



2. Materials and Methods

Site

The trial was conducted from 4th December 2004 til mid December 2005 at the production facility of Portavin Melbourne (PVM) at 114-118 Talinga Rd., Cheltenham, VIC 3192.

Sample storage

Wine samples were stored at PVM, Cheltenham and Amcor Research and Technology (AR&T), Camberwell. Samples subjected to artificially high oxygen or nitrogen environments were stored in 100L tubs with resealable air-tight lids and were gassed with oxygen or nitrogen twice a week in an effort to keep the atmosphere of the tub as close to 100% gas as possible. The samples stored at ambient conditions were stored in the insulated finished goods warehouse operated by PVM.

Wine

Wine for the trial was supplied by Sirromet winery in Queensland. It was 800L of an unwooded blend of a commercial dry white wine from the 2004 vintage (04CDW). Most of the wine packaged into PET was returned to Sirromet for sale. A small amount of the packaged wine was retained by PVM for the trial. All of the wine packaged into glass was retained for the trial.

Wine Preparation

Wine arrived at PVM in 4x200L plastic drums. On the morning of bottling, the contents of the drums were pumped to a 1,000L tank. SO₂ and DO₂ were adjusted to 43ppm free and <0.7ppm respectively. Wine was sterile filtered at bottling. In an effort to minimise any dilution effects from water with the small batch handled, wine was recirculated via the filter system for 20 mins prior bottling and the first 60L in the filler was drained back to the bottling tank. Dissolved oxygen was maintained at 0.7ppm in the tank all that time.

Bottling Machinery

An MBF synchrofill (commissioned in January 2003) owned and operated by Portavin Melbourne was used to fill the glass and PET bottles for the trial. Machine output capacity was 4,500 bph however the trial was conducted at a fraction of that output due to the short run of glass (200) bottles and the fact PET bottles were not compatible with the change parts designed for burgundy shape bottles. Bottles delivered in cartons were fed by hand onto a depalettising table. Bottling followed the SOP of PVM. Bottles were singlised, rinsed, N₂ sparged, filled and screw capped and packed unlabelled into 24x187mL plain cardboard cartons. A top load of 120kg was applied to the screw cap during application. The seal was BVP rather than BVS which is now commonly used in the wine industry.



Bottles

PET

Plastic Bottles used in the trial were supplied by Amcor PET Technologies, Footscay, Victoria. Details of the PET bottle include:

- Antique green colour
- Claret shape
- 48mm wide x 163mm high
- Weight was 31gm
- Fill volume at 16mm ullage was 197mL @ 20°C; nominally called 187mL
- Date of manufacture was 1st and 2nd December 2004.
- 4,000 were supplied.
- The oxygen scavenger Amfresh™ was added during manufacture at a concentration of 2%. Amfresh™ is one of a variety of oxygen scavengers which derive from a parent group of compounds known as Amosorb™.

GLASS

Glass bottles used in the trial were manufactured by ACI and supplied by PVM, details of the bottle appear below:

- Colour was classic green
- Burgundy shape
- 53mm wide x 170mm high
- Weight was 153gm
- Fill volume at 16mm ullage was 187mL @ 20°C
- code 20290
- 217 were supplied.

From a commercial perspective in Australia, the availability of PET is quite limited and their price is currently about 30-50% more than glass 187mL bottles. More competitive pricing for PET would be expected when PET can be purchased in large volume.

Other Materials

Screw caps were 25x42 manufactured by Auscap and supplied by PVM. Cartons (24x187mL) were manufactured by Amcor and supplied by PVM. Plain pallets and stretchwrap were supplied by PVM.



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Line and staff time

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Production Order

The machinery was first set for 187mL glass production which was followed immediately by the PET production. Bottling started at 0930 on Sat 4 December 2004 and finished at 1225 a total of 2 hours and 55 minutes. Glass and PET production was noted on the carton and the treatments were stretch wrapped and stored separately on plain pallets.

Laboratory analysis

The majority of analysis was performed by PVM with some early analysis confirmed at Amcor Research and Training.

1. The following equipment was used to conduct the laboratory analysis;

Free and total sulphur dioxide	SO ₂ Still - Rankine apparatus
pH and Titratable acidity	Metrohm 719S Titrino
Turbidity	HACH 2100P Turbidity Meter
Alcohol	Alcolyser MEP Instruments Anton Paar
Dissolved oxygen	TPS AQUA DO ₂
Torque	Securepak bottle torque metre, model D/3171

2. Methods for conducting the above analysis were followed from Iland, et al (2000), and Portavin's standard laboratory procedures.

3. At each sample interval 5 replicate bottles were analysed individually. The 5 results for each sample interval and each treatment were subject to statistical analysis to assess significance.



Sensory Assessment

1. The following equipment and people were used to conduct the sensory assessment:
 - XL5 wine tasting glasses.
 - Sensory assessment panels were comprised from the staff of Portavin Melbourne who had various levels of wine tasting experience and knowledge. This was considered an advantage for this trial because the cross section of tasters was more likely to resemble the mix of consumers for 187mL product.
2. The following sensory assessment was conducted throughout the trial period;
 - a) Prior the 12 month interval;

In an effort to conserve wine sample blind tastings were conducted (rather than triangle tests) in which samples were given to panelists in a random order in a randomly numbered glass. Each panelist was asked to make notes on each wine, and record preferences. Wine sample for sensory assessment of each treatment at each interval was obtained by blending 2 bottles. This ensured enough sample for the panellists and that the same wine was being assessed without any effect from bottle variation.
 - b) For the 12 month interval;

Twelve (12) panelists participated in the sensory assessment, in which the wine samples from Glass and PET were compared using a modified triangle test. They were presented with a set of three samples in a random order. Panelists had a second attempt, latter in the day, using the same samples presented in a different order.

As well as identifying the odd sample, they were asked to determine which samples they liked and which ones they disliked. Notes on colour, nose and palate could be made.

Wine sample for sensory assessment at this interval was obtained by blending 6 bottles. This ensured enough sample for the panellists and that the same wine was being assessed without any effect from bottle variation.

Statistical analysis

1. Laboratory analysis – the results were analysed with the statistical tool pack in Microsoft Excel, using the ANOVA – single factor function.
2. Sensory assessment – the results were statistically analysed by use of the Statistical Chart 2: triangle test, probability of x or more correct judgments in n trials (one-tailed, $p=1/3$), page 80 of Poste, et al (1991).