

Nutrients & Protectors

under

investigation

Nº3

PROPER WINE YEAST REHYDRATION FOR A SUCCESSFUL ALCOHOLIC FERMENTATION

The use of selected wine yeast in dry form has, since the 1970's, been a revolutionary tool to allow winemakers to use high quality natural microorganisms to complete alcoholic fermentation (AF). The advantages are many; secure and complete AF, reduction of faults, respecting the grape variety potential, lower SO₂ uses and helping winemakers craft their wines. Using wine yeast in dry form is an advantage in terms of stability, ease of use and storage and managing quality. Proper rehydration is necessary for selected yeast in dry form because grape must is a very hostile environment with its low acidity, high sugar and osmotic pressure, and nutrients or micronutrients limitations is a big challenge for any yeast to conduct AF.

YEAST REHYDRATION: CRUCIAL STEP TO SURVIVE THE STRESSFUL GRAPE ENVIRONMENT

The yeast plasma membrane forms a stable barrier between the cytoplasm (the interior of the yeast cell) and the exterior environment, therefore a strong and healthy membrane means that the yeast is protected to face the difficult wine conditions. When wine yeast, after multiplication, is dried, the internal structure of the yeast cells is contracted due to a loss of total cell volume. The plasma membrane is thus wrinkled and small breakages appear with a loss of structural integrity. Sterols and unsaturated fatty acids located in the phospholipids bi-layer of the membrane are responsible for maintaining the integrity of the yeast membrane, increasing its capacity to resist ethanol.

Yeast rehydration prior to inoculation in the must, is crucial to restore the structure and integrity of the membrane and for the cell to recover to its best physiological state. If the yeast is not rehydrated correctly, there is a significant loss of viability as shown in Figure 1 where a loss of as much as 46% is observed.

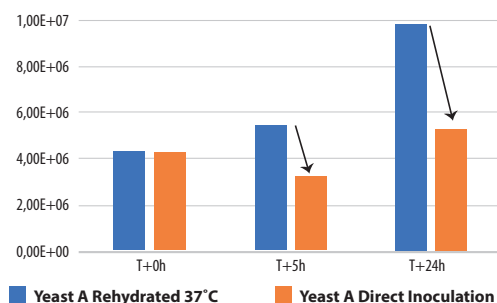


Figure 1. Viability of a dry wine yeast with and without rehydration

BENEFITS OF YEAST REHYDRATION AND PROTECTION

Yeast cells that have a sterol-rich membrane due to the protector from the Go-Ferm Protect™ product used during rehydration are more resistant to alcohol (very important with global warming leading to higher alcohol in wine), have a more efficient AF, will help the yeast dominate the fermentation, and will avoid the production of undesirable compounds. The decreased production of such undesirable compounds as H₂S and volatile acidity (figure 4) leads to better wine quality. The yeast protector is beneficial not only to the initial yeast inoculum population but also to the subsequent generations since without them, during cell multiplication, the thickness of the membrane gradually decreases with each new generation.

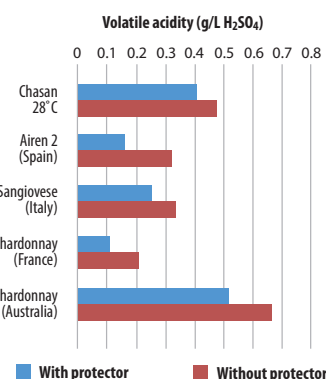


Figure 4. Volatile acidity in different wines with and without protector

PROTECTION DURING REHYDRATION THE KEY TO A SUCCESSFUL ALCOHOLIC FERMENTATION

During the yeast rehydration phase, the incorporation of solubilized sterols is important, especially in difficult wine conditions, because of their capacity to repair and reinforce the membrane integrity (Soubeyrand et al, 2005). This can only be achieved **during the rehydration phase**, and not during AF as the yeast is already under stress right at the onset of AF, and is not able to incorporate any external sterols sources into its membrane. The sterols found in specific protectors in the Go-Ferm Protect™ product range significantly ensure cell survival during AF. Figure 2 shows that yeast rehydrated with protectors have a faster and more secure AF compared to direct inoculation dry yeast.

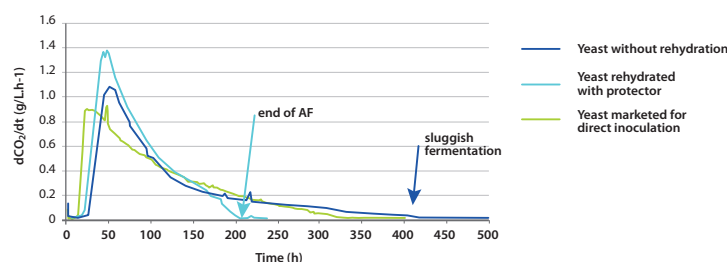


Figure 2. Fermentation kinetics by the same yeast with and without protection and compared to a yeast used in the market for direct inoculation.

The yeast protector added **during yeast rehydration** supplies micronutrients (vitamins and minerals) and survival factors (sterols and unsaturated fatty acids). The yeast is better enabled to deal with the various stress factors, such as osmotic shock, caused by the high juice or must sugar concentration. The yeast viability is also better when a protector is used as shown in Figure 3.

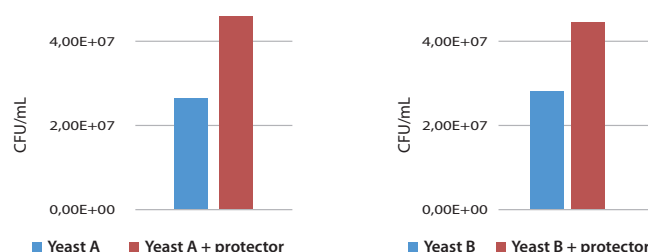


Figure 3. Viability of two different yeasts with and without protector

SUMMARY

Selected wine yeast rehydration especially with a protector such as the ultra performant Go-Ferm Protect Evolution™ is one of the most important steps of your AF to:

- Maximize yeast viability (micronutrients & sterols)
- Optimize yeast efficiency (sterols from protector)
- Improve yeast alcohol tolerance.
- Better yeast survival in difficult fermentation conditions and higher alcohol
- Better wine quality, lower VA
- Avoid stuck and/or sluggish fermentation