

## ***Did you know that the addition of natural grape tannins can enhance the quality of red wine?***

Tarac Technologies employed the wine making service of Provisor Pty Ltd at Roseworthy Hickenbotham Wine Science Laboratory to conduct trials on the effect of the addition of GrapEX™ grape seed (GseedEX) and grape skin tannins (GskinEX) to red wine prior to, and after fermentation.

Shiraz grapes vintage 2004 sourced from Banrock Station, Riverland South Australia, were used for this trial.

### **Experimental Design Summary**

Refer Diagram 1 below.

Grapes were divided into 6 batches of approximately 500 kg each. Pre-fermentation additions were as follows;

Addition of 400 ppm GseedEX	two batches
Addition of 1 v/v % GskinEX	two batches
Control (no addition)	two batches

Each batch was fermented on skins in a rotary fermenter using PDM yeast.

At the end of primary fermentation the matched batches were combined, put through MLF and then racked into used barrels.

The pooled control batch was divided into three equal parts which were treated as follows:

Addition of 200 ppm GseedEX  
Addition of 1 v/v % GskinEX added (post fermentation batches)  
Untreated post fermentation control.

### **Winemaking**

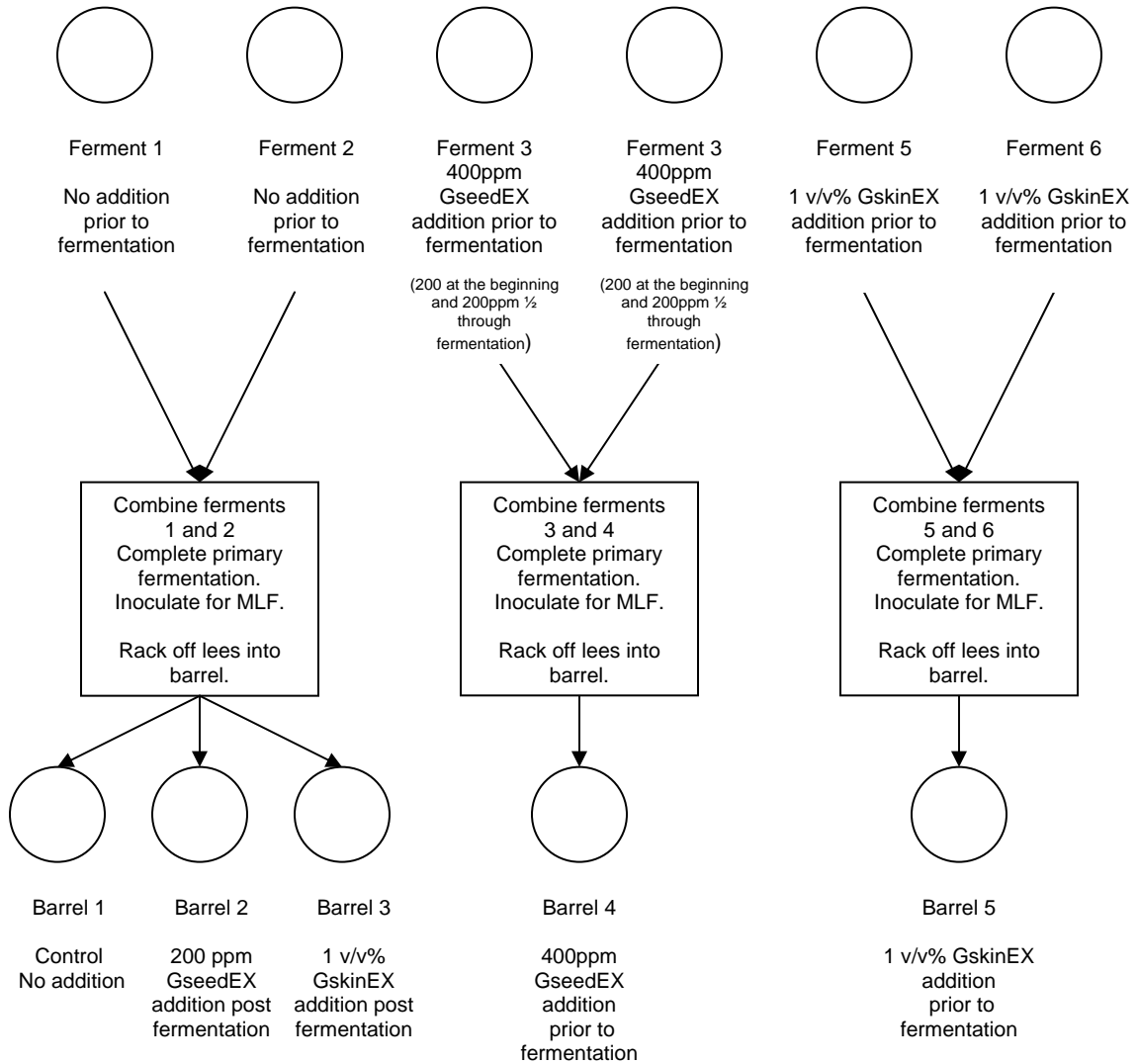
Grapes were crushed and musts were pumped into six 700L rotary fermentors.

PDM yeast was added at a rate of 25g/100kg.

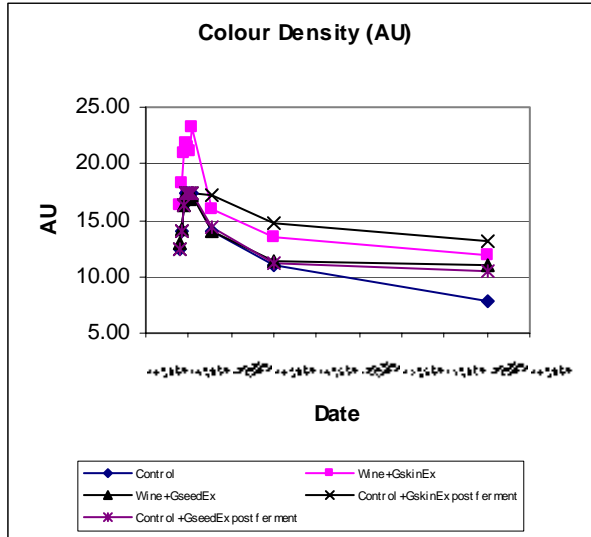
Tartaric acid, 4.8 g/L, was used in each treatment to adjust acidity to approximately 8 g/L and pH below 3.5. Fermentation was conducted at the rate of approximately 1.25 Be / day. The temperature was allowed to peak to 20°C on 5th day and maintained at this level until its completion. The fermentors were drained at 0.2-0.5 Be and malolactic fermentation was initiated utilising EQ 54 culture. After settling in the tanks for 8 days the wines were transferred into 300 L American (1999-5th usage).

Diagram 1

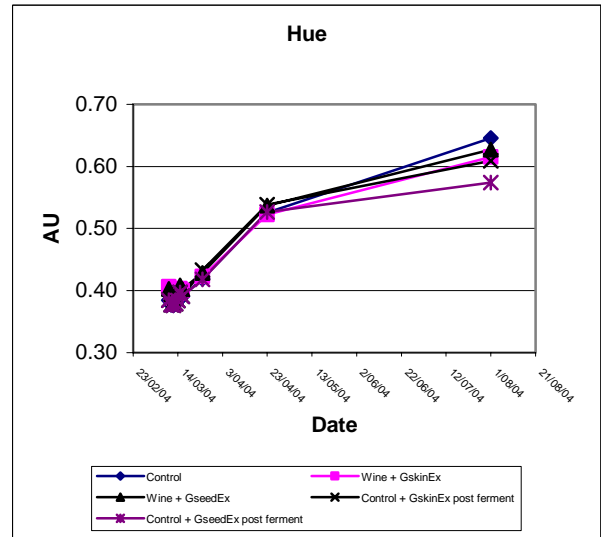
Experimental Design – Investigation of effects of GseedEX and GskinEX on quality of red wines



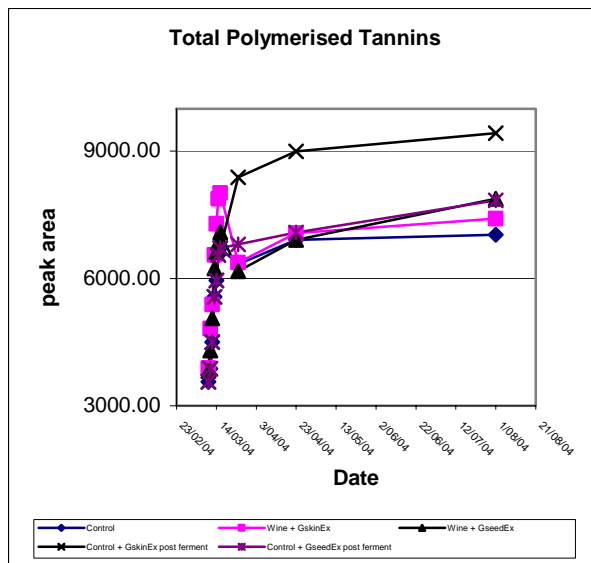
## RESULTS TO DATE



**Figure 1: Colour density vs time**  
 Note: Colour Density = Abs 520nm + Abs 420nm  
 (Expressed per 10mm light path length at pH = 3.5)

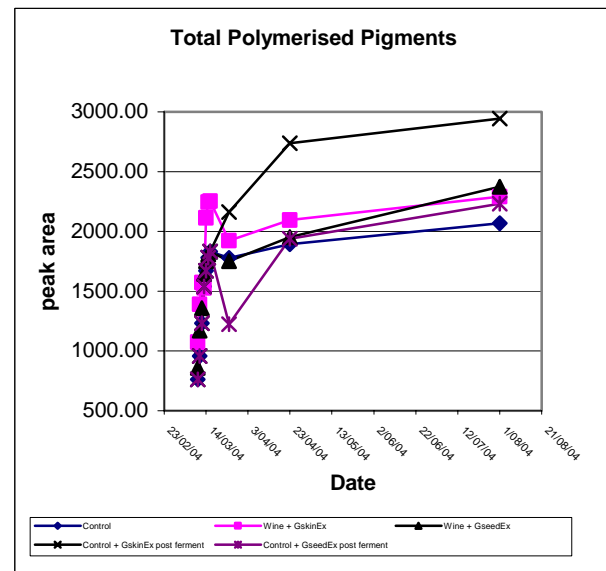


**Figure 2: Colour Hue vs time**  
 Note: Colour Hue = Abs 420nm / Abs 520nm



**Figure 3: Total Polymeric Tannins by HPLC @ 280 nm**

Note: by AWRI HPLC method



**Figure 4: Total Polymeric Pigments by HPLC @ 520nm.**

Results from Figure 1 and Figure 2 indicate that addition of either GrapEX™ grape skin or grape seed tannins had a positive effect on overall colour and hue of the resultant wines. Further, wines with both grape skin and seed tannins had more intense colour with an added purple hue. This effect was maintained over time.

It is also apparent, that addition of GrapEX™ grape skin tannin had a positive effect on total tannin content as well as concentration of polymeric pigments (percent of non-bleachable 'pigmented tannins') in wines after 6 months (Figures 3 and 4) .

The increase in polymeric peak is of particular interest as it indicates the amount of 'colour' in a stable, desirable form.

## DISCUSSION

The results indicate that treatment with GrapEX™ tannins (skin or seed) added at either crushing or after pressing (pre or post fermentation), significantly improved spectral values when compared to the control samples. The observed difference remained significant even after 6 months of storage.

SO<sub>2</sub> non-bleachable colour increased with GrapEX™ addition and showed a further increase with time relative to the control. The 'non-bleachable' pigments are of polymeric nature and have a stabilising effect on overall colour and a positive effect on taste and mouth feel properties of the wine (Waters 1997). These pigments are also more stable to oxidation and pH effects than the corresponding anthocyanins from which they are formed and provide an important pool of colour – stable compounds in red wines (Jones & Astentorfer 1997).

Sommers (1971) reported that the concentration of anthocyanins steadily declines during aging of wine and these are replaced by more stable "polymeric" pigments. Spectral and HPLC analyses confirmed that the above occurred at a higher and faster rate in wines where GrapEX™ tannins were added.

The above findings are in agreement with anecdotal evidence that addition of grape-derived tannins during or just after alcoholic fermentation is likely to support the formation of stable colour in red winemaking.

## CONCLUSIONS

In summary spectral and chemical analysis results indicate the following:

- Samples with GrapEX™ added have a higher colour density than the control, an effect maintained after 6 months.
- Samples with GrapEX™ added had an increased concentration of polymeric pigments which further increased with time.

The trial is continuing for the period of two years.

*If you would like further information on this trial or GrapEX™ contact Darko Obradovic on 08 8562 1522, 0417 852 507, email [darkoo@tarac.com.au](mailto:darkoo@tarac.com.au) or visit [www.tarac.com.au](http://www.tarac.com.au) to view the full report.*

*For GrapEX™ enquiries within New Zealand please contact Mark McGill at Kauri New Zealand Ltd on 04 910 7400 or email [mark@kauri.co.nz](mailto:mark@kauri.co.nz).*



GrapEX™ is a registered trade mark of Tarac Technologies Pty Ltd.

## REFERENCE

Jones, P.G., . & Asenstorfer, E.R., (1997) Development of anthocyanin-derived pigments in young red wine. *In Proceeding of ASVO seminar 'Phenolics and Extraction'* Adelaide, pp 33-37.

Remy, S., Fulcrand, H., Labarbe, B., Cheynier, V., Mouteunet, M. (2000) First conformation in red wine of products resulting from direct anthocyanin-tannin reactions. *J.Sci.Food Agric.*, 60, 745-751.

Somers, T. (1971). The polymeric nature of wine pigments. *Phytochemistry*, 10, 2175-2186

Waters Elizabeth. (1997) Polymerisation of tannins during the ageing of red wines In *Proceeding of ASVO seminar 'Phenolics and Extraction'* Adelaide, pp 38-39.