

Grape and Juice analysis



Vintage 2007

Grape 'quality' assessment analyses

The recognition of the importance of grape 'quality' assessment has increased as the Australian wine industry continually strives to improve grape and wine 'quality'. This recognition has led to an increase in the range of analyses used to assess 'quality' in vineyards and wineries throughout Australia. Although the traditional **brix, pH and titratable acidity** are an essential part of the grape maturity analysis, other analyses such as **colour** are being used as further measurements of 'quality'. Another useful and topical analysis available is **smoke taint**. Following harvest, juice analysis for **yeast assimilable nitrogen** is an important tool to prevent stuck or sluggish fermentations.

What can I use these assays for?

You will be able to use these assays to:

- determine optimal harvest time;
- assess the effect of viticultural practices on berry composition;
- compare the development of anthocyanins and tannins in grapes from different blocks during ripening;
- observe differences between vineyards at harvest;
- observe differences between grapes harvested from the same location in different vintages;
- compare nitrogen levels in juice and optimise fermentation conditions for yeast

Which samples are best?

Berry samples are likely to provide the most useful colour result for assessment of the ripeness of the fruit and can be used in conjunction with brix and pH to decide when to pick the fruit. We will provide containers and labels for the berries, so that you will be able to include all the sample details.

How can I take a 'representative' sample?

We recommend taking a large random sample of berries from all over the vineyard or truck or bin (approximately 1,000 berries), mix them together in a tray and take a sub-sample that **nearly fills** (approximately 200 berries) the provided container. Submitting multiple samples from different vineyards is recommended due to the natural variability among vineyards. Correlating your results with your own observations and from vintage to vintage will help to develop this useful tool for assessment of grape quality. **Please note the requirement for separate samples if you want pH or titratable acidity and colour.**

How do I send my grapes to you without breaching the quarantine regulations?

The AWRI has an import permit for frozen grape material, allowing us to receive grapes from interstate. Please contact us for more information.

Quarantine requirements regarding the importation of grapevine material from phylloxera infested areas to South Australia are available through Plant Health Operations, Primary Industries and Resources SA (PIRSA), contact Bruce Baker 1300 666 010.

The Australian Wine Research Institute
Analytical Service

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- **Titratable acidity and pH**

Titratable acidity and pH provide measures of acidity of the grapes and their hydrogen ion concentration and are measured on free run juice from fresh grapes. **They cannot be measured from frozen samples due to the insolubility of tartrates on freezing.**

- **Brix**

Brix is the measure of the sugar or soluble solids concentration of the grapes and can be measured on juice or grape homogenates. Brix can be easily converted to baumé by dividing the brix result by 1.8.

- **Yeast Assimilable Nitrogen (YAN)**

Slow and stuck fermentations are often associated with sulfide formation. This new analysis is available to provide wineries with information about the nitrogen status of their juice and to avoid or minimise nitrogen related fermentation problems. The analysis will also provide information that will allow wineries to determine optimum additions of di-ammonium phosphate (DAP).

YAN is measured in two steps, as yeast can assimilate nitrogen as ammonia and as alpha amino nitrogen. The two measurements together enable YAN to be calculated. YAN levels range from 50-450mg/L in Australia.

Price per sample (excluding GST)

| Analysis | 1-3 samples | 4-7 samples | 8+ samples |
|--|------------------------------|-------------|------------|
| Basic juice panel (Titratable acidity, pH and brix) | \$39.00 | \$37.00 | \$35.00 |
| | (\$54 if priced separately) | | |
| Juice panel (Titratable acidity, pH, brix and YAN) | \$96.00 | \$90.00 | \$85.00 |
| | (\$133 if priced separately) | | |
| Volume Required | 200 berries OR | | |
| | 50mL juice | | |
| Target response time ☺ | 2 days | | |

A handling fee of \$25 exclusive of GST applies per invoice.

☺ **Response time may vary depending on sample numbers submitted and the current workload in the laboratory and refers to working days after receipt of samples.**

This year the Analytical Service will be using FTIR technology on juice samples enabling improved efficiency and shorter turnaround times for maturity testing.

Berries:

Package the berries in the berry containers provided. Please advise us how many containers you require. It is preferable to **chill** the berries prior to dispatch and to pack them so that they will remain **cold** during the journey as freezing is **not suitable if pH or titratable acidity is required**. **Berries can be frozen if for Brix or YAN analysis only.**

Juice:

Juice can either be submitted in the provided containers or in any other **plastic** vessel. It is advisable to add a protective amount of SO₂ (~ 200mg/L) to prevent fermentation. **Freezing is not suitable if pH or titratable acidity is required**. **Juice can be frozen if for Brix or YAN analysis only.**

Please note: If you require a combination of any of the analyses mentioned in this publication, please submit separate samples as specified by the volume required. For advice or sample containers contact the Analytical Service prior to submission of samples.

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- **Colour measurement**

Colour is an important parameter in Australian viticulture and winemaking when measuring grape quality. Colour analysis provides a measurement of total anthocyanins in red grape berries and is performed on grape homogenate as the bulk of the colour is found in the skins. Anthocyanins and phenolics are extracted from the grape berry during the fermentation process.

- **Tannin measurement**

The AWRI has developed a new method allowing tannin quantification in wine and grape samples. The method, called the MCP (Methyl Cellulose Precipitable) tannin assay, is based on precipitation of tannin with methyl cellulose and a UV-Vis measurement at Abs 280 nm (for total phenolics). The MCP tannin assay is a robust selective method to quantify the pool of tannins and provide the winemaker with information which can assist in improved understanding and management of the tannins in the process from berry to bottle.

Price per sample (excluding GST)

| Analysis | 1-3 samples | 4-7 samples | 8+ samples |
|--|-------------|-------------|------------|
| Colour & phenolics profile - red berries/homogenate (anthocyanins, phenolics, MCP tannins) | \$72.00 | \$67.00 | \$65.00 |
| Anthocyanins ONLY - red berries/homogenate | \$40.00 | \$38.50 | \$37.50 |
| MCP tannins ONLY - red berries/homogenate | \$41.00 | \$38.00 | \$37.00 |
| Volume required | 200 berries | | |
| Target response time ☺ | 5 days | | |

A handling fee of \$25 exclusive of GST applies per invoice.

☺ **Response time may vary depending on sample numbers submitted and the current workload in the laboratory and refers to working days after receipt of samples.**

Berries:

Package the berries in the berry containers provided. Please advise us how many containers you require. It is preferable to **freeze** the berries prior to dispatch and to pack them so that they will remain frozen during the journey.

Homogenate:

Homogenate can either be submitted in the provided containers or in any other **plastic** vessel. You will need to **freeze** the homogenate prior to dispatch.

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How do I interpret my results?

Results of the Institute's research on typical anthocyanin levels in grapes from different regions and in different varieties (see table below).

| °Brix range | COLOUR (mg/g) | Shiraz | Cabernet Sauvignon | Merlot | Grenache |
|-------------|---------------|--------|--------------------|--------|----------|
| 20.1-22.0 | min | 0.37 | 0.21 | 0.37 | 0.35 |
| | max | 2.35 | 2.09 | 1.73 | 0.78 |
| | average | 1.22 | 1.15 | 1.00 | 0.5 |
| 22.1-24.0 | min | 0.46 | 0.52 | 0.29 | 0.42 |
| | max | 2.47 | 2.69 | 2.45 | 0.89 |
| | average | 1.38 | 1.37 | 1.26 | 0.56 |
| 24.1-26.0 | min | 0.47 | 0.55 | 0.53 | 0.32 |
| | max | 2.73 | 2.81 | 2.22 | 0.83 |
| | average | 1.59 | 1.51 | 1.46 | 0.55 |

Data from samples analysed at AWRI over the period 1996 to 2003

• Smoke Taint

The tainting of grapes and wine by bushfire smoke is an industry problem, highlighted by the events of 2003 in Victoria, NSW and WA and the current fires in Victoria and Tasmania. **Guaiacol** and **4-methylguaiacol** were emphasised as important compounds contributing to 'smoky' taint in juice and wines, attributed to bushfire smoke. The AWRI Analytical Service has an inexpensive and rapid method to accurately measure these compounds in grapes, juice and wine, with sensitivity to levels less than the sensory threshold, approximated at 6 µg/L. If you suspect your fruit has been affected by smoke taint, please contact Randell Taylor, Trace Analysis Laboratory Supervisor on telephone 08 8303 6600 or email randell.taylor@awri.com.au

Price per sample (excluding GST)

| Analysis | 1-3 samples | 4-7 samples | 8+ samples |
|---|--------------------------------|-------------|------------|
| 4-methylguaiacol & guaiacol in juice/wine | \$93.00 | \$88.00 | \$85.00 |
| 4-methylguaiacol & guaiacol in grapes | \$106.00 | \$102.50 | \$97.50 |
| Volume required | 200gm berries OR 50mL juice | | |
| Target response time ☺ | 5 days | | |

A handling fee of \$25 exclusive of GST applies per invoice.

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Berries:

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Juice:

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Checklist for submitting samples

- ☐ Check that the samples can be analysed within the target response time.
- ☐ Ensure each sample has a unique number.
- ☐ Make sure the sample label will not wipe off, smudge or wash off in transit. If in doubt, write the unique sample number on the containers and the lid with an indelible marker. Condensation on the surface of frozen sample containers or leaking/broken bottles can lead to the labels being illegible.
- ☐ Check that the sample will reach the laboratory in a "sound condition". Add sealed ice packs if necessary. If your vineyard/winery is remote or the weather particularly hot make sure sufficient ice packs are enclosed to keep the sample intact. We cannot return icepacks or shipping containers.
- ☐ Retain a sub-sample in case samples are lost during shipment/damaged or unsuitable for analysis.
- ☐ If your shipment includes frozen items or bottles which may leak, please make sure a copy of your requirements and purchase order are placed in a sealed "zip lock™" bag, so they remain legible. Alternatively, place the purchase order in a secure envelope on the outside of the shipping container.
- ☐ If large numbers of samples are to be analysed, let us know in advance if that is possible. We have limited storage space. If several containers are sent mark each container as number / number of containers (ie 1/5 would indicate box 1 in a shipment of 5 boxes).
- ☐ Send a manifest (ie list of all samples being shipped). This will help us to check that the whole shipment has been received.

For more information, contact Randell Taylor or Leanne Craddock at The Australian Wine Research Institute on telephone **08 8303 6600**, facsimile **08 8303 6621**, or email: randell.taylor@awri.com.au or leanne.craddock@awri.com.au

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