

Stuck fermentation

Stuck fermentation – what is it?

Sometimes fermentation slows or stops too soon. The signs of fermentation – such as bubbles of carbon dioxide and falling specific gravity – grind to a halt. If this happens before all the available sugar in the wine has been converted to alcohol and carbon dioxide the fermentation is ‘stuck’.

What causes it ?

Stuck fermentation is a complex problem and research has identified many causes. Most come down to yeast and how it is used in the fermentation process.

Wine yeast works best when the temperature is not too hot, or not too cold and there is plenty of food (nutrients and sugar) to eat. It needs clean, sanitary conditions and a supply of oxygen. Killer agents, such as high concentrations of ethanol, can prevent it from working.

When fermentation is stuck, these are the most likely causes:

- Extreme temperatures – too hot or too cold.
- Dirty equipment – increasing the risk of spoilage from bacteria and unwanted yeast.
- Using the wrong yeast.
- Using yeast incorrectly – always follow the manufacturer’s instructions.
- Too little or too much sulfite.
- Lack of nutrients – such as nitrogen.
- Too much sugar – increasing the chances of high ethanol concentrations.

In March 2008, a heatwave across southern Australia led to an increase in the number of stuck ferments reported. In extreme heat, the AWRI has identified the following additional factors:

- Heat stress, transport delays and refrigeration problems can give unwanted microbes a boost, further compromising yeast activity.
- High sugar levels are more likely, leading to high ethanol concentrations - toxic to yeast.

Low levels of available nitrogen after persistent drought can also compromise fermentation.



How can you prevent it?

The AWRI stands by the basics. Monitor and/or maintain: general cleaning/sanitation; residual nutrients such as glucose, fructose and nitrogen; sulfur dioxide usage; pH balance; turbidity/clarification; and barrel management.

The basics will also help you to recover from a bout of stuck fermentation and prevent your wine from experiencing further trouble in the bottle: high sugar levels in red wine, for example can lead to 'Brett' problems down the track.

In extreme heat conditions – common during the Australian summer – the AWRI recommends the following steps:

- Increase the concentration of sulfur dioxide you add to grape bins. This will keep microbial 'bugs' at bay and slow oxidation which can speed up at higher temperatures.
- Sanitise bins between loads. Cover bins during transport to keep the sun off your fruit. Clean all your equipment to stop growth of yeast and bacteria.
- Choose yeast known to have high tolerance to alcohol and prepare it properly.
- Add tartaric acid as soon as must tanks are mixed and acidity levels are known.
- Take steps to reduce pH to improve the efficacy of sulfur dioxide. Lower pH increases SO₂'s antimicrobial and antioxidant properties. It controls the growth of unwanted microorganisms including lactobacilli.
- Monitor pH during fermentation and maintain it between 3.4-3.5.
- Consider adding lysozyme to must of ferments to control bacterial development.

How can I restart fermentation?

Many winemakers have had success using the following method, available from the AWRI:
http://www.awri.com.au/practical_solutions/technical_notes/notes/TN05.pdf

Similar methods are also promoted by yeast suppliers. Please note that the aeration steps and maintenance of nutrients are essential for success, as outlined in the method.

Where can I find out more?

To find more strategies to reduce the impact of hot weather on wine quality visit:
http://www.awri.com.au/information_services/current/pdfs/Drought_response.pdf

The management of sub-optimal fermentation is also discussed in a presentation called *Management of wine fermentation* by Dr Paul Henschke. See it on the AWRI's website via: <http://awri.streamcast.com.au>

Contact us

For further information on stuck fermentation please contact us:

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