Can 'Brett' affect white wines?

Adrian Coulter

IT IS well known Brett spoilage can occur in red wines, however, can Brett spoilage also occur in white wines? The short answer is "yes"!

The first case of Brett spoilage in a white wine investigated by the AWRI was in 2000, and there have been occasional cases investigated since then.

However, an unusual trend has occurred recently with six cases of Brett in white wine investigated in the past six months.

The level of 4-ethylphenol (4-EP), responsible for the Band-aid® aroma associated with Brett growth, ranged from 77 to 1320 µg/L in these wines.

How can Brett off-flavour occur in white wines?

4-EP and 4-ethylguaiacol (4-EG), the two main compounds associated with Brett, originate from two hydroxycinnamic acid precursors: p-coumaric and ferulic acids.

These acids are found in both red and white grapes. So, given the precursor compounds for 4-EP and 4-EG are present in white wines, there is potential for 4-EP and 4-EG to be generated if Brett grows in a white wine.

What white varieties have you seen Brett problems in?

Chardonnay is the white variety most frequently affected by Brett characters.

The six cases of Brett in white wine investigated in the second half of 2013 were all Chardonnay wines. Brett has also occasionally been observed in Riesling and in sparkling base wines where Chardonnay has been a component.

Why can I see Brett characters when the level of 4-ethylphenol is quite low?

For two of the six white wines investigated last year, the level of 4-EP was 77 µg/L in one and 168 µg/L in the other.

Many tasters would not recognise red wines with these levels of 4-EP as being 'Bretty', so why are such levels recognisable in white wines?

A large part of the answer lies with the 4-EP to 4-EG ratio (4-EP:4-EG). If the amount of 4-EG relative to 4-EP is increased, the wine is rated higher for 'Brett' characters (Curtin et al. 2008).

That is, the threshold of 4-EP is decreased in the presence of increasing 4-EG concentration.

The six Chardonnay wines investigated in 2013 had high levels of 4-EG relative to 4-EP, which amplified the sensory effects of the 4-EP.

What is responsible for the recent increase in Brett in white wines?

This is a difficult question to answer, but some possibilities are listed below:

- Riper fruit: Higher average temperatures might increase ripeness, resulting in higher pH and phenolic content in the fruit. With increasing phenolic content, there would be an increase in the level of the volatile phenol precursors. With higher pH, sulfur dioxide (SO_2) is less effective at controlling Brett. Riper grapes and higher alcohol levels might also increase the likelihood of residual sugar in wines, favouring Brett growth.
- 'Natural' winemaking: An increasing trend to make 'natural wines', where there is limited, or no, use of SO_2 at the crusher and during ageing increases the likelihood of Brett growth and also other micro-organisms.
- Storage on yeast lees: Barrel-fermented Chardonnay wines are often stored on lees; this will increase the total nitrogen content, helping to support any possible Brett growth.
- Adaptability: It might be that Brett is becoming more adapted to the generally harsher conditions of white wine (e.g. lower pH, higher SO_2).
- Chardonnay winemaking: Techniques commonly used when making Chardonnay wines may increase risk of Brett. For example, using skin contact time to achieve texture may extract more volatile phenol precursor compounds and putting wines through malolactic fermentation can leave them susceptible to Brett growth while SO_2 levels are low.
- Lower thresholds: There is a learning effect with repeated exposure to the aroma of Brett, so perhaps over time industry personnel are becoming more sensitive.

How can I control Brett growth in white wines?

Control of Brett in white wines is approached the same way as with red wines.

Control can be achieved by implementing a range of winemaking strategies that aim to reduce the population and proliferation of Brett.

Areas to be addressed include general cleaning and sanitation, management of residual nutrients (G+F and nitrogen), sulfur dioxide (at least 0.6 mg/L molecular) and pH (pH and SO_2 are inextricably linked), turbidity/clarification and barrel management (Coulter et al. 2003).

All these winemaking aspects should be addressed concurrently as part of a holistic approach.

CONCLUSION

Note that, like Saccharomcyes, Brett like oxygen, so take extra care during any rackings or transfers, and be on guard after any of these processes, as exposure to air (oxygen) will stimulate Brett growth. Always test wines for free AND total SO_2, as any observed increase in the level of bound SO_2 is nearly always a warning sign of either oxidation and/or yeast growth.

Sometimes the yeast growth is Brett, so acting early, as soon as a larger-than-usual increase in bound SO_2 is observed, can help to avoid a bigger problem later.

Contact: For more information, contact the AWRI Winemaking Services team at winemakingservices@awri.com.au or 08 8313 6600.

REFERENCES:

Coulter, A.D.; Robinson, E.; Cowey, G. Francis, I.L. Lattey, K. Capone, D. Gishen, M. Godden, P. (2003) Dekkera/Brettanomyces yeast — An overview of recent AWRI investigations and some recommendations for its control. Proceedings of a seminar organised by the Australian Society of Viticulture and Oenology, held 10–11 July 2003, Tanunda, SA: Australian Society of Viticulture and Oenology; 2003: 41–50.

Curtin, C.; Bramley, B.; Cowey, G.; Holdstock, M.; Kennedy, E.; Lattey, K.; Coulter, A.; Henschke, P.; Francis, L.; Godden, P. (2008) Sensory perceptions of 'Brett' and relationship to consumer preference. Proceedings of the 13th Australian Wine Industry Technical Conference, 28 July to 2 August 2007: 207–211.

Brett like oxygen, so take extra care during any rackings or transfers, and be on guard after any of these processes, as exposure to air (oxygen) will stimulate Brett growth.