

Botrytis – implications in wine development

Over the past few months, almost one in every five requests for assistance taken by the AWRI's winemakers has related in some way to the presence of botrytis and laccase. Questions are now relating to how affected wines should be treated post-fermentation, ageing and before bottling. Here are some of our responses.

What is laccase?

Wines made from grapes affected by *Botrytis cinerea* may contain laccase, a polyphenol oxidase enzyme which, due to its relative stability in wine, is capable of causing serious oxidative damage, both before and after primary fermentation, including browning and premature ageing of wine.

How is laccase measured?

The measurement of laccase activity is conducted traditionally by determining the rate at which the laccase enzyme oxidises the phenolic substrate syringaldazine to a purple-coloured oxidation product. The colour change is measured using a spectrophotometer with the activity expressed as units of laccase activity per mL (U/mL).

Quantitative determination of laccase activity can also be achieved using a number of test kits available commercially based on the method above, however, the activity is determined by comparing the colour change to an incremental colour scale provided in the kits indicative of increasing oxidative risk. It is important to note that the kits available commercially have different incremental colour scales which cannot be interchanged for laccase activity interpretation. Some kits report laccase activity in units of activity per mL (U/mL) while other kits report laccase activity as simply 'units of laccase'.

At what levels of laccase do I need to take action?

Visually low levels of botrytis (<10% infection) result in <4U/mL laccase activity with visually high levels of botrytis reporting levels from 4–30U/mL. For the test kits, generally speaking, the lowest levels on the several scales we have observed are indicative of positive botrytis infection.

Does the laccase test underestimate potential laccase activity in wine?

Reasons for this could be that laccase is extracted further from skins in red ferments, and/or there might be

compounds present which protect the laccase enzyme from destruction. Lightly pressed red juice samples may not provide the most adequate representation of laccase extraction in a red wine ferment and so it is best to test for laccase in the finished wine.

Deeply-coloured Shiraz has also proven difficult to effectively decolourise to perform the laccase test. The method relies on the ability to detect a purple colour change.

Samples should ideally be colourless before performing the test to aid with interpretation. Different kits provide different means to decolourise samples, generally through a mixture of PVPP and carbon.

Sulfur dioxide and tannins can also interfere with results obtained from these tests.

Appropriate actions

The best option for inactivating laccase in wine is the application of pasteurisation (minimum of 65°C for 20 seconds). Subsequent cooling after heat treatment should be rapid to minimise any negative effects of treatment.

Struggling MLF fermentation

High levels of malic acid (>4g/L) are being observed this year, with some winemakers struggling to start their ferments and suspecting a botrytis-related cause. For affected wines it is ideal to get your ferments through quickly to minimise any possible oxygen exposure should laccase persist. Try using a malo starter culture and slowly scaling up the volume before adding to the wine. If you have previously pasteurised your wine, you must inoculate with MLF bacteria as indigenous bacteria will be destroyed during heat treatment.

Acid levels – my Baume was the same value as my TA!

If you have harvested earlier to minimise botrytis infection, then you may now have wines with very high titratable acidity (TA). Whilst some TA may be removed during cold stabilisation, and with MLF fermentation, you can also consider deacidification of the wine by treatment with calcium carbonate or potassium bicarbonate.

My wine is now difficult to clarify and filter

This could be due to botrytis-derived glucans. Glucanase enzymes are available which break down these glucans that

AUGUST WORKSHOPS

The Australian Wine Research Institute will be hosting 'packaging workshops' in Victoria and South Australia this month. There is a cost for each workshop, which includes morning tea and lunch, and contact details for booking are as follows:

17 August 2011

AWRI Gippsland Packaging Workshop
Venue: Century Inn, 5 Airfield Road, Traralgon, VIC 3844
Contact: Alistair Hicks, Mob. 0411 079 073 or email: mail@bluegables.com.au

19 August 2011

AWRI Rutherglen Packaging Workshop.
Venue: Tuileries Complex, Drummond St, Rutherglen VIC 3685
Contact: Julia Brown, Winemakers of Rutherglen, on Ph: (02) 6033 6301 or email: julia@winemakers.com.au

31 August 2011

AWRI McLaren Vale Seminar
Venue: McLaren Vale and Fleurieu Visitor Centre, Main Rd, McLaren Vale
Contact: Anna Novy, McLaren Vale Grape, Wine & Tourism Association on Ph: (08) 8323 8999 or email: anna@mclarenavale.info

then allow the wine to settle or to be filtered effectively.

Wine storage considerations

Wines that have been effectively treated for botrytis (laccase, glucans) should be safe to age in tank or oak but it is advisable to err on the side of caution and treat the wines as 'higher risk'. Oxidation of wine due to low level laccase activity will only occur in the presence of oxygen. Therefore maintaining anaerobic conditions at all times, including barrel or tank storage or during the winemaking process, is of paramount importance.

Any queries?

Our winemaking and viticulture specialists are available to help Australian wine and grape producers. Call us on 08 8313 6600 or email at: winemakingservices@awri.com.au. 