

Constant observation key to avoiding dilemma of stuck ferments

Stuck fermentations are a regular occurrence for one reason or another, and each vintage the winemaking team at The Australian Wine Research Institute field several questions associated with this frustrating problem. Some of the more common questions are answered here by the AWRI team.

How do I know if my ferment has become stuck?

If your ferment stops prior to your desired style (sugar level) or if the fermentation slows to an unpractical rate, then you have a sluggish or stuck ferment – and a rescue plan is required. It is useful to monitor your ferment (generally Baumè or Brix) and temperature daily, or twice daily, and to represent it graphically. This allows you to clearly observe when fermentations begin, starts to slow down or becomes a stuck fermentation.

My laboratory has measured only fructose in my stuck ferment. Do I need a fructophilic yeast strain to complete the fermentation?

No. Any of the robust, alcohol-tolerant yeast strains will metabolise the remaining sugar, which is predominantly fructose. The step-wise acclimation rescue procedure enhances fructose metabolism in any yeast. Typically,

glucose is consumed first by yeast, leaving mainly fructose when low levels of residual sugar are present.

Could the level of clarification of the juice have affected the ferment?

Yes, it can. Highly clarified juices are very low in phytolipids and will affect the alcohol tolerance of the yeast. It is important to choose an alcohol-tolerant yeast strain for highly clarified juices compared with higher solids juices. Using slightly higher turbidities is beneficial, or an aeration step made before the mid-point of fermentation can strongly stimulate fermentation without affecting flavour profile.

My ferment is starting to slow down. Should I add some DAP first?

The addition of DAP will stimulate the ferment, however, it will depend on the stage of the ferment and should not be solely relied upon to 'fix' the problem; ideally, yeast assimilable nitrogen (YAN)

determination should be made first. Adding DAP when there are only small amounts of residual sugar remaining is not advisable and can leave nutrients for spoilage micro-organisms.

It is highly recommended that YAN be routinely measured immediately prior to harvest or inoculation and appropriate addition made when necessary.

When should I aerate my ferment?

A short aeration can be equally effective when made at almost any stage of fermentation, but preferably before the mid-point as a preventative measure.

What has caused my ferment to stick?

Stuck ferments are one of the most annoying winemaking problems that a winemaker will confront and, in most instances, the cause(s) will go undetermined, primarily due to the extremely complex nature of the issue. Nonetheless, there are numerous references in the literature that point to nitrogen deficiency as being one

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of the biggest causes of stuck or sluggish fermentations, which is consistent with the fact that Australian juices contain low levels of yeast assimilable nitrogen (YAN) (AWRI publication #412). Since nitrogen management is now relatively well understood, other causes of stuck fermentations are more likely, and include:

- temperature shock
- extremely high Baumè level
- heat or mould-affected fruit
- incorrect choice or inoculation of yeast strain
- nutrient imbalance
- inhibitory substances or toxins and physiological conditions (AWRI publication #514).

How do I rescue my ferment?

There are essentially two rescue procedures, the choice of which depends on the alcohol and residual sugar concentrations present in the stuck ferment. When ferments have approximately less than 12 per cent v/v alcohol together with less than 1% (10g/L) residual sugar, a simple and often

successful procedure can be the use of fresh yeast lees taken from a compatible, successfully finished fermentation.

How do I prepare a rescue culture?

A step-wise acclimatisation rescue culture procedure can be used. Note that this procedure can take up to two days, and it has important steps that are not part of the inoculation process used when rehydrating your initial chosen yeast strain. One of the most important steps when preparing a rescue culture is the aeration step. Aerating the yeast at this point allows them to build sterols into their cell walls, which are extremely important for alcohol tolerance (remember that the sluggish or stuck ferment will have alcohol present). The aeration step involves aerating the rescue culture by either using clean filtered air or, for smaller rescue cultures, this can be simply done by transferring the rescue culture from one bucket to another four or five times. It is also essential to prevent nitrogen depletion at each step, since this can inactivate fermentation

activity (i.e., induce a stuck ferment in the rescue culture).

Which yeast is best for a rescue culture?

When using yeast lees, a strong, robust yeast strain that has high alcohol-tolerance is recommended for rescuing a stuck or sluggish fermentation. Each yeast supplier can recommend suitable strains. When using the step-wise acclimatisation procedure, the AWRI experience shows that the procedure is much more important than the strain, as the procedure is designed to build into the culture strong tolerance to alcohol and any toxins present. Nevertheless, choosing a strain with proven tolerance to the potential alcohol level of the stuck ferment is beneficial. Also, note that the choice of strain will have no impact on the wine's flavour profile.

Where can I find out more? Further information on stuck or sluggish fermentations can be found on the AWRI website: www.awri.com.au 



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