

Memstar responds to rising alcohol levels

By Mark Smith

Is 14% alcohol the new 12.5? That's the question Australian wine consumers ask these days as they make their selection at the local bottleshop. Chardonnay, Shiraz, Pinot Noir or Cabernet Sauvignon – you name it, consumers are now being asked to purchase wines that contain far more alcohol than they did 20 years ago.

That fact is supported by figures compiled between 1984 and 2004 by the Australian Wine Research Institute's Analytical Service. The organisation's own report, published in 2005 by Peter Godden and Mark Gishen, showed mean increases in alcohol concentration across all grape varieties and Australian wine regions. Red wines rose markedly over the period, from approximately 12.3% by volume to 13.9%.

Winemaking Tasmania's Julian Alcorso has no doubt that the adverse effects of excess alcohol in table wine – especially dead fruit characters, lack of flavour freshness, and unpleasant hotness on the palate – are the result of a combination of factors. These include recent increases in drought and summertime temperatures, poor vineyard management, and the shared goal of growers and winemakers leaving fruit in the vineyard to attain full physiological and flavour ripeness.

The issue of excessive alcohol is not confined to hot climate regions of Australia.

Tasmania's warm, dry summer and low cropping levels caught out a significant number of Alcorso's client growers during vintage 2007. By the end of March, at least 10 Pinot Noir harvests had arrived at his company's Cambridge winery with juice levels hovering between 14.5Baume and 14.8Baume.

"They're going to end up with alcohols that are 15-plus after fermentation," he says.

"That's bad news for anyone wanting Pinots with elegance and finesse. The problem isn't just a vintage aberration. It's something we've begun to see quite frequently in Tasmania, especially since 2001."

The acknowledged Pinot Noir and Riesling specialist believes it's time winemakers made moves to redress the balance – literally. That's the reason his contract winemaking operation in the Coal River Valley made a \$300,000 investment in Wine Network's Memstar AA alcohol reduction technology at the end of 2006.

Memstar – an acronym for Membrane Separation Treatment And Recombination – is the brainchild of former Tarrawarra winemaker David Wollan and fellow Wine Network director and principal consultant, Gary Baldwin.

Alcorso commissioned his acquisition earlier this year, just prior to his home State's annual Tasmanian Pinot Noir



Former Tarrawarra winemaker and Wine Network director David Wollan... his company's Memstar response to rising alcohols is proving to be an effective technique in Australian and international wine markets.

Forum. In doing so, he prepared six samples of 2006 Pinot Noir wine for a forum blind tasting in February. The test bottles represented a range of different alcohol concentrations, beginning at 13%, and rising in 0.2% increments to 14%.

He says the forum's 40 Pinot Noir growers and winemakers were unanimous in their choice of the bracket's top wine – one labelled 13.4% – even though all six samples had been drawn from a single blended wine.

"If we'd been able to spend the time to do a proper set of trials we would've had more like 20 samples, perhaps spanning 12.5 and 14.5, and increasing in 0.1% increments. Even so, there were two clear sweet spots in the range, with everyone in the room agreeing about one of them."



In search of a sweet spot... Tasmanian winemaker Julian Alcorso is using Wine Network's Memstar AA technology to address problems of excess alcohol in wine.

Wollan says that outcome is typical of what can be concluded from bench trials of the same wine tasted blind with differing concentrations of alcohol.

"I don't know that we can explain why that is, but it seems there are a number of components in wine that are differentially soluble or volatile with respect to alcohol. These have an effect on the overall balance of different flavours and palate characteristics," he explains.

"It's weird, but there are these points where they all seem to work together – where the wine tastes better in the mouth, and has better fruit expression than any of the others in the trial, even others right alongside may differ by as little as 0.1%.

"Often, you find there's a range of different sweet spots, so that at 14.1% a particular Chardonnay sample might seem a really attractive, full-on New World style; at 13.4 or 13.5, you might find it more Burgundian; and at 12.8 or 12.9 you might find it looking Chablis-like, with more mineral characters showing."

Wollan says such sweet spot trials can provide something of a revelation to the most experienced tasters. He recalls being approached by a fellow winemaker after a seminar and Chardonnay tasting conducted in Western Australia.

"A guy came up to me and said, 'This is amazing. For years I've been trying to fine out the hardness in my Chardonnays with milk, gelatin and PVPP. Now I've found that hardness was really related to alcohol, not phenolics.' Memstar allows winemakers to make small, simple adjustments to alcohol without having to mess around any further with phenolics."

Even so, there's a limit to the extent of improvements that can occur when excess alcohol is removed from a wine.

"Once you get below 10%, you start to struggle again with getting balance in the wine. Memstar is really only intended to take the edge off wines that are excessively alcoholic. It's technically very challenging to make a wine less than 10% that still tastes good. At those lower levels, the tannin stands out, the acid stands out, and the whole thing becomes very unattractive.

"You can address some of those concerns by lowering acidity, and perhaps by increasing the sweetness to fill out the palate and make it appear less aggressive. But that becomes especially difficult if you're trying to make a true dry red that has low alcohol. In fact, without adding glycerol and other components it's almost impossible."

The Memstar AA technology recently purchased by Winemaking Tasmania is entirely portable and is used in conjunction with an eight-membrane Memstar reverse osmosis unit the company bought from Wine Network in 2005. The Memstar AA plant is one of just five alcohol reduction units that Wollan and Baldwin have sold in Australia during the process's three-year development and manufacturing phase. Similar units have also found their way to customers in South Africa, Chile, and the United States.

Winemakers like Alcorso say their value is not limited to simply improving palate profiles and making wine producers appear more socially responsible. Excessive alcohol can contribute to a range of issues that ultimately compromise

wine quality. His list is headed by oxidation and premature ageing, but also includes prolonged or stuck ferments – and subsequently higher levels of residual sugar – bacterial spoilage, elevated levels of volatile acidity, loss of SO₂, and susceptibility to brettanomyces infection.

The benefits to growers are equally important.

"If growers are prepared to embrace it, they'll be able to simply pick their fruit when it's ready," he explains.

"They won't have to worry about sugar levels. They'll just pick when it tastes good. That will leave us to deal with the consequences. Purists might say you shouldn't do that – and you wouldn't need to in many cases if vineyards were planted on the right sites. The thing is, there are commercial imperatives at work as well. No-one in their right mind is going to pull out vines and go elsewhere. Besides, with climate change looking more likely, these issues are not going to go away. Winemakers eventually will have to face up to them."

WHAT IS MEMSTAR ALCOHOL REDUCTION?

Alcohol reduction is one of a suite of related processes that can be carried out by Wine Network's Memstar technology. The others include wine and juice concentration, VA reduction, and the removal of taints resulting from brettanomyces infection and smoke.

During alcohol reduction, the wine to be treated is separated by reverse osmosis into retentate and permeate flows. The latter is created when wine components of low molecular weight, such as water, carbon dioxide and ethanol, pass through a thin, semi-permeable membrane. Glucose, fructose and various flavonoids of higher molecular weight are unable to pass through the RO membrane, and become the retentate flow that moves in a loop through the process's various stages.

Both flows are de-gassed, heated and pumped to a small plant where the alcohol-rich permeate flows past what is called the Memstar AA perstractive membrane system. On the other side of the membrane is a counter-flowing stream of filtered and de-oxygenated strip water. The membrane allows some ethanol to pass through it and into the water. This reduced-alcohol permeate flow is then recombined with the remaining components of wine from which it was extracted. Strip water and alcohol, meanwhile, is collected and sold for distillation. No water is added to wine.

One pass through the Memstar AA plant typically reduces wine alcohol by between 0.9% and 1.5%. Processing continues in a steady enclosed loop until the wine being treated achieves the desired level of alcohol. Losses in total wine volume are minimal. The cost and time of alcohol reduction is dependent on the volume of wine to be processed and the portion of alcohol to be removed. An eight-membrane Memstar RO408 model can process wine at the rate of 3,500L/hr.

REFERENCE

Godden, P. and Gishen, M. (2005) Trends in the composition of Australian Wine. Wine Industry Journal, Vol 20 No 5, September-October 2005.