and the development of novel fining agents. These include seaweed polysaccharides, chitin, zirconium dioxide, and packed-bed cation exchangers, as well as ultrafiltration techniques. <http://dx.doi.org/10.1021/acs.jafc.5b00047>

A new method for the rapid separation of spent yeast from sparkling wine

In Méthode Champenoise, the final step is to remove the spent yeast biomass from the bottle. Traditionally this is done by rotating and simultaneously inclining the bottle gradually until all the yeast cells settle into the neck of the bottle. This process

requires up to 60 days of rotation. After the sedimentation, the bottle neck is submerged into freezing liquid and the sediment is frozen. When the bottle is opened the frozen yeast sediment plug is expelled from the bottle by the internal gas pressure.

Now an ingenious method for the rapid separation of yeast cells from sparkling wine has been developed. Superparamagnetic nanoparticles of iron oxide coated with a thin layer of silica were prepared and were absorbed onto the yeast cells, thus effectively making them magnetic. After the secondary fermentation the bottles were simply turned upside-down and exposed to a permanent magnet. The magnetized yeast sediment was thereby accelerated into the bottlenecks. This took 15 minutes instead of 60 days. Thereafter the sediment was removed in the usual way. The process has been patented.

<http://dx.doi.org/10.1016/j.bej.2014.03.014>

Human saliva can produce wine odorant molecules from odourless glycosides

Grape aroma precursors are odourless glycosides. Since wine consumption starts in the oral cavity, the processing of these compounds in the mouth could be an important factor in influencing aroma perception. A study has demonstrated the ability of oral bacteria in human saliva to hydrolyse grape aroma precursors, releasing different types of odorant molecules (terpenes, benzenic compounds and lipid derivatives). The hydrolytic activity seemed to be bacteria-dependent and was subject to large inter-individual variability. <http://dx.doi.org/10.1016/j.foodchem.2015.04.068>

The environmental impact of vinegrowing and winemaking inputs

A survey of 89 wineries in 9 countries in Europe has assessed the overall environmental impact of each input used in the winemaking process. It was found that, in decreasing order, glass bottles, cardboard boxes, fuel, electricity, closures, pesticides, and fertilizers have the biggest environmental impact.

The wineries also provided data related to the cost of the different inputs. On average, for wines without wood aging; glass bottles accounted for almost 50% of the production cost related to inputs; closures, capsules and boxes made up an additional 30%. Inputs used in the vineyard (fuel, fertilizers, pesticides) accounted together for less than 15% of the consumable costs. Electricity represented about 7%. <http://infowine.com/default.asp?scheda=14569>

Other News

38th World Congress of Vine and Wine

Part 1 (64 papers) of the scientific publications presented at the 38th World Congress of Vine and Wine (OIV) held in Mainz, Germany in July 2015 are now available at www.bio-conferences.org/articles/bioconf/abs/2015/02/contents/contents.html

Biotechnology in vitiviniculture

The International Organization of Vine and Wine (OIV) has published a *Review Document On Debate On Biotechnology In Vitiviniculture Within OIV*. The purpose of the document is to assemble in a single document some of the important elements of guidance from the OIV activities related to biotechnology in vitiviniculture. The document represents the consensus reached by the members of the Ad Hoc Group 'Biotechnology' of the OIV and is a collective expert report. The document does not attempt to cover in detail all the issues and facts, but rather contextualizes the overall potential impact of the application of biotechnology in the wine sector so as to provide a factual basis for potential discussion. Different approaches regarding vitiviniculture products derived from modern biotechnology are expressed. www.oiv.int/oiv/info/en_document_biothech_OIV

Free software methods to optimize wine production at all stages from vineyard to bottle

A software package, Gm.Linux, has been developed at the Center of Wine Science & Beverage Processing Technology, HS Geisenheim University. It provides a comprehensive and up-to-date collection of free scientific open-source software which can be used to analyse and optimize a large variety of wine production processes at all stages from vineyard to bottle. Step-by-step instructions are provided for many relevant procedures. The system can be used on all common platforms such as Windows and MacOS and it is available at www.hs-geisenheim.de/index.php?id=1219. It is in German, but is being translated to English. <http://dx.doi.org/10.1051/bioconf/20150502013>

Precision farming is growing rapidly from its infancy towards maturity

The total precision farming market size is expected to grow at a compound annual growth rate of 12.2% from 2014 to 2020 and reach \$4.55 billion by 2020. Driven by advancements in data management, precision farming has a remarkable impact on traditional approaches to farming. Applying technological developments in data collection, including drones and geo-location tracking, precision farming uses technology to optimize yield and detect operating efficiencies as well as deficiencies. Precision farming applications guide farmers about the right time to plant and harvest, and the amount of fertilizers and pesticides needed for better yield production. This information helps cut down input costs, fuel usage, and labour, and negate the environmental impact. A report analyses the precision farming supply chain, giving a very clear insight of all major segments and supported segments to the industry. www.marketsandmarkets.com/Market-Reports/precision-farming-market-1243.html



Winetech Scan is available on the Winetech website www.winetech.co.za

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