

# Tannin additions and micro-oxygenation: How do they work in partnership?



**Simon Kinley**  
Account manager - wine services  
Tarac

Micro-oxygenation is a technique used in winemaking where small accurately controlled amounts of oxygen are introduced into red wines. The aim of micro-oxygenation, or MOX as it is more commonly called in the wine industry, is to mimic the oxygen ingress that a wine is exposed to whilst in barrel. Micro-oxygenation of a red wine can soften tannins, stabilise wine colour and decrease vegetative aromas (del Carmen Llaudy, M. *et al.* 2006). It is also claimed that micro-oxygenation may improve the overall organoleptic profile of the wine under treatment (Dykes, S *et al.* 2007). A question was asked about the effects of micro-oxygenation when used in conjunction with Tarac's GrapEX™ range of tannin products. To answer this an independent trial was developed to investigate the effect of GrapEX with and without micro-oxygenation on colour and organoleptic profiles on red wine. Tarac has been producing tannins under the brand name GrapEX for many years and the two tannin products chosen for this trial were:

- GskinEX - naturally derived grape skin tannin
- GseedEX - naturally derived grape seed tannin.

The trial was undertaken by Provisor Pty Ltd, at Adelaide University. Provisor sourced a post-primary ferment Shiraz wine from the vineyard at the National Wine Centre, Adelaide. Tarac had requested a challenging wine in an attempt to clearly demonstrate the trial impact. The wine selected by Provisor was considered to be unbalanced and of poor quality by Tarac winemakers due to the presence of harsh green tannins. A winemaking summary provided by Provisor is shown in Table 1.

The wine was then divided into four batches and stored in 4 x 5-year-old barriques to lessen the effect of oak on each batch. Each 225L barrel of pre-malo wine was treated as detailed in Figure 1 and then bottled to produce over 20 dozen 750ml bottles of each treatment.

Table 1. Winemaking summary.

Grapes at harvest	13.4 Baume Shiraz pH 3.88 Total acidity 5.1g/L
Fermentation conditions	Grapes spent nine days on skins at a temperature between 18 - 22°C. Three ferments were employed; in Potter, Vinimatic and open fermenters. The three ferments were combined post-ferment for this trial.
Fermentation additions	Yeast: 25g/hL AWRI 796 MLF Bacteria: 1g/hL Lallemand Lalvin VP41 2g/L tartaric acid following crushing Diammonium phosphate (DAP) as required. (Total DAP addition 300ppm). 1g/L tartaric acid added post-MLF/pre-cold-stabilisation

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- Buttery flavours, acetic acid and mousy flavour caused by **Lactobacillus**



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# winemaking

## Micro-oxygenation (MOX) protocol:

21 days at 54mL/L/month  
 7 days at 28mL/L/month  
 MOX stopped 17 May 2006  
 MOX reconnected 4 Aug 2006 for additional 26 days  
 at 8mL/L/month  
 MOX stopped 30 August 2006.

MOX treatment was conducted prior to malolactic fermentation to replicate commercial winemaking and the same MOX unit was used for Batches 3 and 4. At the conclusion of the MOX treatments malolactic fermentation was conducted to completion. The four treatments were sampled regularly during MOX treatment until bottling. Chemical analyses of the four batches post-bottling is contained in Table 2.

Wines were all filtered using a z6 grade pad (polishing, non-sterile) into 750mL bottles with screwcap closures.

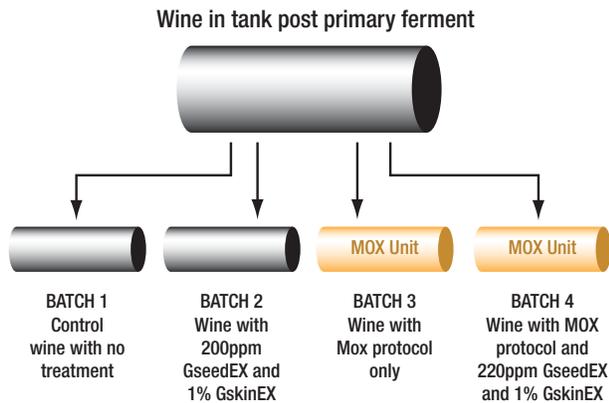


Fig. 1. Treatments of fermented wine.

## Analytical results

The four batches were monitored whilst in barrel and tested post-bottling for a period of 69 weeks with colour monitored using the red wine colour and phenolics measures as per Iland *et al.* Colour density is measured in this analysis by the addition of the

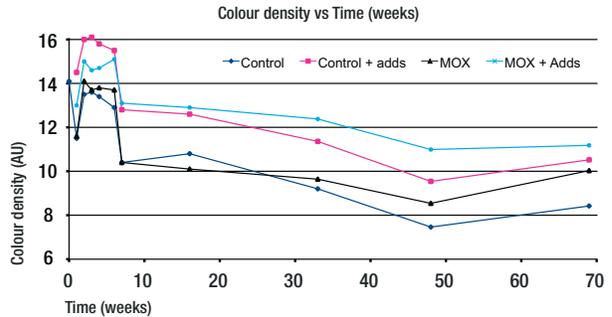


Fig. 2.

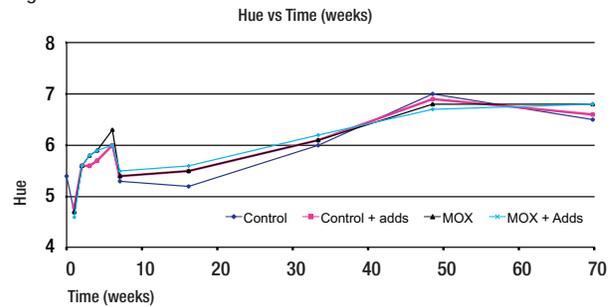


Fig. 3.

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Table 2.

Treatment	pH	T.A. (g/L tartaric)	Total SO <sub>2</sub> (ppm)	% Alcohol v/v	V.A. (g/L acetic)	Number of bottles
Control	3.54	7.9	Adjusted to 75	15.0	0.32	21 dozen + 3/12
Plus GrapEX	3.57	7.8	Adjusted to 75	15.0	0.34	21 dozen + 9/12
Plus micro- oxygenation	3.55	7.9	Adjusted to 75	15.0	0.32	22 dozen
Plus GrapEX & micro-oxygenation	3.58	7.8	Adjusted to 75	14.9	0.34	22 dozen
Total number of cartons						87 cartons

Table 3.

Treatments	Most-common tasters' comments
control wine	Tasting harsh and green, bitter, short, no real intensity, fruit or palate structure
control wine + GskinEX and GseedEX	More rounded palate, sweet fruit with firm tannin structure. A definite improvement over the control
control + micro-oxygenation	No longer bitter, a definite improvement over the control, some fruit but with drying tannins, possible MOX rates too high.
control + GskinEX, GseedEX micro-oxygenation	More integrated tannins with developed characters. Clear fruit and intensity and tannin backbone. A much better wine than the control.

absorbances at 520 and 420nm. The colour density is defined as the intensity of colour, where the absorbance at 520nm relates to the concentration of red-coloured pigments and the absorbance at 420nm to the concentration of yellow/brown pigments. Wine colour hue is measured by dividing the absorbance at 420nm by the absorbance at 520nm. Hue is defined as the tint or shade of the colour rather than its intensity (Illand *et al.* 2004). Basically it is a measure of the proportion of yellow/brown pigments to red pigments; higher hue figures therefore mean the wine appears a more yellow brown shade than red. Results are shown in Figures 2 and 3.

As is evident in the results; the colour density of the wines decreased slowly over time while the hue increased slightly over time. As expected the wine containing GrapEX skin and seed tannins (designated 'Adds' in Figures 2 & 3) had a higher colour density when compared with the wine with no additions. Combining micro oxygenation with the tannin additions produced a slightly higher colour density compared to the wine with additions of tannins only. In time the MOX-treated wine achieved a higher colour density than the control but less than the wine containing added tannins.

### Tasting results

The wine batches were tasted regularly throughout the trial by Tarac winemakers. General consensus of tasting notes between the Tarac winemakers and Provisor staff were that:

- the control wine was found to be quite harsh, green and with poor palate structure
- treated wines were found to be vastly improved compared with the control wine with more fruit, structure and balance.

Post-bottling samples were provided to winemakers during regional visits to illustrate the results of the trial. Time pressure prevented

formal blind tastings being conducted but a general summary of responses to Tarac staff on the wines are summarised in Table 3.

Clearly the results demonstrate how the addition of tannins and micro oxygenation improved the quality of this wine. Analysis of treated wines found an increase in colour density without an increase in hue. Tarac winemakers found a dramatic improvement in the overall balance, weight and structure of the treated wines. Individual treatments of MOX or added grape-derived tannin was found to reduce the harsh; bitter characters of the wines and a combination of the two produced an even more developed and structured wine.

*For more information, please contact Tarac Technologies on (08) 8562 1522 or via email [simonk@tarac.com.au](mailto:simonk@tarac.com.au)*

### References

del Carmen Llaudy, M. *et al.*, 2006, 'Influence of Micro-Oxygenation Treatment before Oak Aging on Phenolic Compounds Composition, Astringency and Colour of Red Wine', *J. Agric. Food Chem.* 4246-4252

Dykes, S. *et al.*, 2007, 'Micro-oxygenation - 'Optimizing the Maturation Process', *Aust. and N.Z. Wine Ind. J.*, 31-45

Illand, P *et al.*, 2004, 'Chemical analysis of grapes and wine: techniques and concepts', Patrick Illand Wine Promotions, 2004.

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