



## MANAGING BOTRYTIS-INFECTED FRUIT

The past week of excessive heat and humidity have significantly increased the risk of fungal infections – both *Botrytis* and other mildew infections – in our vineyards. We have been seeing a large number of brown juices at the lab.

Infected fruit is at risk of developing unpleasant aromas, often described as phenolic and mouldy, and may result in decreased fruit character through the destruction of fruity esters and monoterpenes. Infected grapes usually support larger populations of other unwanted spoilage microbes which may produce ethyl acetate, acetic acid and other negative aromas. Laccase is the oxidative enzyme produced by *Botrytis* and can cause serious oxidative damage in the presence of oxygen. Where present, laccase may continue to be active after fermentation and may cause premature ageing, browning in white wines, and low colour and colour instability in red wines.

Normal processing protocols need to be modified when handling infected grapes. Infection rates as low as 3% may negatively affect the sensory qualities of the juice. It is also reported that laccase activity can precede the visual appearance of *Botrytis* infections in the vineyards by as much as 3 days.

The two most important goals when dealing with rot-infected grapes are as follows:

- minimize oxygen exposure
- try to eliminate the laccase

To test for the presence of laccase activity:

Add 60mg/L SO<sub>2</sub> to two samples of juice, each in a covered wine glass. One glass should be left overnight in the fridge and the other on the bench. Browning of the bench sample compared to the fridge sample indicates laccase activity. The faster the bench sample browns, the higher the level of laccase activity.

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For white grapes:

- Sort all infected fruit, discard as much of the infected fruit as possible.
- Add at least 60mg/L SO<sub>2</sub> in the vineyard to prevent oxidation and to suppress the growth of other unwanted spoilage microbes. Note that SO<sub>2</sub> will not inactivate laccase.
- Whole-bunch press where possible
- Free-run juice has a lower laccase content and so should be kept separate from press fractions.
- Use CO<sub>2</sub> to exclude oxygen where possible.
- Pectinase and β-glucanase preparations should be added and juice should be rapidly settled at low temperatures using any or a combination of PVPP, casein, bentonite or other settling agents to assist settling and remove off-aromas. Tannin additions are also thought to reduce laccase activity.
- Discard the lees as it will contain higher levels of laccase.
- Where infection levels are high, fine, settle and rack a second time.
- Juice NTU should be approximately 100.
- Measure YAN levels as fruit is usually depleted of nutrients. Complex nutrients, including amino acids, DAP and vitamins, particularly thiamine, should be added at 3 recommended addition stages (see prev blog).
- Increase yeast inoculation rates to 30g/HL.
- Ferment at higher than normal temperatures, up to 20°C, to reduce any stress on the fermentation yeast.
- After fermentation rack off heavy lees as soon as possible as the lees will contain most of the laccase.
- Continue to work with CO<sub>2</sub> and minimize oxygen contact.
- Fine with PVPP and casein if off-aromas and phenolic characters are present – do trials first.
- Repeat laccase activity test and rack off fine lees if test is positive.
- Flash pasteurization inactivates laccase and should be considered if laccase is still present.

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For red grapes:

- Sort all infected fruit, discard as much of the infected fruit as possible.
- Add at least 60mg/L SO<sub>2</sub> in the vineyard to prevent oxidation and to suppress the growth of other unwanted spoilage microbes. Note that SO<sub>2</sub> will not inactivate laccase.
- Do not cold soak.
- Do not add additional SO<sub>2</sub> as this will prevent tannin/pigment polymerization and reduce colour stability.
- Add oenological tannins to the must at 20-50g/HL, depending on quality of grapes and required wine style.
- Ferment at higher temperatures, up to 30°C, to increase colour extraction and colour stability;
- Use CO<sub>2</sub> at pressing and aim to exclude oxygen.
- Separate press fractions.
- Rack off fermentation lees either at pressing or 24hours after pressing.
- Test for laccase activity and settle and rack again.
- Consider flash pasteurization if laccase activity persists.
- Do not put wines in barrel until the test for laccase is negative.
- Clarification enzymes may be required before bottling.

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