

# Honey Fermentation Concerns

**Q: What's different about fermenting honey?**

**A:** It's a well known fact that honey is a poor source of nutrients, "Honey contains little amino nitrogen, with the lowest levels found in the lightest honeys", *the compleat Meadmaker* (pg 54). Add to that honey's acidic nature, and poor pH buffering capabilities and you have three factors that can adversely affect the yeast's ability to effectively to its job - low FAN & pH with little buffering.

Yeast needs nitrogen during their growth phase. A **Staggered Nutrient Addition** schedule provides the additional nitrogen they will need, when they need it. But be careful not to add nitrogen late in the fermentation (past the mid-point) as the yeasts lose their ability to take in nitrogen because of the effects of the alcohol.

The following comments made by Dr. Clayton Cone during the **2003-2005 Fortnight of Yeast** Q &A sessions, underscore the need for staggered nutrient additions:

- Yeast prefer that nutrients be added in increments over the first 1/3 of the fermentation. When all of the nutrients are added only at the beginning a large cell mass is produced with each cell having a low protein content. This low protein content makes it difficult to complete the fermentation and withstand the alcohol toxicity near the end.
- Yeast sugar transport systems that bring the sugar into the cell at a prescribed rate, contain nitrogen. Some of their half life span is about two hours, so new transport enzymes must be generated constantly. This requires a fresh source of available nitrogen.
- Yeast require a steady source of nitrogen through out the growth phase to produce DNA, RNA, amino acids, proteins and other cell components. If the sulfur containing amino acid skeleton is not available to receive the H<sub>2</sub>S as the yeast produces it, the yeast will expel it out of the cell resulting in rotten egg odor.
- Adding the nutrients, primarily Nitrogen, in increments results in less, but adequate, yeast growth with each cell having a larger amount of protein. High protein yeast ferment faster and with stand alcohol toxicity better than low protein yeast.
- Potassium is a nutrient requirement that should be taken into consideration when fermenting honey, corn & cane sugar, and grape concentrates - potassium carbonate should take care of this requirement added with in the first 12 hours of the fermentation.
- Oxygen should be considered as a yeast nutrient, so make sure that the yeast gets enough O<sub>2</sub> near the end of its growth phase.
- Unhealthy yeast comes from lack of nutrients and oxygen earlier in the fermentation. Honey contains very little nutrients for yeast growth. You will need to supplement with a well balance nutrient like Fermaid-K.
- Honey also contains very little (if any) buffering material. The pH will drop dramatically during the first few hours of fermentation, sometimes as low as 2.7-2.9. This will seriously stress the yeast, producing a very unhealthy yeast cell resulting in a long drawn-out fermentation. The problem can be minimized by adding a small amount of potassium carbonate at the beginning of the fermentation.
- Strive for the fermentation to be completed in two weeks.

Too large an influx of nitrogen can also be harmful to the yeasts. It throws the cell's metabolism off-balance leading to flavor problems, nitrogen wasting, and can even "yeast suicide", and fermenting too fast a can generate enough heat to kill the yeast.

Lastly, it is not necessarily a good practice to add nitrogen to a sluggish or stuck fermentation because it won't help and it CAN hurt! The nitrogen will not be used by the yeasts, and the excess can cause the pH to rise and off flavors to be developed by stimulating spoilage microbe growth.