A Compendium of Mead Knowledge

Kyle Byerly Various Gotmead Contributors

August 3, 2011

Contents

1 Fermentation

This is perhaps the most important aspect of mead making. You can have the best ingredients, but if you don't have a healthy fermentation your honey, and other ingedients, won't shine.

1.1 Yeast

There is a vast variety of high quality yeasts available to the average meadmaker. Highlighed below are a few of the favorite more easily available ones. In general, the best results from a given yeast are usually obtained when fermenting in the lower third of the yeast's fermentation temperature range.

D-47: A classic yeast for white wines. Often used to great effect in traditionals. Be careful of letting it get to warm (above 70F) as it throws off fusels and harsh alcohols. It can surlee for quite some time, adding floral characteristics.

DV10: A champagne isolate of a bayanus strain that produces minimal esters and phenols. Also tends to not blow off more delicate honey aromas. Ferments to 18% regularly. Good for dry meads and high alcohol sweet meads. It is a low nutrient yeast, but tends to produce sulfur unless front-loaded with nutrients (50/25/25 schedule or 75/25 seems to work well).

71B-1122: Narbonne yeast that can metabolize a certain amount of malic acid. Useful for young meads (low alcohol) or those with a significant portion of an acidic fruit.

K1V-1116: A generic fruit wine yeast. Seems to produce good results in high temperature fermentation environments such as in excess of 75F.

Uvaferm 43: A bayanus yeast strain that has an alcohol tolerance of 18%+. It is commonly used for high alcohol wines and tends not to blow off delicate aromas. Also commonly used with dessert wines and stuck fermentations.

1.2 Yeast Nutrients

Nutrients are used to make up for the lack of proper nutrients in the must, to aid in fermentation speed, or to overcome a stuck fermentation. They are typically added in relatively small amounts throughout the fermentation process. Because of the small amount needed, adding too much can be done easily so some amount of care should be taken when calculating and adding nutrients to the must.

Go-Ferm: Used in rehydrating yeast. 1.25g of Go-Ferm per gram of yeast with 17g grams of water. Mix go-ferm and water together and add yeast at re-hydration temperature (typically 104-109F). Provides

DAP: Also known as Di-ammonium phosphate, chmical name $(NH_4)_2HPO_4$ is a source of inorganic nitrogen, which provides YAN (Yeast Available Nitrogen) for nitrogen deficient musts (such as honey). 1g/L provides 210ppm of YAN. 1g/Gallon provides 50ppm of YAN. Do not add past 2/3 sugar break. The yeast cannot consume the nutrient at this stage and it will likely result in Urea type aromas and flavors in the finished mead. Do not add to hydrating yeast as DAP is somewhat toxic to re-hydrating yeast.

Fermaid K: Provides micro-nutrients and YAN for yeast health. Pyridoxine and Patothenate are two of these micro-nutrients. 1g/Gallon provides 25ppm of YAN.

Yeast Hulls: also called Yeast Ghosts are dried yeast cells. Used to aid in unsticking of a stuck fermentation or to combat H_2S formation at the end of a fermentation (usually past 2/3 sugar break).

1.3 Yeast Feeding

The process of yeast nutrient additions is relatively simple at the core. Yeast need nutrients and honey does not have enough, therefore small amounts of nutrients need to be added in order to keep the fermentation healthy. The Nanaiomo Winemakers have a good bit of detail on nutrient addition for fermentation [1].

It is a very good idea to mix powders in liquids that you plan on putting into a fermenting liquid. Adding a powder to a fermenting liquid will introduce nucleation points which will in turn produce lots

of foam. Mixing the powder into the foam allows one to gently stir the mix into the must without huge amounts of foam.

1.3.1 Guidelines

There isn't a set amount of nutrients to add, although there are guidelines. One of the easier (and common) to use nutrient combinations is Fermaid K and DAP at a ratio of 70% Fermaid K and 30% DAP. Ratio is based on weight.

1.3.2 Calculating YAN

1.4 Yeast Pitching Rate

Yeast need to be pitched at the proper rate in order to have a high enough cell count to ferment cleanly. There are numerous calculator online, although most are focused on beer. Generally one 8g packet of yeast is enough to properly ferment a 5 gallon batch of an under 1.120 O.G. mead. If over than 1.120 O.G. pitching two packets is recommended.

Sometimes a starter is necessary. The ideal starter for wine yeast is generally 1.070. Using a stir plate is generally a good idea since it oxygenates and stirs, which keeps the yeast in solution and pushes off CO_2.

1.5 Stirring

Something as simple as stirring during fermentation can be one of the most important steps in producing an amazing mead. Stirring drives off CO_2 which is a toxin to yeast. It mixes together the yeast and the must, bring the yeast back into suspension, thus making it more readily able to consume the sugars. It also allows a slight mixing in of oxygen which is necessary for yeast growth. Mixing makes it easy to add your nutrients. Having a touch-point with your mead often make is easy to check for H_2S or other issues.

Stirring tends to make fermentations faster and healthier.

There is a higher risk of infection with frequent stirrings. However, if you are careful with sanitation and keep your fermentation area clean the risk is minimal. The rewards of a proper stirring schedule far outweigh the risks of infection.

When beginning to stir, start slowly so as not to be overwhelmed by foam.

1.5.1 Stirring Schedule

The easiest schedule to follow for a traditional mead is every 12 hours until 50% sugar break or 2/3 sugar break. Stirring much past that tends to introduce oxygen at a stage that oxygen is less than ideal. You also want to let the yeast drop at some point.

1.5.2 Stirring Schedule with Fruit

1.6 Tricks to Stirring

Get a drill attached stirring device.

1.7 Oxygenation

1.8 H_2S and Mercaptans

One of the simplest indicators of yeast stress is the production of H_2S. H_2S smells of rotten eggs or sulfur. Yeast stress indicates that there is something off in the fermentation dynamics. The most common reason

for H_2S is low nutrients. Other causes are temperature (either too low or too high for the yeast) and pH (too low or too high).

1.8.1 Eliminating Before 2/3 Sugar Break

The easiest thing to add here is DAP. If you've added no DAP or Fermaid K you should add a 70/30 mix of Fermaid K and DAP. Add at a dosing rate of [RATE], stir and the H_2S should lessen in under 5 minutes. If it doesn't, then add [RATE] and stir again. If at this point it is still smelling of H_2S then the issue is likely not because of lack of nutrients, but rather from a low pH, low temperature, or insufficient yeast pitching rate.

1.8.2 Eliminating After 2/3 Sugar Break

If you smell H_2S after 2/3 sugar break you should not use DAP or fermaid K to remidy the situation. Both of those contain inorganic nitrogen (DAP) that the yeast can't metabolize very well at that point of the fermentation. The best thing to add is Yeast Hulls at .5g to .9g per Gallon. Start with .5g/Gallon and then if after stirring and waiting 5 minutes the H_2S smell doesn't go away add additional Yeast Hulls in .2g/Gallon increments (stirring and waiting inbetween additions).

1.9 Temperate control

1.10 Must pH

Important in maintaining a healthy fermentation. Keeping the pH between 3.7 and 4.6 for initial fermentation is key.

1.10.1 H_2S or Sluggish Fermentation

If you're finding that your mead is producing a large amount of H_2S and that temperature, and/or Yeast Hull or nutrient additions are not eliminating it, chances are your pH is off. You will need to measure your pH to see if that is the cause. If you can measure your pH and it is below 3.5 then you'll want to add some $CaCO_3$ (Calcium Carbonate) at [DOSING RATE] until you've reached a pH of 3.7. If your pH is too high, above 4.8, you can add some acid blend to adjust below 4.6. There are issues with using too much acid blend or $CaCO_3$.

If your temperatures are outside the recommended yeast temperature range, slowly adjust the temperatures up or down with a water bath with ice to cool or warm water and/or a heating device such as a fermwrap or brewbelt. You'll want to slowly adjust the temperature, going fast will likely shock the yeast which could stop fermentation. Generally changing the temperature of the must/mead faster than RATE] can make the yeast drop out and end fermentation.

References

[1] Nanaiomo Winemakers, Adding Nitrogen to Fermentations. http://www.nanaimowinemakers.org/Winemaking/General/AddingNitrogen.htm