

# 'Shining the light on Wine Shows'

## – rapid spectral wine analysis linked with show performance

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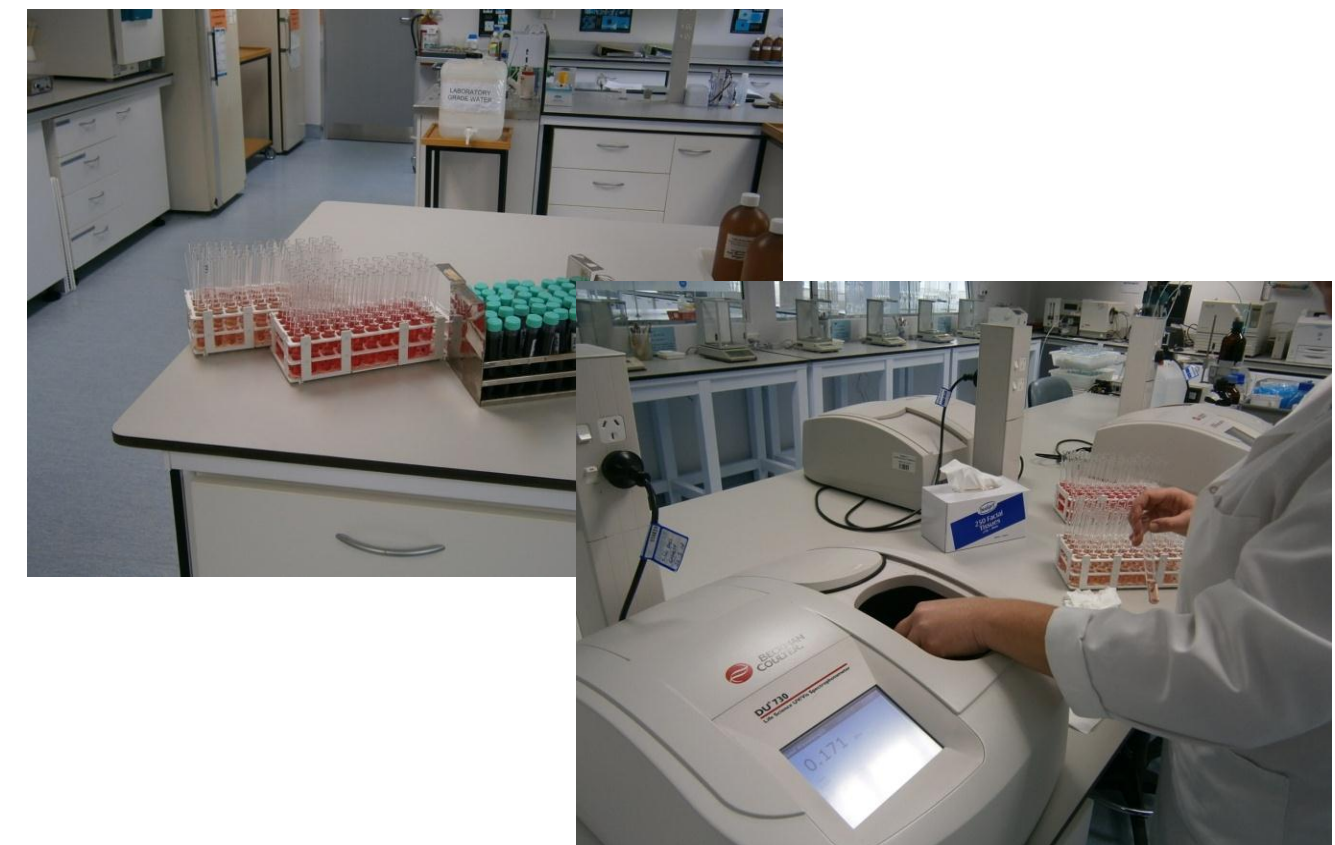


### Introduction

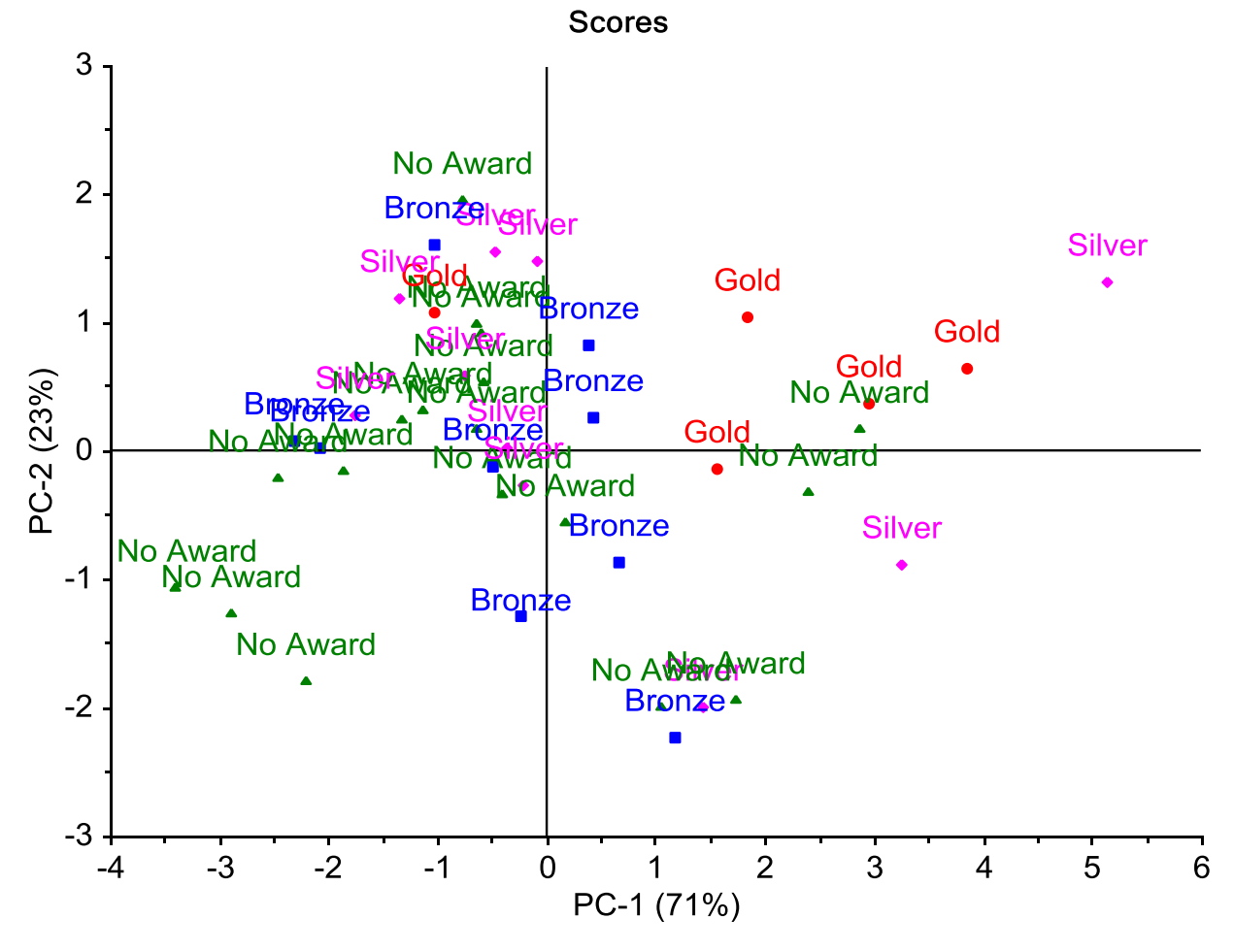
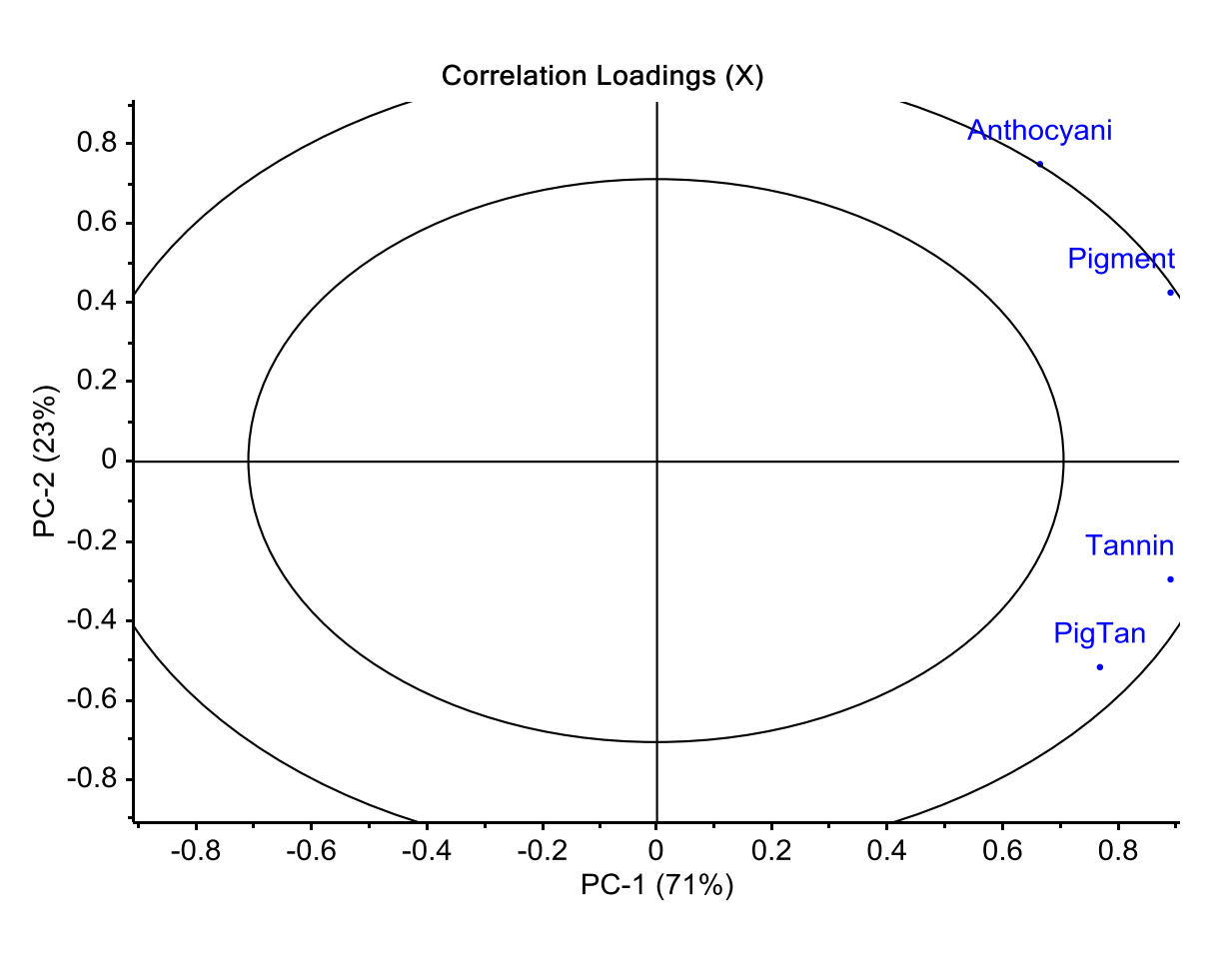
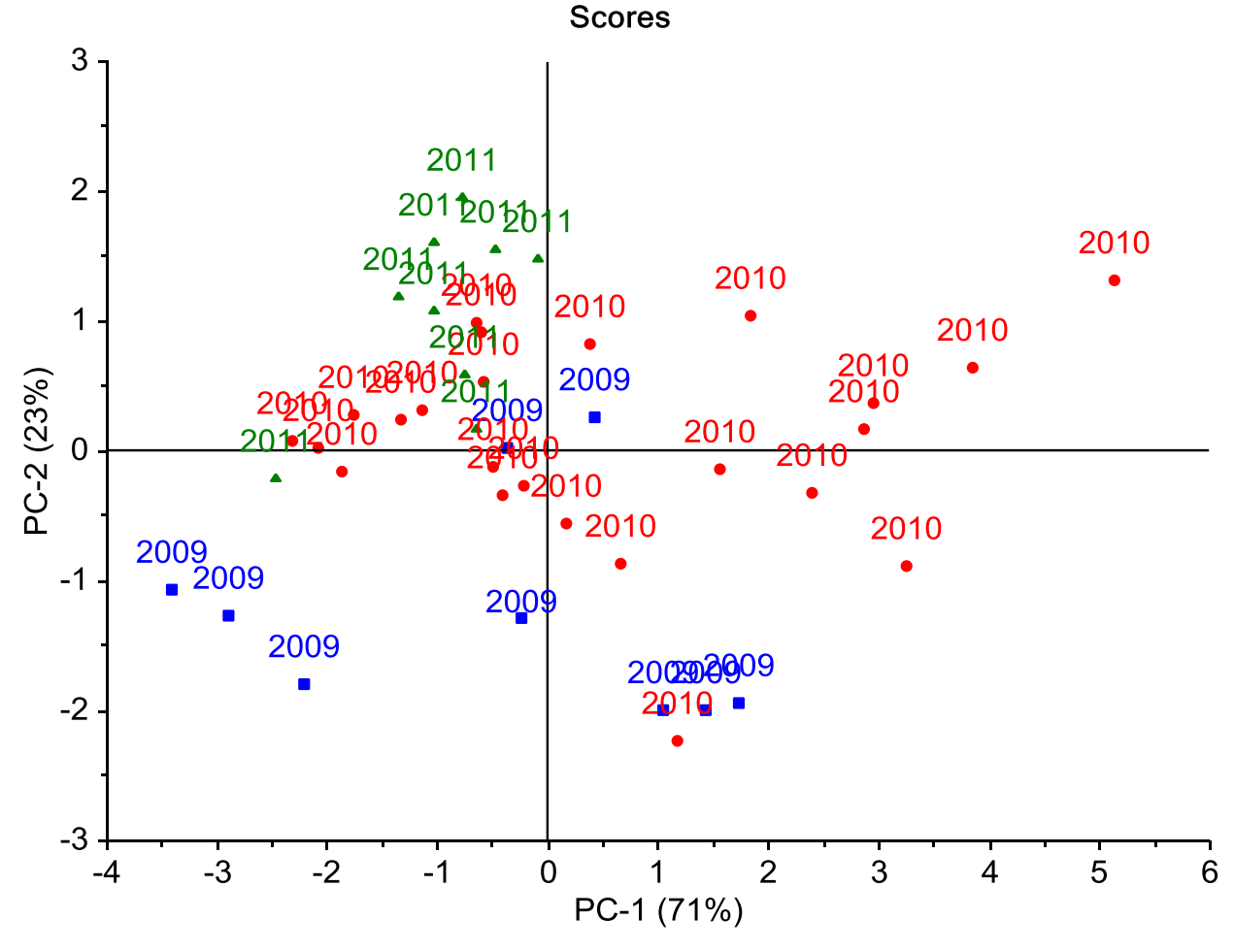
Objective measures of red wine sensory quality can streamline the winemaking process and provide important clues regarding quality drivers. Red wine quality is often linked to wine colour and tannin concentrations, with the perception that higher tannin levels and increased colour densities are found in wines of higher quality. This was tested using Syrah wines from Hawke's Bay New Zealand, using quality scores from the Hawke's Bay Wine Show.

### Method

- ❖ Syrah red wines in the 2012 Hawke's Bay Wine Show were sampled and analysed for tannin, pigment, total phenolics, pigmented tannin and free anthocyanins, using rapid spectral wine analysis with the AWRI Tannin Portal.
- ❖ Wines were judged blind by a panel of experienced wine judges scored using the standard Australian 20 point scoring system.
- ❖ The medal performance was compared with phenolics profiles: standardised phenolic analysis data was reduced using Principal Component Analysis (PCA) performed with *The Unscrambler X* (Camo Norway).
- ❖ The PCA scores were used to perform discriminant analysis and predict medal ratings from the analytical data. This was compared with the actual medal ratings the wines achieved.
- ❖ PCA loadings were used to determine the relationships between vintage, medal performance and phenolics data.



### Results



**Figure 1: PCA score plot marked with vintage**

- Vintages form clusters
- PC1 partly separates 2010 from 2011 and 2009
- PC2 separates 2011 from 2009

**Figure 3: PCA loadings for PC1 and PC2**

- PC1 (71% of the variation) is positively loaded with all the analytes
- PC2 (23% of the variation) is positively loaded for anthocyanin and total pigment, negative for others
- 2010 was the coolest vintage and tended to be higher in tannin and colour
- 2009, 2011 had low tannin, but 2011 had higher colour than 2009
- Gold medal wines tended to be higher in both tannin and colour
- Silver medal wines high in colour, but not necessarily tannin

**Figure 2: PCA score plot marked with medal**

- Gold medal wines tend to be towards top right quadrant described by both PC1 and PC2
- Silver medal wines are spread along both PC1 and PC2 (upper half)
- Bronze and no medal wines are scattered

|           | 2009 | 2010 | 2011 |
|-----------|------|------|------|
| 2009      | 7    | 1    | 0    |
| 2010      | 1    | 20   | 0    |
| 2011      | 1    | 3    | 9    |
| % correct | 77.8 | 83.3 | 100  |

**Table 1. Vintage discriminant analysis**

4 PC scores from PCA of phenolics data were used to discriminate vintages. The table shows actual vintages in columns, predicted vintages in rows.

- All 2011 wines were predicted correctly
- 20 out of 24, 2010 wines were predicted correctly
- 7 out of 9, 2009 wines were predicted correctly
- This data confirms that vintages have distinctive phenolic profiles

|           | No medal | Bronze | Silver | Gold |
|-----------|----------|--------|--------|------|
| No medal  | 11       | 1      | 0      | 0    |
| Bronze    | 4        | 6      | 2      | 0    |
| Silver    | 1        | 1      | 8      | 0    |
| Gold      | 2        | 1      | 0      | 5    |
| % correct | 61       | 67     | 80     | 100  |

**Table 2. Medal discriminant analysis**

4 PC scores from PCA of phenolics data were used to discriminate medals. The table shows actual medals in columns, predicted medals in rows.

- all 5 Gold medal wines were predicted correctly
- 8 out of 10 Silver award wines were predicted correctly
- 6 out of 9 Bronze award wines were predicted correctly
- 11 out of 18 No Award wines were predicted correctly
- incorrect classifications tend to be in adjacent categories

### Conclusions

#### Using phenolics portal data:

- ❖ Vintage can be discriminated, with 2010 vintage having a group of wines with highest values of all analytes
- ❖ Gold medal wines can be 100% discriminated and are high in all phenolic measures, but tend to be weighted slightly towards colour
- ❖ Silver medal wines can be 80% discriminated and are more loaded for colour, without necessarily high tannin
- ❖ The scatter of Bronze and no medal wines suggests another order of sensory discrimination, not described by phenolics

**Gold medal winners are high in both tannin and colour !!**



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