vinlab
your partner in quality wine making

Slow sluggish and Stuck fermentation
GUIDELINES

Stuck fermentation is where fermentation has ceased prematurely or the rate of fermentation is considered too low for practical purposes, leaving a higher residual sugar content than desired in the wines at the end of the fermentation

The following is a guideline for sluggish / stuck alcoholic fermentation.
Further information can be obtained from page 37 in the ***Vinlab manual***

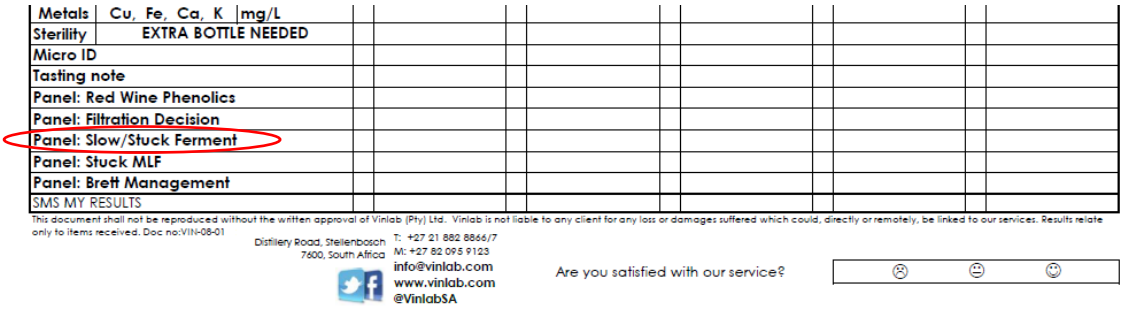
How do you know if you have a sluggish or stuck fermentation?

The best way would be to monitor the fermentation twice daily for ˚Balling and temperature. Plot this data as a fermentation curve. Graphing this data as a fermentation curve will quickly identify potential problems so proactive action can be taken.

Stuck fermentation can be identified by constant Balling reading (density not decreasing) as well as the stopping of bubble formation. Off odours can also start to develop.

Know what you are dealing with

Tick the Slow / Stuck ferment panel box
at the bottom of the Vinlab WINE (GENERAL) Analyses request form.



Metals	Cu, Fe, Ca, K	mg/L									
Sterility	EXTRA BOTTLE NEEDED										
Micro ID											
Tasting note											
Panel: Red Wine Phenolics											
Panel: Filtration Decision											
Panel: Slow/Stuck Ferment											
Panel: Stuck MLF											
Panel: Brett Management											
SMS MY RESULTS											

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Are you satisfied with our service? ☹ 😐 ☺

Samples will be tested for the following:

- Volatile Acidity
- MLF %
- Glucose & Fructose
- MicroID
- Yeast count (should be more than 10^6 cells/mℓ)
- Yeast viability (should be more than 50 %)

Other recommended analysis

- SO_2

PREVENT Stuck Fermentation

- Choose the right yeast strain
  - Alcohol tolerant
  - Low nutrient requirements
  - Good fructose utilisation
  - Low SO_2 formation
  - Strong fermenter
  - Responds well to nutrient supplementation
- Ensure fresh yeast (check expiration date)
- Increase yeast dosage (sacrificial yeast addition)
- Rehydrate properly
  - Use rehydration nutrition
  - Avoid temperature shock
  - Follow supplier's recommendations closely
- Add complex yeast nutrition combined with DAP
  - Refer to ***Vinlab Manual*** page 25 for optimal YAN levels at different sugar concentrations
  - Make sure to add nutrients that includes minerals, vitamins, sterols and organic nitrogen. All these have been proven to help maintain yeast viability and limit the production of off aroma
  - Add thiamine (vitamin) to produce yeast biomass and to maintain good fermentation speed (60 mg/L is the maximum admissible dosage)
- Aeriate the must before inoculation (careful of oxidation)
- Ferment at the temperature prescribed by yeast supplier
- Ensure proper sanitation

Slow fermentation from the onset

Make sure the fermentation is not slowing due to inhibitors such as:

- High ˚Balling
- High SO_2
- Very low pH
  - especially when in combination with SO_2
- High Volatile Acidity
  - From native microorganisms
  - Check bacteria populations
- Pesticide residues
  - fungicide, herbicide and insecticide
- Chlorine from water used during yeast hydration
  - Test your cellar water

A yeast inoculation at twice the usual dose can be done as a sacrificial addition of yeast. In the case of high SO_2 musts, be sure to rehydrate and aerate the inoculum properly before inoculation to ensure viability and aldehyde production which binds excessive SO_2. Make sure to add yeast nutrients that includes minerals, vitamins, sterols and organic nitrogen.

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How to deal with existing stuck fermentation

Perform one or more of the following to deal with stuck fermentations. Be sure to protect the tank from oxidation as there is no more CO_2 generated from an active fermentation

- Manage fermentation temperature
  - Fermentation will be affected by extreme temperatures (either too low or too high)
  - Respect the yeast optimal fermentation temperature range
- Add a yeast hull product
  - Choose a product with good absorption capacity
  - Choose a product with good affinity to toxic compounds
- Aeriate the must/wine
  - There is minor risk of oxidation of the wine while the yeast is still active
  - Careful of oxidation if the yeast is no longer active
- Agitate the fermentation to bring settled yeast cells into suspension
- Rack the wine onto compatible healthy yeast lees of a finished wine
- Rack the wine from the lees and reinoculate with freshly rehydrated yeast
  - Choose the right yeast strain
    - Alcohol tolerant
    - Low nutrient requirements
    - Good fructose utilisation
    - Low SO_2 formation
    - Strong fermenter
    - Responds well to nutrient supplementation
  - Increase the yeast dosage (sacrificial yeast addition)
  - Ensure proper yeast rehydration
  - Follow supplier's instructions for gradually adding rehydrated yeast to the stuck wine
  - Reinoculation protocol is explained in detail in the ***Vinlab Manual*** on page 41
- Do not wait for stuck/sluggish fermentation to occur before adding complex yeast nutrients. In the event of a stuck fermentation the addition of nutrients can be done with caution.
  - Add nutrients naturally rich in vitamins, minerals and available nitrogen to feed the yeasts when restarting a stuck fermentation.
  - The amount added will depend on how far along the fermentation is. Be careful of addition towards the end of fermentation (after 10 g/L sugar / 1˚Balling). Residual nutrients can lead to bacterial spoilage
- Add lysozyme (100 mg/L) if bacterial spoilage is the cause
- Correct the glucose:fructose ratio. Please note that adding pure glucose directly is illegal.

Sulfides produced

Sulfides can be produced during sluggish and stuck fermentations due to nutrient deficiencies. This is best managed as a preventative action (measure the YAN in the juice before inoculation), however, complex nutrients can be added in the initial stages of fermentation. Studies have shown that an imbalance between high YAN and low pantothenic acid levels in must significantly drives H_2S production. Ensure good nutritional balance (minerals, vitamins, sterols and organic nitrogen). If the sulphides persist, the source might be agrochemicals such as elemental sulphur.

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Worried about microbial spoilage causing stuck alcoholic fermentation?

- Ensure optimal pH and acid content of the grape must
  - High pH (>3.5) promotes microbial spoilage
- Avoid cold maceration and extended skin contact due to the potential microbial spoilage
  - Remove the wine from the skins as soon as possible
  - Use enzymes for flavour, colour and tannin extraction
- Ensure sufficient SO_2 content (50 ppm total SO_2) at crushing
  - Lower SO_2 dose is recommended when co-inoculating MLF bacteria
  - Also consider yeast strain resistance when adding SO_2 to must
- Consider adding lysozyme
  - Suppress bacterial growth during alcoholic fermentation
- Be cautious of spontaneous/natural fermentation when the risk of microbial spoilage is high

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