

HIGH GRAVITY BREWING AND ALES

1. High Gravity Brewing
 - a. A technique allowing a brewer to brew a larger end-batch volume of ale without needing larger fermentation equipment. A higher specific gravity beer is first fermented, and then diluted/blended with water to produce a larger volume of a lower ABV beer, lower IBU and SRM.
 - b. Advantage is producing a larger volume of beer than system allows. A 500 bbl system can produce 700 bbl of beer. For homebrewers, a 5 gal batch can produce 6-6.5 gals, maybe more if careful.
 - c. Stereotypically used with American Pilsner
 - d. Disadvantages
 - i. Fermenting wort that is above 1.064 can add esters into final beer (fruity: banana or apple)
 - ii. Hop utilization decreases slightly at higher wort gravities, needing proportionally more hops needed to results in same IBU.
2. High Gravity Ales
 - a. Ales that are brewed to a higher than typical specific gravity, but are not diluted, resulting in higher ABV ale.
 - b. Typically original gravities are 1.060 - 1.070 and higher.
 - c. Challenges:
 - i. Same as high gravity brewing; hop utilization and esters.
 - ii. Fermentation not starting quickly, typically requires a yeast starter.
 - iii. Stuck fermentation, typically from lack of oxygen as the solubility of oxygen decreases with increased wort concentration. Fermentation requires oxygen, high wort concentration leads to low O₂, as fermentation goes on, the O₂ is consumed and eventually gone and fermentation stops.
 1. Aerate properly
 2. Use a yeast starter
 3. Pitch more yeast
 - iv. Achieving complete attenuation often requires extra care
 1. longer fermentations
 2. multiple pitching
 3. rousing the yeast
 - a. Agitate (old breweries used to "walk" the cask)
 - b. Personal experience, racking the beer
3. Some high gravity styles and their SG range.
 - a. Barley Wines; 1.090 - 1.120
 - b. India Pale Ale; 1.050 - 1.070
 - c. Bock 1.066 - 1.074, Maibock 1.066 - 1.068, Doppelbock 1.074 - 1.080, Eisbock 1.092 - 1.116
 - d. Fruit beers; max 1.116
 - e. Old Ales; 1.057 - 1.125
 - f. Strong Scotch 90/-; 1.072 - 1.085
 - g. Foreign Stout; 1.052 - 1.072, Imperial Stout; 1.075 - 1.095
 - h. Märzen/Oktoberfest; 1.052 - 1.064
 - i. Weizen Bock; 1.065 - 1.080
4. Recommended yeasts
 - a. White Labs
 - i. WLP007 Dry English Ale
 - ii. WLP099 Super High Gravity Ale (ferment up to 25%)
 - iii. WLP500 Trappist Ale
 - iv. WLP510 Belgian Bastogne Ale
 - v. WLP530 Abbey Ale or WLP540 Abbey IV Ale
 - vi. WLP570 Belgian Golden Ale

- b. Wyeast Labs
 - i. 1728 Scottish Ale
 - ii. 1084 Irish Ale
 - iii. 1214 Belgian Abbey
 - iv. 1388 Belgian Strong
 - v. 1762 Belgian Abbey II
 - vi. 3787 Trappist High Gravity
- 5. Specific Beers
 - a. Sierra Nevada Brewing Company - Bigfoot Ale
 - b. New Holland Brewing Company has a High Gravity series of 8 different beers
 - c. Ayinger - Celebrator Doppelbock
 - d. Bell's Brewing Company - Expedition Stout
 - e. Founders Brewing Company - Harvest Ale
- 6. 21% ABV All-grain Beer (<http://www.byo.com/component/resource/article/51-21-alcohol-all-grain-beer>)