
PREVENT STUCK FERMENTATION

Stuck fermentations have always been a problem in the wine industry regarding wine quality and economic impact. There are various causes of unintentional stuck fermentation:

- Poor yeast preparation and acclimation
- Nutrient deficiencies (nitrogen, vitamins, oxygen, sterols, long-chain fatty acids ...)
- High initial Brix
- High fructose content
- Extreme fermentation temperatures (high or low)
- Yeast stress due to accumulation of toxins (medium-chain fatty acids, ethanol, acetic acid ...)
- Microbial contamination
- Presence of toxic compounds (residual fungicides)

It is essential to determine where the risks are of stuck fermentation and adjust the winemaking practices accordingly.

- **Proper yeast preparation and acclimation**

Yeast rehydration is one of the most important steps of fermentation. Sterols play a role in maintaining the integrity and the fluidity of the yeast membrane, increasing its resistance to alcohol. Adding **OENOSTIM®** during yeast preparation supplies the yeast with essential vitamins, minerals, as well as lipids and sterols used to build a strong and fluid membrane and consistently improves the yeast's health condition. OENOSTIM® ensures an efficient, healthy, and complete fermentation and optimizes aromatic production. It provides the essential building blocks for yeast membranes (long chain unsaturated fatty acids and ergosterols), guarantees fluidity of the membrane, and its correct functioning for the full fermentation. The addition of OENOSTIM® significantly reduces the production of VA and H₂S and increases the expression of varietal aromas.

Rehydrated yeast must have time to acclimatize to juice/must conditions (temperature, pH, etc.). Improper acclimatization can shock the yeast, increasing the lag phase or killing the cells. In this case, a reinoculation might be necessary. To avoid this problem, follow the below protocol of yeast preparation.

Yeast preparation protocol:

1. Mix in OENOSTIM® rehydration nutrient at a rate equal to the inoculation dose of yeast in 20 times its weight of chlorine-free water at 40°C (104°F).
2. Sprinkle yeast over the surface of the water and mix in gently.
3. Let stand for 20 minutes.
4. Add juice from tank or barrel to drop the temperature by 10°C/18°F. Mix gently and wait 20 minutes.
5. Repeat the juice addition and 20 minutes wait until inoculum is within 10°C/18°F of the tank to be inoculated.
6. Add to tank and homogenize.

- **Giving the proper yeast nutrition to prevent stuck fermentation.**

A proper yeast nutrition strategy anticipates the nutritional factors that are needed and at what stage they should be provided. Early in fermentation, yeast needs amino acids together with vitamins and minerals, to allow an adequate population growth without temperature increase and stress. Encouraging an early accumulation of long-chain unsaturated fatty acids and sterols helps increase yeast endurance and survival all along the fermentation. At one-third of the fermentation, oxygen and ammonium can be supplied to ensure the cell membrane remains functional until complete sugar depletion. The nutrition strategy should also be adjusted to fermentation conditions and winemaking practices. Find our guidelines to help you decide on your yeast nutrition [HERE](#).

- **How to manage high initial Brix?**

The addition of water to adjust the initial Brix can be a good option to manage alcohol content and reduce the risk of stuck fermentation. Two ways for water addition: volume replacement of must by water or simple addition of water. [HERE](#) you can find help to calculate water additions. Adding water will help reduce initial Brix but will also dilute yeast nutrients, total acidity, and phenolic compounds. For that reason, it is important to check and adjust your acidity and pH, and your YAN to a proper level after you added the water. We also recommend adding **5-10 g/hL of VINITAN ADVANCE** (pure grape tannins) to the water to compensate the dilution factor on skin tannins.

- **How to manage high residual fructose content?**

To ensure completion of fermentation, especially in high °Brix and high fructose conditions, we propose a “no restart” protocol that consists in using a second inoculation with a fructophilic yeast such as **L.A. BAYANUS** at 8-5°Brix, rehydrated with **OENOSTIM** to improve yeast health, resistance to stressful conditions and optimize their metabolism.

Protocol: At 8-5°Brix to your fermenting wine, you can add L.A BAYANUS® to ensure fermentation completion and avoid a full restart protocol.

- 1- Rehydrate 40 g/hL of L.A BAYANUS® with 40 g/hL with OENOSTIM®
- 2- Acclimate to wine temperature by adding same volume of wine and wait 20 min
- 3- Repeat acclimation step 2 times.
- 4- Add the yeast preparation to fermenting tank and mix gently.

- **Prevent microbial contamination**

Microbial contaminations on grapes and must can have strong consequences on fermentations and wine quality. To prevent stuck fermentation, it is essential to control microbial populations, and make sure the dominant population conducting fermentation is *Saccharomyces cerevisiae*. SO₂ is the most common anti-microbial use at this stage but it comes with some flaws: it is not efficient at high pH, it inhibits and stresses *Saccharomyces cerevisiae*, and some spoilage microbes' strains are resistant to it. For an efficient microbial control without side effects, we have been working successfully with bio-protection with our **EXCELLENCE B-NATURE**. It is a non-Saccharomyces yeast, pure *Metschnikovia pulcherrima*, non-fermentative. It inhibits the development of spoilage microbes such as other non-Saccharomyces, and bacteria on grapes and juice. EXCELLENCE B-NATURE is an organic anti-microbial solution, used as an alternative to SO₂ on grapes. It protects grapes/juice from microbial contamination during transport and processing, does not inhibit *Saccharomyces cerevisiae*, and reduces SO₂ combining compounds production (thus increasing SO₂ efficiency). EXCELLENCE B-NATURE can be added directly to grapes, without rehydration. Simply sprinkle the yeast on the top of the grapes at picking.

- **What to do in case of toxins accumulation?**

If accumulation of toxins, you will notice a slowdown of the fermentation kinetics around 8°Brix left. At this step, you can use **ACTIBIOL**®. **ACTIBIOL**® is a wine detoxifier composed of inactivated yeast, yeast hulls, and purified cellulose. **ACTIBIOL**® releases growth (vitamins, minerals,) and survival factors (long-chain unsaturated fatty acids, sterols) and binds pesticide residues and inhibitory compounds such as medium-chain fatty acids. **ACTIBIOL**® efficiently detoxifies the wine and provides nutrients to the yeasts used for restarting the AF.

- **Temperature shocks:**

Temperature will affect AF when it is the extreme, either too low or too high. Each yeast strain has an optimal temperature range and anything outside of this range can cause yeast stress. If the temperature is too high (or if it spiked at any point), it's possible that the yeasts are no longer viable and a reinoculation will be necessary. If the temperature is too low, try slowly warming the wine. To improve temperature resistance of the yeast and limit the risks of stuck fermentation, we recommend using **OENOSTIM**® at rehydration to ensure healthy yeast cell membrane, with higher resistance and adaptation to stress conditions.

- **What to do if my fermentation gets sluggish or stuck?**

If fermentation is slowing down around 8-5°Brix, it is not too late to prevent a stuck fermentation and to react. It usually is related to high alcohol level, high fructose content and/or toxins presence. The first step is to use **ACTIBIOL**® to detoxify the wine and provide survival factors to yeast. Then, add **L.A. BAYANUS** rehydrated with **OENOSTIM** to improve yeast health, resistance to stressful conditions and optimize their metabolism, following the protocol below. If you suspect microbial contamination, it is essential to use **KILLBRETT** to remove any spoilage microbes that could inhibit the proper yeast activity and completion of fermentation. **KILLBRETT** is a pure chitosan, wide spectrum anti-microbial agent. It eliminates and inhibits *Brettanomyces*, *Lactic Acid Bacteria* and *Acetic Acid Bacteria*.

If fermentation is stuck, with no activity since 48hrs, we recommend to follow a **FULL RESTART PROTOCOL**.