

Tips for Better Extract Brewing

09/21/2003

Drew Beechum

- 1) Ingredients
 - a. Always choose the freshest ingredients, especially extract
 - b. Chew your malts and soak your hops in hot water to learn their characters.
- 2) Water
 - a. Charcoal Filter
 - i. Brita type Filter (\$20)
 - ii. Under-sink (\$30)
 - iii. Whole House (\$60)
 - iv. Reverse Osmosis (\$150)
 1. Greatest Flexibility w/ Minerals
 - b. Water Vendors – Long term no win.
 - c. LA DWP – Uses Chloramine which does not boil off
- 3) Yeast
 - a. Starters
 - i. DME, Nutrient, Hops
 - ii. ~3.2 oz (by weight) DME per Quart
 - b. Stir plates
 - i. Absolutely necessary? No. But you'll double your yield.
 - c. Making Cultures from Bottles
 - i. Easy method
 1. 2 bottles of target beer.
 2. Decant most beer off yeast.
 3. Swirl and pour yeast into a prepared starter
 4. Might need to try multiple times before success. Smell and taste the starter wort.
 - ii. Complicated method
 1. Culture to plates or slants.
 - d. Other sources
 - i. Make friends with your local pro-brewer (BJ's) and get slurries
 - ii. Make friends with local homebrewers, re-pitch off of their batches
- 4) Nutrient
 - a. Always Add for extra FAN (less important for All-Grain)
- 5) Hops
 - a. Learn to adjust your hopping schedule based upon the Alpha Acid percentage of your available hops and don't stick to the recorded amount on a recipe. Only in your later additions does an addition of 8% Cascade yield the same bitterness as a 6% hop.

- 6) O2
 - a. Venturi Tube
 - b. O2 Canister
- 7) Full Wort Boiling
 - a. Lightens up the beer.
 - b. Allows for better hop extract
 - c. Softens the sometimes apparent "extract twang"
 - d. Absolutely requires a chiller.
- 8) Chilling – Immersion / CFC
 - a. Immersion – Cleaning a snap, a little slow and the efficiency isn't spectacular.
 - b. Counter Flow – Very Efficient, More Work to Keep Clean
 - i. Caustic – PBW, Caustic, etc.
 - ii. Hot Water Rinse
 - iii. Acid Rinse – Sani-Clean, Citric Acid, et. al.
- 9) Sanitation with Sani-clean / Star-San or Iodophor
 - a. Much better than Bleach. Minimal contact time or chlorine problems.
- 10) Cold Steeping Darker Grains
 - a. Better Control of Color Contribution.
 - b. Less Harsh Acid Flavor
 - c. Fair storage for later use
- 11) Late Addition of Extract
 - a. Allows for a lighter color beer by avoid excessive caramelization.
 - b. Better Hop Extraction
 - c. Couple it with large yeast quantities to deal with minimal sanitation issues.
- 12) Knowing your numbers
 - a. See equations below. It is crucial to know how to adjust your numbers for different brews and hop levels, etc.
- 13) Parti-Glying with Extract or Mash
 - a. By understand the numbers above you can squeeze two boils in at once and get two batches for a small investment of extra time.
 - b. See equations below
- 14) Record Keeping
 - a. Notebook. Legal pad. Index cards. Anything to keep the notes around
 - i. Handy to track what you did differently.
 - ii. Track how a beer changes.
 - iii. When you give the beer to a judge or an experienced brewer, they can tailor their remarks to what you actually did.
 - b. ProMash is the Rolls of Computer Programs
 - i. Brewing Recipes calculates all the things you need.

- ii. Brewing Sessions track individual brew attempts.
 - c. Other computerized options include StrangeBrew, BeerSmith, HBD Recipator, Handmade Excel Worksheets (Tom Wolf has a particularly handy sheet)
- 15) Your Fellow Homebrewers
- a. They may not always be right, but keep an open mind about what they've done.
 - b. Brew with them. No one remembers all the little things they do or the little gadget they made and it's the perfect way to spot it. Plus it's a good excuse to drink some beer with your friends.

Equations to know:

Gravity Units

Think of gravity points as a SG with out the 1. (e.g. 1.038 becomes 38 Gravity Units (GU). This denotes how much sugar should be given from one pound of sugar source in one gallon of water.

Sugar Yield from a Malt Quantity

Sugar Yield = (Weight of Malt X Maximum Malt GU X System Efficiency)

Every grain has a slightly different yield. Sugars and Malt Extracts have an efficiency of 100%. The amount of sugar yielded from a malt will differ from brewer's system to system.

Typical Malt Yields

	Yield (GU/lb)	Typical Efficiency
Malt/Sugar		
Liquid Malt Extract	37-39	100%
Dry Malt Extract	45	100%
Corn Sugar	37	100%
Cane Sugar	46	100%
Honey	30-35	100%
Pale and Pils Malt	35-37	70%
Munich/Vienna/Biscuit	35-36	70%
Crystal Malts	33-35	70%
Chocolate/Black/Roast	25-30	70%
Wheat Malt	37-40	70%

As an example I want to know how much sugar I should get from a pound of Great Western Domestic 2-Row Pale Malt in one gallon on my system at 72% efficiency.

$$GU = (1 \text{ lb} \times 36 \text{ GU/lb} \times .72) = 25.92 \text{ GU}$$

Or roughly 1.026 from one pound in one gallon.

Calculating Total Gravity

$$OG = (\text{Malt1 Sugar Yield} + \text{Malt2 Sugar Yield} + \dots + \text{MaltN Sugar Yield}) / \text{Total Volume}$$

Let's take a simple malt bill of 1lb of Crystal Malt (60L) and 6 pounds of LME in 5 gallons

$$GU_{(\text{Crystal})} = 1 \times 34 \times .70 = \sim 24$$

$$GU_{(\text{LME})} = 6 \times 38 \times 1.0 = 228$$

$$\text{So.. } OG = (GU_{(\text{Crystal})} + GU_{(\text{LME})}) / 5.0$$

$$OG = (24 + 228) / 5 = 50.4 \text{ or } 1.050$$

Calculating IBU's (Simple)

$$IBU = (\text{Hop Weight (oz)} \times \text{Utilization\%} \times \text{Alpha\%} \times 7489) / \text{Boil Volume}$$

Boil Time	Whole Hops Utilization%	Pellet Utilization%
Dry Hop	0	0
< 10 mins	5	6
< 20 mins	12	15
< 30 mins	15	19
< 45 mins	19	24
< 60 mins	22	27
< 75	24	30

This formula doesn't take into account a number of factors but will ballpark you for those last minute adjustments to your recipe because the shop doesn't have Cascade at 6%, but 8%.

Balancing your beer by the numbers

Ray Daniels in *Designing Great Beers* introduced the BU:GU ratio as a handy numerical indication of the hops vs. malt ratio of your brew.

Simply take your calculated IBU level (e.g. 60 IBU's) and your calculated gravity units (1.050 or 50 GU) and you get a BU:GU of 60/50 or 1.2 a beer edged to the bitter side.

Good Resources:

Designing Great Beers – Ray Daniels

The AHA Style Guide Books

CloneBrews – Tess and Mark Szamatulski

Beer Captured - Tess and Mark Szamatulski

Zymurgy - The official magazine of the AHA

Brew Your Own – A more beginner oriented magazine.

The Maltose Falcons (But I might be biased!)

Really Your Local Homebrew Club

Other Articles found on the Web.

Makings of a Wining Extract Brew

By Brett Schneider

Introduction - This year's Octobrefest tasting surprised almost all of us as the top two beers were extract brews. We've long felt one could make a great tasting extract brew but until now one had never topped of one our tastings. In the following article, Bill Shelly shares some of his wining secrets!

Below is the process I use for brewing lagers:

- Heat crushed grains in 1.5 gal water to 150 - 153F and steep for 30 min.
- Strain grain water into brew pot and rinse with .5 gal water at 150F.
- Bring to boil, remove pot from stove, add malt extracts.
- Boil 60 minutes.
- Add hops and Irish moss according to schedule.
- Remove pot from stove and cool with immersion chiller.
- Pour wort through strainer into fermenter containing 2 gal of aerated cold (50F) water.
- Rinse hops with cold water to get 5 gal in fermenter.
- Aerate wort with immersion chiller and adjust temp to 70F.
- Pitch yeast (use starter!).
- Leave fermenter at 65-70F until bubbling (overnight).
- Move fermenter to proper temperature (used refrigerator with external thermostat).
- Rack to secondary after 7-14 days.
- When fermentation is completely done (another 7-14 days), begin dropping the temp by 2 degrees every 2 days to 33F.
- Bottle (adding a little more yeast - about 1/4 Wyeast packet).
- Leave bottles at 65-70F for 1 week.
- Move bottles to 55-60F for 2 weeks.
- Gradually drop temp to 33F.

I'm very fortunate to have well water that is cold and free of chlorine and bacteria. Most equipment gets sanitized with Bio-San and rinsed with tap water. Bottles are sanitized with Bio-San in the dishwasher and rinsed. Bottle caps are disinfected with Iodophor and rinsed.

I always try to:

- Use hop plugs or whole leaf hops. Pellets gum up strainers.
- Boil as much of the wort as I can -- but my pot only holds 2.5 gal.
- Boil for at least 60 minutes. The lid is on, but off-center while boiling to minimize evaporation while avoiding boil-overs.

- Chill the wort before pouring it into the fermenter and avoid splashing/aerating until chilled.
- Aerate the chilled wort by pouring slowly through the hops strainer and by sloshing the wort in the fermenter with the wort chiller.
- Use a yeast starter.
- Avoid splashing/aerating the beer while racking.
- Be REALLY careful about sanitation.

And now for the wining recipes:

Vienna Style Lager

Vienna Style

Based on the "Negra Modelo Dark Beer" recipe from "CLONEBREWS" by Tess and Mark Szamatulski

OG 1.054 (CLONEBREWS predicts 1.050-1.051)
 FG 1.015 (CLONEBREWS predicts 1.011-1.013)
 IBU 27 (assuming 23% utilization)

6oz 60L crystal malt
 8oz German Vienna malt
 2oz chocolate malt
 3lb M&F light dried malt extract
 3.3lb Bierkeller light malt syrup
 .75oz Hallertau Hersbrucker plugs @ 4.5%AA (3.4 HBU) (60 min boil)
 .9oz Tettnanger Tettnang plugs @ 4.9%AA (4.4 HBU) (60 min boil)
 .5oz Tettnanger Tettnang plugs (last 10 min of boil)
 1tsp Irish moss (last 10 min of boil)
 Wyeast 2124 Bohemian Lager yeast (use starter!)
 Ferment at 42-52F (used 47F).
 1.25 cups M&F extra-light DME priming for bottling

Octoberfest

OG 1.054
 FG 1.015
 IBU 25 (assuming 23% utilization)

12oz Carapils
 6oz Caravienna
 5.6lb William's Brewing German Gold extract syrup
 (from 50% German Moravian Pilsner, 50% German Munich)
 1.4lb Alexander's Pale extract syrup
 .8oz Hallertauer Hersbrucker plugs @ 4.5%AA (60 min boil)
 .8oz Tettnanger Tettnang plugs @4.3%AA (60 min boil)
 .25oz Hallertauer Hersbrucker plugs (last 10 min of boil)
 1tsp Irish moss (last 10 min of boil)
 Wyeast 2206 Bavarian Lager yeast (use starter!)
 Ferment at 42-52F (used 47F).
 1.25 cups M&F extra-light DME priming for bottling

Brewing Better Beer Without Buying A Restaurant or, Improving Your Extract Beers Incrementally

by Scott Tringali

Okay, so you've brewed five, maybe ten, maybe more, batches of decent extract homebrew. You follow the kit recipes to the letter, are squeaky clean, read Papazian, and steep your specialty grains just right before brewing. They taste good; in fact, you have one or two after work each day. But something still isn't just right—you aren't ready to stop buying your beloved Sierra Nevada Pale Ale or Guinness just yet. They just don't seem to be getting any better. You've reached the intermediate brewer's plateau. What do you do?

Well, you've heard of all-grain brewing. You might even know a couple of folks who do seemingly immensely complicated things for 10 hours straight on a Saturday. They talk about lowering the pH of their sparge to get a couple more points of efficiency and other such obscure things. Homebrewing is supposed to be fun, you don't want to become obsessed, buy a few tons of equipment or lose all of your free time.

The good news is you don't. The simplest changes make the biggest difference.

These are my personal experiences going from brewing "okay" beer, to beer that I truly enjoy drinking. My advice is to heed this advice in the order presented here, because they are listed in order of largest impact to lowest. You could adopt them all at once, but if you're like me, you don't want to change everything at once. Changing things one at a time is a great way to learn their effects on the finished product.

One last word of advice: taste and smell everything ingredient at all steps along the way. Taste and smell the hops, some grain, the yeast. Do it when dry, before boiling, before pitching, before secondary, before bottling, and various times after. Your subconscious mind will pick up on things that you don't notice, which helps build intuition and ultimately, better beer.

Get Wet or, Use Liquid Yeast

You might think that most of the flavor comes from adjusting the grains, and the yeast just makes the alcohol. One Packet Of Dry Ale Yeast, heck, it's even last on the list. Must not be important. Wrong! It is responsible for more flavor than you think. It has a huge impact in the quality of your beer.

Take a raisin. Soak it in water for a while, and eat it. Now, eat a grape. Do they taste the same? I don't think so. Now, I'm not saying yeast are the same as grapes, but the drying process does disturb the flavor somewhat.

If you're an extract kit-brewer, you might not even know that liquid yeast exist. That's problem with following kit recipes to the letter: they only serve as an introduction to brewing. Liquid yeast simply produces cleaner flavors. Isn't that what you want?

In addition, you can get certain flavors appropriate for style. Ever think that the spicy, banana-clove flavor of a German wheat beer is due to the wheat? No. It's a special strain of yeast that produces those unique esters. Using liquid yeasts, like when you first tried specialty grains, can open a whole world of new flavors to your **brewing** palette.

Resist the urge to save \$3. Get the liquid yeast. Read the instructions, and make a starter. Try it, make up your own mind, but try it. If you're really concerned about price, you can reuse yeast from your fermenter, or easier, from the bottle.

Chill Out or, Keep Your Temperature Cool & Consistent

Since you are now convinced to use liquid yeast, you should know that yeast are best when they are consistent. Once you make the leap to liquid yeast, it's easier to realize the huge flavor difference between different strains. Now, different strains work best at different temperatures, but all work best at consistent ones. Learn what the best fermentation range is, and do everything possible to keep it there.

Your fermenter should have a plastic, flat thermometer attached to it. Now, you aren't likely to ever need to heat it, because you probably keep your place at 60-70F. During the winter, for ales, this is fine. Liquids change temperature much more slowly than air, so minor fluctuations won't hurt.

The problem you are likely to have is heat during the summer, when it could be 90° during the day, 65° at night. These wild swings can really pose problems in your beer. If you have the most expensive piece of homebrewing equipment-a basement-then you have an ideal place to keep your beer. If you need to cool it further, there are various tricks that will buy you a few degrees here and there before resorting to a fridge, but putting in the basement should get you in the right ballpark.

Scale (the Verb, not the Noun) or, Don't Measure Hops by Weight

One day, I decided to plug a few recipes into a **brewing** calculator, and got a nasty surprise-I was underhopping all my **beers**! The calculator measures the bitterness extracted from the hops and compares it against the normal range for that style. All my **beers** were way below the "minimum". Why? Well, the actual AA%, the prime contributor of bitterness, of the hops as bought was way below what the recipe expects. Loosely speaking, if your recipe wants 1 oz of 10% AA hops, and you buy 1oz at 5%, you're putting in half the amount of bitterness. Once again, following the kits to the letter led me astray.

The solution is to scale it exactly: divide the expected versus AA%, then multiply the expected amount of hops by that factor:

$$\begin{aligned} \text{actual amount} &= (\text{expected AA\%} / \text{actual AA\%}) * \text{expected amount} \\ &= (10\% / 5\%) * 1 \text{ oz} \\ &= 2 * 1 \text{ oz} \\ &= 2.0 \text{ oz} \end{aligned}$$

This method isn't perfect, but it's close enough, and much **better** than nothing. Don't make a Pale Ale without it.

Faster, Bigger, Harder or, Boil Vigorously

Typical **extract** recipes call for a concentrated boil. That is, you boil a gallon or two of concentrated wort, and then mix with three or so gallons of cold water in the fermenter.

A **better** way is to boil the entire batch at once. In addition, try using whole (plug or leaf) hops instead of pellets, and boil vigorously-no wimpy little bubbles allowed. Don't be afraid of a boilover. (But still be vigilant!)

By doing this, you gain a few benefits. One, your hop utilization will be **better**, because hops bitter the beer **better** when it is less concentrated. Two, you are less likely to caramelize your wort because of the lower concentration of sugar. Three, the physical action of a strong boil plus the collision of the whole hops causes much more protein (hot-break and cold-break, or trub) to precipitate out of the wort. This gives you **better** flavor, clearer beer, and less sediment in the glass.

You might have trouble getting a large volume of liquid to a rolling boil on your stove. A lid can help, but don't cover it once it's boiling. The steam needs to escape to drive off undesired flavors, such as dimethyl-sulfide or DMS. Prop the lid up with a clothespin. This allows the steam to escape and allows you to enjoy a faster boil.

Now you've got a problem: a pot of boiling, unconcentrated wort, and nothing to cool it with. No, don't leave it to cool overnight! Instead, invest in an immersion chiller. This baby will usually take your wort down to pitchable temperature in about 15 minutes, all for \$30 or so. Even cheaper, buy some flexible copper tubing and build your own.

What? You say your pot isn't big enough to handle five gallons of a rockin' boil? Read on.

Size Doesn't Matter or, Try A Small All-Grain Batch

What? You've tried everything, and you're still not getting the flavor you're looking for? Maybe you want to go all-grain, but have nightmares about buying gargantuan industrial burners, pots and stirring implements. After all, it takes a lot of equipment to boil five gallons at once.

Relax: do a small batch first. 2 to 3 gallons is perfect: it's easier to handle, you'll be done quicker, and I bet you already have all the equipment you need. You can mash in a picnic cooler or in the oven, and sparge with a pasta strainer. You can boil the entire batch, and get it really rolling.

The great thing about this is it's just as easy as doing a partial-mash, except for you get the full flavor of all-grain. After a few all-grain batches, you'll know exactly what

equipment you need for scaling up to five or ten gallon batches, and cease to be scared or bewildered by those guys who have what amounts to a small restaurant in their basement.

Hey, you just might never go back to **extract**.

<http://byo.com/feature/188.html>

http://www.foamontherange.org/club_files/Improving%20extract%20brewing.pdf