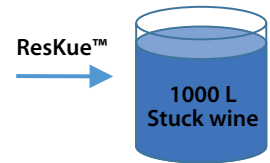


Stuck Alcoholic Fermentation: Procedure to restart a stuck alcoholic fermentation – 1000 L

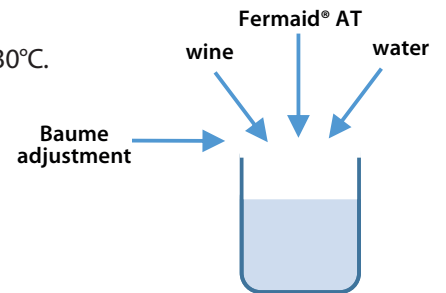
1. Preparation of the wine

- Ensure 7-8 ppm free SO₂.
- Rehydrate 400 g **ResKue™** (40g/hL), as per the data sheet.
- Stir resuspended **ResKue™** into the wine.
- Allow to settle for 48 hrs, then rack or filter the wine



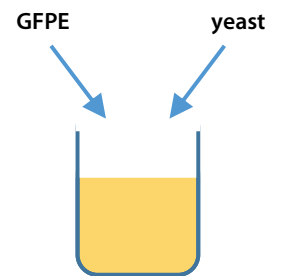
2. Preparation of the 'initial starter mixture'

- Prepare the initial starter mixture and adjust temperature to 25-30°C.
 - 25 L stuck wine.
 - 25 L water.
 - 25 g **Fermaid® AT** (50 g/hL)
 - Adjust sugar to approx. 5° Baume (e.g. with grape juice of grape concentrate).



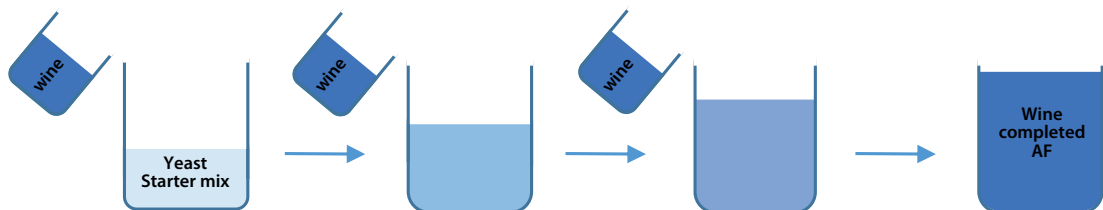
3. Preparation of the yeast

- Add 300 g **GoFerm Protect Evolution™** (30 g/hL) into 6 L water, 40-43°C.
 - Stir until a homogenous suspension.
 - Leave for 10 minutes.
- Sprinkle 500 g **Uvaferm 43 Restart™** (50 g/hL) slowly & evenly onto GFPE/water, 35-40°C.
- Wait 20 minutes.
 - Further gentle mixing.



4. Restart the fermentation of the stuck wine

- Slowly add yeast (Step 3) into the initial starter mixture (Step 2).
 - Ensure temperature does not change more than 10°C.
 - Mix well; maintain temperature at 20-24°C.
- Monitor the sugar level of the starter.



- When sugar has dropped by half, slowly double the volume with stuck wine
- Monitor the sugar level
- Maintain temperature at 20-24°C
- When sugar has dropped by half, slowly double the volume with stuck wine
- Maintain temperature at 20-24°C
- Repeat adding stuck wine, as above, until all the stuck wine has been added
- Only allow the last batch of added stuck wine to go to complete dryness

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Stuck Alcoholic Fermentation: Procedure to restart a stuck alcoholic fermentation – 1000 L

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 is important. 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 culture. The addition of **ResKue™** (100% yeast walls) 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) / **ResKue™** 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 Lallemand research project, the fructophilic ability of nineteen yeast strains (suited for restarting stuck ferments) was studied. The results show that under oenological conditions where nitrogen, sugar and glucose/ fructose ratios were varied, the yeast strain **Uvaferm 43 Restart™** 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® AT** in the first fermentation phase of the restart procedure is a key prerequisite 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® AT**) 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 4, next page).

PRODUCTS REQUIRED

ResKue™ – 40g/hL of stuck Wine Volume

GoFerm Protect Evolution™ – 30g/hL of stuck wine volume

Uvaferm 43 Restart™ – 50g/hL of Stuck Wine Volume

Fermaid® AT – 50g/hL of INITIAL STARTER MIXTURE Volume (Step 2, next page).

Juice or Grape concentrate.

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