

Ask The Expert

Nutrient Use in High Brix / Low YAN Juice

Question 1

My juice has low YAN and a high Brix, how can I best address the nutrient needs of the must for optimal yeast fermentation (red and white)?

From the perspective of the yeast, fermentation is like a long run with a long steep slope at the end. To achieve a goal a long distance runner must be in good shape to start with while having sufficient reserves at each point of the run to meet the challenges along the road. Common sense tells the runner it would be ill advised to run in the mid-day sun or in driving rain. Yeast are similar. Good fermentations are far more likely if the winemaker is pro-active and takes common sense precautions. During my 20 years of fermentation R&D I worked to develop systematic practices for winemakers to deal with difficult juice. Let me review the main ones.

1. **Select a yeast that is “up to the task”.** Strains like ICV-D254, ICV-D47, QA23 and Lalvin BM4x4, for example, were selected to support high Brix, low YAN juices, and to bring longevity to the wine. The way the yeast is produced at Lallemand assures a good initial yeast physiology. Think of this as being a kin to good training and diet for an athlete prior to a run. Improvements in yeast production like the YSEO process bring even better adaptation to difficult juices.
2. **Make sure the yeast has what it needs to succeed.** The removal of 95% of the water during drying puts a real stress on active dry yeast. The rehydration process is therefore a key to achieving best results. Recent research has shown that rehydration with a special inactivated yeast formulation (example: GoFerm Protect) optimizes the rehydration and protects the yeast from excessive stress. GoFerm Protect is useful in avoiding sulfur like off odors and in building longevity. The addition of a complete yeast nutrient without ammonia (DAP) right at the beginning of fermentation (example: Fermaid O) is also recommended in very difficult juice (Brix over 24 and/or YAN under 200 mg/L). Consider this to be like a well-balanced meal and a good warm up before the run. By contrast, ammonia at that point for the yeast would be like a runner eating a candy bar. It would be assimilated quickly but the effects during the run would be negative. There is another positive effect of the GoFerm Protect and Fermaid O on yeast cell structures. They help to detoxify the juice as compounds toxic to the live yeast fix instead on the inactivated “GoFerm Protect” and “Fermaid O” cells.
3. **Provide your yeast with a balanced diet.** The complete nutrients in GoFerm Protect (for rehydration) and Fermaid O (in the juice) should supply your young yeast population with ample nutrients (including sterols, organic nitrogen, fatty acids and vitamins) to reach the first third of fermentation. This first third of fermentation is an absolutely key period to limit production of volatile acidity and sulfur like off odors. At the one third point, however, the winemaker needs to be alert. The nutritional balance of the fermenting must will have evolved and struggling cells will begin throwing off toxic compounds (small chain fatty acids). Think of this as similar to a runner potentially getting cramps.

At this stage the winemaker needs to refuel with a complete nutrition package (sterols, organic nitrogen, fatty acid, vitamins) plus oxygen. The nutrient Fermaid K was developed for exactly this purpose almost 30 years ago. It remains the best nutrient for refueling yeast at this point. Some ammonia (in the form of DAP) may also be used without negative effects.

Wine yeasts are programmed such that if they are given enough protection, provided correct initial nutrition and are refueled at one third of fermentation, there should be adequate reserves to complete a fermentation.... So long as there are no other excessive negative fermentation conditions.

4. **Avoid stressing your yeast.** Long distance runners hate the mid-day sun and the driving rain. Yeast also like to avoid certain negative conditions.

High temperature is the worst. Some people think yeast is happy because it ferments quickly. No so! Yeast is just altering its physiology, and burning its reserves. The logical consequences are early yeast die off and a stuck fermentation! High Brix and low YAN juices require that the winemaker manage fermentation

temperature. When the juice is over 24°Brix I very strongly recommend fermentation temperatures not to go over 24-26°C (75-78°F) as measured just under the cap. Color stability, tannin quality and longevity are all improved in wines made from such juice when the fermentation temperatures are kept under control.

Yeast cells settled and packed at the bottom of the tank or the barrel can be a second problem. Keeping the entire yeast population in suspension is important. Barrel stirring or tank mixers are important aids to assure regular fermentations and avoid sulfur like off odors. In reds I recommend agitating the juice and lees below the cap twice a day. For whites I recommend a little more care. Your first agitation can create a foam geysers!

Toxic compounds: These compounds can originate from the juice itself or from stressed yeast. When inactivated yeast products like BoosterBlanc, Opti-White, BoosterRouge or Opti-Red are used, one of their numerous positive effects is to help detoxify the juice. Similarly, the addition of Noblesse half way through the fermentation will help manage contrary conditions by adsorbing short chain fatty acids and other toxic compounds. Noblesse is the best known inactivated yeast to adsorb different undesirables such as ochratoxin, copper residues or off sulfur compounds. When the winemaker has problems managing agitations well, I recommend adding some Noblesse during the second third of fermentation. This helps facilitate the remainder of the fermentation by detoxifying the fermenting must and reducing CO2 pressure on the living yeast.

5. **Remember that your yeast has competition.** A runner needs to pay attention to the other runners in the race. Yeast is no different. There is always risk indigenous yeast and bacteria will compete for nutrients and will produce compound that are toxic to your yeast. There are 3 key points to managing these risks.

First, limit the presence of contaminants through good harvest and winery equipment sanitation good practices. This is obvious but should never ever be taken for granted.

Second, make sure that you use a strong yeast strain (from a physiological point of view). It needs to be up to the challenge of a particular fermentation. You wouldn't send a sprinter to do a marathon. Make sure it is prepared by re-hydrating properly with water and by using GoFerm Protect.

Third, give your yeast a "leg up" on the competition. Inoculate the must early with the recommended quantity. Early and adequate inoculation will limit the time available for contaminant growth.



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