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High Gravity Brewing!

By Steve Bader, Bader Beer & Wine Supply

We all love high alcohol beers (well, most of us anyway). Imperial IPA's, Barleywine, Belgian Dubbels, Winter seasonals, etc. But how do you properly make these beers? High gravity brewing, or the making of high alcohol beer, requires a bit more care than regular strength beer. Many homebrewers want to make these beers, but do not understand the extra care required to successfully make these beers. This article will address the major points to be aware of in high gravity brewing, so you can be more successful with your high gravity beers.

The primary problem with high gravity brewing is this: To start with, there is a higher amount of malt sugars in your beer. Malt sugars are at best about 80% fermentable, meaning there will be residual malt sugars not fermented into alcohol. The higher the original gravity of the beer, there will be a comparative higher ending gravity in your beer. If you do not make the beer correctly, you produce a beer that will not ferment completely, which means a beer that can be overly sweet. The balance of flavors is too far toward the malty, almost syrupy side, and you can only drink about half a pint before you want something else. While there may be high hop bitterness in the beer, the sweet malty aftertaste covers up the hop bitterness, and almost any other flavor in the beer.

Why did this happen? The answer is this: your yeast did not ferment all of the sugars that were available into alcohol. So your beer is too sweet, and probably about 1% or more short of alcohol.

The reasons your yeast did not ferment all the malt sugars is due to primarily 4 things.

#1) Your yeast did not have enough oxygen available to ferment all of the beer.

#2) You did not use enough yeast.

#3) You did not use the proper kind of yeast nutrient (*Servomyces*)

#4) You used a yeast that does not ferment a high percentage of sugars into alcohol.

The solutions to this problem are simple:

#1) Heavily aerate your beer prior to pitching yeast.

#2) Make a yeast starter for high gravity beers.

#3) Add 1 tablet of *Servomyces* to each batch of beer.

#4) Be sure to choose a yeast with a high attenuation.

Recommendations for high gravity brewing

#1) Yeast requires large amounts of oxygen dissolved in the unfermented beer to be able to ferment the maximum amount of malt sugars. Beer that has been boiled for more than about 15 minutes has virtually no oxygen in it. You may add the wort you boiled to 2 to 3 gallons of cold water that will still have oxygen in it, and while this method works well for low gravity (low alcohol) beers, it is not enough oxygen for high gravity beers. So the solution is to aerate your beer heavily, either with a small fish pump and fine air stone that you pump air (approximately 21% oxygen) into your beer for about 20 to 30 minutes just prior to adding your yeast, or to use an oxygen bottle that is nearly 100% oxygen, and pump via a fine air stone into your beer for about 1 minute.

No, simply shaking your beer in the carboy, or stirring it heavily in the carboy, will not work!

#2) There is much written on the subject of how much yeast to add to each beer, so I will not go into great details here. To simplify this issue for high gravity beers, here is my recommendation. For 5 gallon batches of beer with an original gravity of up to about 1.070, one package of White Labs and Wyeast will work pretty well *if you aerate heavily AND add a vial of White Labs Servomyces*. For original gravities over 1.070, it would be best to make a yeast starter or use 2 packages of yeast, and of course aerate heavily and add the *Servomyces*. Go to this link for White Labs recommendation for making a yeast starter.

http://www.whitelabs.com/beer/homebrew_starters.html

#3) White Labs *Servomyces*: This is a relatively new product, being out on the market since February of 2005. This is not your normal yeast nutrient, but a much stronger yeast supplement that has proven to be a fantastic product for high

gravity beers. Many of our customers use the Servomyces and report faster and much more complete fermentations.

Here is White Labs description from their web site:

Servomyces is a nutritional yeast supplement (GMO free) that was originally developed for German brewers by Weihenstephan and the Munich University. It conforms to the restrictions of Reinheitsgebot. Servomyces enables any yeast strain's ability to incorporate essential nutrients into its cellular structure. Tested in breweries around the world, it has been proven to:

- * Cut down fermentation time
- * Increase flocculation
- * Greatly reduce harsh sulfur notes
- * Improve the health and viability of yeast
- * Reduce levels of diacetyl at the end of primary fermentation
- * Produce faster, more complete attenuations
- * Increase yeast production for a better harvest
- * Improve the quality of the finished product

#4) Yeast Choice. All liquid yeast companies list their attenuation abilities for all their yeasts, and for high gravity beers you should use yeast with higher attenuation abilities. I would suggest any yeast that has an attenuation of higher than 75%.

Bonus recommendation!! - All grain brewers: Mashing temperatures will have an effect on the fermentability of your wort. Mashing at 148° produces a more fermentable wort, and mashing at 158° gives you a less fermentable wort. So for high gravity beers be sure to mash at the lower temperatures.

Bonus recommendation #2 - Malt sugars are the most difficult sugars to ferment into alcohol, with most yeast only able to ferment about 75% of the various malt sugars that are in beer wort. Corn sugar, rice sugar, and Candi (beet) sugar are typically nearly 100% fermentable, and substituting a pound or 2 of these sugars for malt sugars will allow your high gravity beers to more completely ferment. There will be a slightly thinner body and more alcoholic taste to your beer, but in high gravity beers this is often desirable. A great example is many of the high gravity Belgian beers that use Candi sugar.