Nº5

REHYDRATION: STILL THE OPTIMAL PROTOCOL TO INOCULATE SELECTED WINE ACTIVE DRY YEAST

How do we measure the success of an alcoholic fermentation? It is a complete and regular fermentation, done in a timely matter and especially when a specific selected yeast is used, the maximum sensory revelation is expected. Wine is beyond just an hydroalcoholic drink, it is complex, rich and multifaceted and the main goal of each winemaker is to express and reveal all the potential of its grapes and terroir. The role of alcoholic fermentation and selected wine yeasts is to allow this optimal and full expression. Successful alcoholic fermentation is tightly link to how the wine yeast is rehydrated. This *Under Investigation* will show a review of the different options available to inoculate selected active dry yeast, and what are the recommendations of the yeast experts in terms of rehydration.

A BIT OF ON THE HISTORY OF SELECTED ACTIVE DRY YEAST

Since 1963, wine active dry yeasts are used successfully. It is one of the positive revolutions for the industry and led to selection programs and understanding of wine ecosystems. Krauss et al (1981) showed the importance of temperature and the type of rehydration media on fermentative activity on healthy cell membrane and constituents. Soubeyrand et al. (2006) confirmed the importance of the rehydration procedure on the viability, and fermentation behavior.

Popular now, is the use of various direct inoculation products and understandably so, winemakers are tempted by easy to inoculate products thinking that they can have the same performance as classically rehydrated wine yeasts. Clear instructions must be available to winemakers so that they can make the most informed choice when it comes to their wine quality and maximize inoculation efficiency.

DIFFERENT CHOICES FOR YEAST INOCULATION AND THEIR SUCCESSES

Currently, winemakers using selected wine yeast are offered different options for their alcoholic fermentation. It can be the classic wine yeast rehydration, a simpler rehydration method, a short suspension, a sprinkle on top of the juice/must or add the dry yeast during the tank filling. It can be confusing, and wine yeast inoculation must be done without compromising performance and sensory quality. In order to understand better the role of rehydration, we tested different wine yeast in our different trials.

- Wine Yeast A: Lallemand yeast used with rehydration
- Wine yeast B: Lallemand yeast used with rehydration
- Wine yeast X: direct inoculation yeast (other producer)

When different selected wine yeasts were compared with one another in laboratory conditions, whether rehydrated or directly inoculated at 25g/hL, we saw different fermentation duration which were strain dependent, and the rehydrated yeast always performed better than the directly inoculated ones even with the yeast for direct inoculation (Table 1).

Wine Yeast at 25 g/hL	Fermentation Duration (days)	
	Rehydrated prior to inoculation	Directly inoculated
Yeast A - Lallemand - recommended for rehydration	10	15
Yeast B - Lallemand - recommended for rehydration	8	16
Yeast X – promoted as direct inoculation	16	24

Laboratory trial: 25 g/hL, synthetic medium mimicking clarification (2 mg/L of phytosterols), 220g/l of sugar (13%v/v pot.alc.), 250 mg/L of YAN

VITALITY INDEX: A BETTER PERFORMANCE INDICATOR

A lower performance from wine yeasts, with direct inoculation products is seen when the yeast are not rehydrated. The number of viable cells is not sufficient to measure the efficacy and the vitality index reveals a better physiological state of the cell yeast metabolic activities (primary & secondary metabolisms for aroma compounds production). It results in a measure of the fitness of a viable and active yeast population (Rinaldo et al., 2017).

Part of the vitality index includes the production of aroma compounds from the secondary metabolism and we evaluated the impact of the type of inoculation (rehydrated or direct) on the production of key aroma compounds. Thiols and esters productions production in Macabeu (Figure 1) were greatly affected whether the yeast was rehydrated (more thiols) or direclty inoculated (Yeast X, a yeast used for direct inoculation). The thiols are almost non-existent for the direct inoculation wine, compared to the rehydrated one. The production of esters is also greatly affected, with a reduction in the fruity volatile aroma compounds of isoamyl acetate and 2-phenylethyl acetate when directly inoculated.

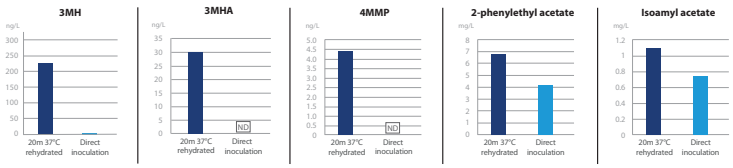

Figure 1 . Thiols and esters produced by Yeast X either in direct inoculation or classically rehydrated at 25 g/hL.

At the winery level, we also measured the impact of rehydration on the vitality index in a Chardonnay with an alcohol potential of 14% inoculated with either direct inoculation yeast (Yeast X) or a classically rehydrated yeast (Yeast A). The highest number of viable cells did not result in higher vitality index (Figure 2). Fermentation duration was 6 days shorter as seen in Figure 3 for the rehydrated yeast A.

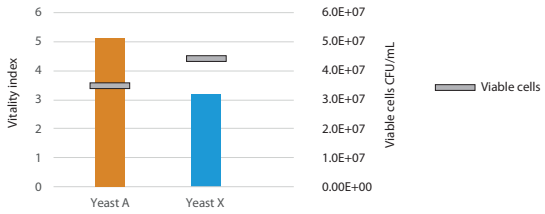

Figure 2 . Vitality index @ 2/3 of AF

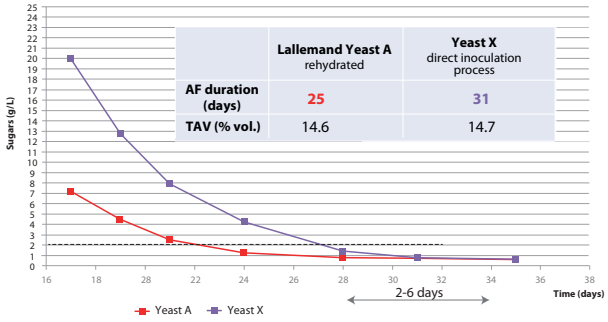

Figure 3. Sugar degradation of wine yeasts.

RECOMMENDATIONS

Our recommendations remain steadfast and rehydration of 25g/hL of active dry yeast, at the appropriate temperature (37°C), ideally with a protector (if high potential alcohol, highly clarified musts, w/o oxygen addition during alcoholic fermentation). It is the most secure technique to have a regular and complete fermentation and unlock the aromatic potential of the yearly grape production. Properly rehydrating wine active dry yeast as shown by our studies on the vitality index is the best way to avoid compromising on wine quality.