



LALLEMAND AUSTRALIA PROCEDURE FOR RESTARTING YEAST ALCOHOLIC FERMENTATIONS

BACKGROUND INFORMATION

The importance of removing the spent yeast and toxins from the primary fermentation

Before restarting with fresh yeast culture the removal of spent yeast requires special comment. Where problem ferments have been going for some time it is best to remove the yeast which may contain or remain to be a source of inhibitory compounds to the fresh active rescue culture. The addition of Nutrient Vit END (a complex product including yeast hulls) prior to yeast removal will help remove short and medium chain fatty acids and fungicides that are toxic to yeast cells. From industry feedback it is best to centrifuge if possible, otherwise filter or cold settle and rack wine away from fermentation (yeast) / Nutrient Vit END lees.

Wine Yeast ability to consume sugar

Under oenological conditions, glucose and fructose are the main fermentable sugars used by *Saccharomyces cerevisiae*. Although both of these hexoses are generally present in musts in equivalent quantities, *Saccharomyces cerevisiae* prefers to consume glucose, which explains why the main residual sugar in stuck ferments is fructose. Therefore the rescue yeast employed for a restart procedure needs to have a fructophilic capability.

In a recent Lallemand research project, the fructophilic ability of nineteen yeast strains (suited for restarting stuck ferments) was studied. The results show that in oenological conditions where nitrogen, sugar and glucose/fructose ratios were varied, the yeast strain UVAFERM 43 proved to be the most efficient at metabolising fructose under conditions similar to those found in stuck ferments.

Note on use of yeast nutrient in restart procedure

The conditions prevailing in wine where the primary ferment has been arrested short of dryness provides winemakers with various challenges including:

1. Minimising the risk of excess nutrient following a successful restart and completion of fermentation
2. Limiting the toxic effect of ethanol on the permeability of cell plasma membranes and limiting the uptake of glucose/fructose and amino acids.
 - *The use of Fermaid A in the first fermentation phase of the restart procedure is a key pre-requisite to limiting the impact of ethanol toxicity on the yeast cell membrane.*

The yeast is able to take up the alpha-amino nitrogen (provided by Fermaid A) in an environment where the cell membrane permeability and intracellular pH control ATPase functions are not compromised by the alcohol present. As a result, the intracellular reserve of alpha-amino nitrogen is increased and in readiness for an acceleration of metabolic activity when the yeast inoculum is introduced into the problem wine (Step 7, next page).

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This method is particularly recommended for stuck fermentations where alcohol is suspected to be the main cause of the stuck ferment and residual sugar is less than 50g/L.

The yeast strain selected should be alcohol tolerant, have fructophilic strength and be a reliable vigorous fermenter. Uvaferm 43 meets this criteria and is the recommended yeast strain, combined with the use of Fermaid A, for restarting alcoholic fermentation.

Procedure for 10hL (1000L) of

PREPARE THE STUCK WINE

The addition of Nutrient Vit END helps remove potential inhibitory substances in the wine.

1. Suspend 400g of Nutrient Vit END (40g/hL) in warm water, gently stir the suspension into the stuck wine, and allow Nutrient Vit END to settle for 48hours, then rack and filter.

PREPARE THE RESCUE YEAST

2. Add 300g (30g/hL) of GOFERM PROTECT® into 20x its weight of 40-43°C clean chlorine-free water (not distilled).
3. Stir until an homogenous suspension, free of lumps is achieved. Due to the high sterol content, GoFerm Protect does not easily dissolve. Once the powder is added to the water and stirred, leave for 10 minutes, within which time the powder will have dissolved.
4. When the temperature of this Goferm Protect / water suspension is between 35-40°C gently sprinkle 500g (50g/hL) of Uvaferm 43 yeast , slowly and evenly, onto surface of the suspension, whilst gently stirring. Use 100g/hL of Uvaferm 43 if the winery lacks good temperature control.
 - *slow addition of yeast to the suspension surface is necessary to allow rehydration while yeast is in suspension.*
 - *The aim is to achieve uniform hydration (whilst avoiding clumping/mass deposits where moisture uptake is inconsistent) in the rehydration vessel.*
5. Allow the Yeast/GoFerm Protect Suspension to stand for 20 minutes, before further gentle mixing.

ACTIVATE THE PREPARED RESCUE YEAST WITH NUTRIENTS

The nutrient content of the stuck fermentation will most likely be quite low and unable to adequately support yeast growth. In addition the rescue yeast culture will require adaption to the alcohol content of the wine.

6. Prepare the following initial starter mixture and adjust the temperature to 25-30°C
 - o 25L (2.5%of volume) of stuck wine
 - o 25L (2.5% of volume) as water
 - o 25g (50g/hLof wine/water mix) of Fermaid A
 - o Adjust sugar level of this solution to approximately 5° Baume with grape juice or grape concentrate. For example add 50 L of 10°Baume juice to the wine/water mix. For example add 10L of 500g/L grape concentrate.

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RESTART THE FERMENTATION AND SEQUENTIAL ACCLIMITISATION OF THE STUCK WINE

7. Slowly add the GoFerm Protect / Yeast suspension to this wine/water/juice suspension, mix well and maintain the temperature at 20-24°C
8. Monitor the sugar level of this starter. When the level has dropped by half, begin to add the stuck wine to the starter and maintain between 20-24°C, until the volume is doubled. Add 25g/hL of Nutrient Vit END to each batch prior to adding to the starter (this will promote active fermentation). Monitor until the sugar has reduced by half.
9. Repeat the addition of the problematic wine (with Nutrient Vit END added) as per step 8, until the total volume has been added.
10. Only the last batch of added stuck wine should be allowed to completely go to dryness.

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