

## Managing *Botrytis* infected fruit

### What is it?

*Botrytis cinerea* is a weather driven fungus which causes the grapevine diseases botrytis bunch rot and grey mould. High humidity or prolonged rain in conjunction with cool or mild temperatures results in persistent moisture on berry surfaces and promotes infection and disease development. Previously infected sites and sheltered vineyard areas such as hollows are at greatest risk of developing the disease.

### What are the implications?

Managing *Botrytis* in the vineyard can be a challenge because many factors contribute to infection and disease development. *Botrytis* can cause two problems during winemaking. First, it produces the oxidative enzyme 'laccase', which in the presence of oxygen can cause oxidative spoilage. Second, the presence of *Botrytis* can lead to the presence of a mouldy character in the resultant wine. Preventing this enzyme from causing damage requires techniques that minimise or eliminate exposure to oxygen. Eliminating or minimising the quantity of *Botrytis*-affected fruit processed will reduce the potential effects of oxidative damage, however, a holistic approach is required which involves many aspects of the winemaking process.

*Botrytis* infection in red grapes will require different treatments to infection in white grapes. The following processing strategies will help reduce the oxidative damage that can be caused by *Botrytis* infected fruit.

### Strategies to use for red and white grapes

Minimise the quantity of mould-affected fruit at harvesting. For crops picked by hand, fruit can be selectively harvested and infected fruit avoided. Pickers must be able to [recognise](#) *Botrytis* bunch rot and know which bunches should be avoided.

If the vineyard is to be machine harvested, send hand pickers through the vineyard to remove the worst affected fruit prior to machine harvesting.

Add more sulfur dioxide (SO<sub>2</sub>) than usual (in the range of 60-80 mg/L) due to the increased risk of oxidation from laccase (although SO<sub>2</sub> does not inactivate laccase) and because there is likely to be a higher than usual population of other unwanted microorganisms if *Botrytis* is present.



## White grapes

Whole bunch press with CO<sub>2</sub> cover. Assess press fractions for mouldy taint carefully.

Add pectic enzyme at the higher end of the recommended range and cold settle at low temperature to achieve rapid settling. Extra additions of pectic enzyme might also be required if settling.

Rack and discard the heavy lees.

Trial and add bentonite to remove mouldy characters and settle for 24 hours. Recommended starting rate is 0.5 – 1 g/L bentonite.

Rack off bentonite lees.

## Qualitative test for laccase activity

A simple bench test can be used to obtain a qualitative result. Sulfur dioxide is added to the sample in question to give a total SO<sub>2</sub> concentration of about 60 mg/L. The sample is then poured into two wine glasses (approximately 50 mL of sample in each glass) and each glass is covered with a watch glass or petri dish lid. One sample is placed in a refrigerator, whilst the other sample is left 'on the bench'. The samples are examined after 24 hours and compared for any change in colour or quality. If there is laccase activity, the sample left on the bench should be more brown than the sample left in the fridge and there may be an oily film on the surface of the wine.



After 24 hours:

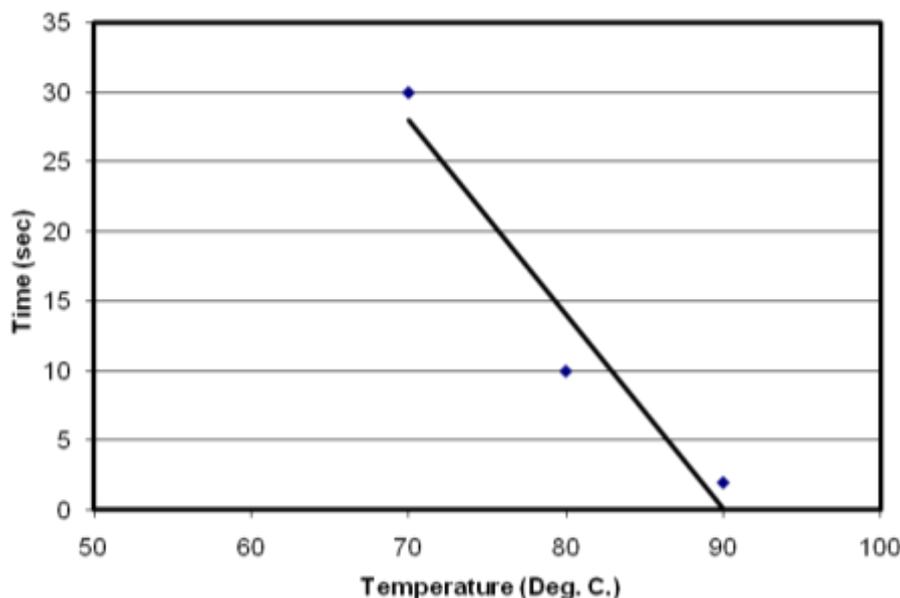
Fridge sample

Bench sample

## Quantitative test for [laccase](#) activity

Quantitative determination of laccase activity can be achieved using a number of commercially available test kits. AWRI Commercial Services perform simultaneous quantitative and qualitative analysis for laccase activity.

If laccase activity is detected, heat treatment (pasteurising) should be considered to deactivate the laccase enzyme before conducting the fermentation. It is recommended that the juice (or wine) be pasteurised at a minimum temperature of 65°C for 40 seconds.



Graph prepared from data provided by Dr Roger Boulton (pers. Com.)

If heat treatment is not available, initiate fermentation. Addition of 0.1 – 0.2 g/L of bentonite during fermentation might be beneficial.

As SO<sub>2</sub> can inactivate thiamine, the addition of thiamine to the must should be considered.

The lees will contain much of the laccase, so it is important to rack off fermentation lees as soon as possible after the fermentation is complete, and keep wine in stainless steel with inert gas cover.

Test for laccase activity: if positive, further racking can be beneficial in order to remove all fermentation lees. However, if laccase activity is still detected in the wine after subsequent racking, heat treatment of the wine might be necessary.

### Red grapes

Minimise the time between crushing and inoculating. Cold soaking should be avoided.

Addition of greater yeast inoculums as a sacrificial culture could assist with binding of free SO<sub>2</sub>.

Addition of 200-500 mg/L of an oenological tannin at crushing will bind the laccase enzyme (note that tannin addition can change wine style).

Where practical, separate heavy fermentation lees at pressing, utilising the carbon dioxide (CO<sub>2</sub>) produced during fermentation for coverage, and press to stainless steel not oak.

Rack off gross lees after 24 hours and test for laccase activity. If laccase activity is still detected in the wine after subsequent racking, heat treatment of the wine might be necessary.

These wines are often difficult to clarify and filter due to the presence of long chain [polysaccharides](#) which are produced by *Botrytis*. A suitable enzyme (see 'Pectic and lysozyme enzyme preparations

available for winemaking - 2009/2010' in *Technical Review* 182) to assist with clarification and filtration might be required at a later stage.

### Further reading and References

Further reading on other vineyard-derived moulds can be found in Godden, P. Management of various vineyard-derived moulds during winemaking. *Technical Review* 129: 13-17; 2000.

Boulton, R.B.; Singleton, V.L.; Bisson, L.F.; Kunkee, R.E. Principles and practices of winemaking. New York: Chapman & Hall; 1996: 459.

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Somers, T.C. *Botrytis cinerea* - consequences for red wines. *Australian Grapegrower and Winemaker (Aust. Grapegrower Winemaker)* (244) Ryan Publications: Adelaide, SA: 80, 83, 85; 1984.

### Contact us

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