Not so pretty in pink

WHAT IS PINKING?

Pinking is a term used to describe the sudden and unexpected development of a salmon/bronze colour in white wines after bottling or when poured into a glass.

Although the aroma and flavour of the wine generally remain unchanged, the pink colour often can be misconstrued as the brown colour more typically associated with wine oxidation. This appearance can subconsciously influence the consumers' expectation of the taste of wine, with pink wines often considered oxidised.

WHEN DOES PINKING OCCUR?

To preserve freshness, colour and aroma, some aromatic white wine styles are produced in almost the complete absence of oxygen, by using inert gases and higher amounts of preservatives such as sulfur dioxide (SO_2).

When such wines are suddenly exposed to oxygen (during bottling or when poured into a glass), a pink colour can sometimes develop.

WHY DOES IT HAPPEN?

The chemistry:

Margalit (1997) suggested that pinking is due to a slow accumulation of flavenes (a colourless anthocyanin compound with SO_2 attached).

Normally, precursors to these compounds are oxidised during white winemaking by the presence of oxygen and converted to yellow-brown pigments.

In some reductively made wines, however, these accumulated flavenes can convert to the red-coloured form of anthocyanins upon sudden exposure to oxygen.

Another possible route for flavene formation has recently been identified, due to the discovery that small amounts of anthocyanins are produced in white grapes (Arapitsas et al. 2015). High SO_2 levels during winemaking can cause these anthocyanins to form flavenes.

However, as SO_2 levels drop during ageing or upon exposure to air, the red form of the anthocyanin is released, forming a pale red colour in the wine.

The anthocyanins can then polymerise to a more stable form that is insensitive to SO_2 or pH changes, creating a permanent red colour in white wine (Andrea-Silva et al. 2014).

HOW CAN YOU TELL IF YOUR WINE IS AT RISK?

Riesling, Sauvignon Blanc, Semillon and Muscat wines have been found to be most susceptible to pinking.

The pinking risk of a white wine can be estimated using this method from Iland et al. (2004):

1. Label a 100 mL clear glass screwcap bottle as 'control' and another as 'test'.
2. Completely fill the 'control' bottle with wine.
3. Measure 40 mL of the same wine into the 'test' bottle and add 0.5 mL of 0.3% w/v hydrogen peroxide. Mix.
4. Place the 'test' sample in a dark cupboard at approximately 25° overnight.
5. Observe the degree of pinking of the 'test' wine compared to that of the 'control'. As well as this visual assessment, spectral measures of the 'test' and 'control' wine at 520 nm can be quantified and compared.

CAN YOU MEASURE PINKING?

Simpson (1977) detailed a spectral method to quantify the pink colour, pinking susceptibility and pink precursor content.

This analysis is offered by AWRI Commercial Services. Results can be interpreted as follows:

- Pink colour value >5 is generally recognisable as 'pink' in most white table wines;
- Pinking susceptibility values >15 might be capable of developing pink colour; and
- Pinking precursor content values >50 are considered high and at risk of pinking.

TREATMENT OR REMOVAL

Pink colour and/or pinking precursors can be removed from wine by fining with PVPP.

It is also possible that the formation of pink colour in wine in clear glass bottles can be reversed by exposure to UV light; however it is suggested that this be trialled in the first instance by placing a couple of bottles that are considered pink on a window sill in direct sunlight.

PREVENTION

For white wines that have been made under reductive conditions, using a combination of SO_2 and ascorbic acid is recommended to protect wine from pinking during bottling.

When only SO_2 is present, it is assumed that the pinking precursors may compete with free SO_2 for available oxygen or oxidants.

However, when both SO_2 and ascorbic acid are present, the dissolved oxygen reacts almost exclusively with ascorbic acid, with the free SO_2 then combining rapidly with the hydrogen peroxide that is produced.

This means that oxygen will be consumed before it can react with any of the pinking precursors.

Winemakers should be cautious when using ascorbic acid, ensuring there are adequate levels of SO_2 to prevent any generated hydrogen peroxide from oxidising other wine components.

Note that the peroxide produced from about 2.8 mg/L of ascorbic acid could potentially react with 1 mg/L of SO_2, so appropriate additions of SO_2 should always be made before ascorbic acid addition, to ensure there is an excess of SO_2 and that the final level of SO_2 in the wine is appropriate for the desired shelf life.

ABOUT THE HELPDESK

The AWRI helpdesk provides a free-of-charge advice service to Australia's grapegrowers and winemakers who pay the Winegrapes and/or Grape Research levies. Advice is available on winemaking, viticulture, regulatory and health-related issues from experienced winemakers, viticulturists and scientists.

Phone: 08 8313 6600 during business hours

Email: helpdesk@awri.com.au

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