

August

2015

Volume 24

Number 8

## In This Issue

1 Pres' Msg

3 Styles

3 Tastings

4 Darts

5 Boil

## 10 Nutrition Next Meeting

Tuesday, August 11  
at 7 pm. At

### **Stein Fillers**

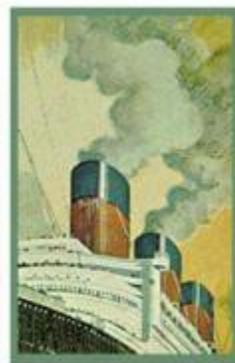
4160 Norse Way  
Long Beach 90808  
562-425-0588

[brew@steinfillers.com](mailto:brew@steinfillers.com)  
<http://www.longbeachhomebrewers.com>

# The Brews Telegram

The Newsletter of the  
Long Beach Homebrewers

long beach



homebrewers

## President's Message

### **Greetings fellow Long Beach Homebrewers,**

August is here and that brings us to our next round of the LBHB Homebrewer of Year competition. The competition for this month features meads. Mead is by some estimates the oldest fermented beverage in the world, most likely due in part to its simplicity. For example, honey mixed with some water, in the most basic form. Mead also tends to be higher in alcohol content, so make your travel arrangements for the meeting accordingly.

Last month's meeting featured a visit from Neva Parker from Whitelabs, who delivered her MythBusters-style talk on yeast and fermentation. There was great discussion on many facets of yeast fermentation. Many thanks to Neva for making the presentation.

Continuing on the celebration of the club's 25<sup>th</sup> Anniversary, the club has an event coming up on Saturday August 29<sup>th</sup>. As envisioned and initiated by former club President Josh Smith, LBHB has partnered with Timeless Pints to create and brew a collaboration beer on their commercial system to celebrate the club's 25<sup>th</sup> anniversary. In this case, the collaboration was between Timeless Pints' Head Brewer and Owner Chris Sparacio and the 2014 LBHB Homebrewer of the Year. (The 2014 Homebrewer of the Year award was split between two brewers, i.e. myself and Randy Weber). Based on a pilot brew that I made, the decision was made to brew a version of my Imperial Black India Pale Lager that I served at the NHC in San Diego on club night (taking inspiration from Beachwood's Hop Vader Black IPA, I named it "Darth Malt" at the NHC). So on July 8<sup>th</sup> at the god-forsaken hour of 5:00 AM, Chris and I brewed up the beer on Timeless Pint's system. A 5 gallon homebrew version of the recipe is shown below, but in a nutshell the beer is an 8% hop monster, that utilized Mash Hopping, First Wort Hopping, Huge Late Kettle additions, and two rounds of dry-hopping, and fermented cold with lager yeast. The beer features several varieties of hops, but most prominently features a new variety,

Continued on Page 2...

## Continued from page 1

Azacca, that also just so happens to be in the new re-vamped version of Stone's Ruination IPA. So on to the details of the event:

Where: Timeless Pints Brewery, 3671 Industry Avenue, Lakewood, CA.

When: 12:00 PM on Saturday August 29<sup>th</sup>. Note that their normal opening time is 1:00 PM.

They are opening up an hour early just for the club and this event!

What: Release of the LBHB Anniversary Collaboration Beer. The beer will featured and just for the day, there will be \$1 off on pints of this beer only. However, and more importantly, LBHB club members only will be allowed one pour each into the club's **Anniversary Steins** that were handed out at the Beachwood dinner, for the same price as a regular pint. The club steins hold 25 ounces so this a great deal, especially considering the huge amount of hops that were used to make this beer (i.e., this beer wasn't cheap to make)! If you don't yet have a Stein, they will be offered at the fire-sale price of only \$12 at the next club meeting. Food truck(s) will also be there, but exact details are not yet available at newsletter "press" time.

Homebrew Recipe for LBHB 25<sup>th</sup> Anniversary Beer (aka Darth Malt version 2.0):

Volume: Target 5 gallons into the keg, but do to hop-losses, target 6 Gallons at flameout, yielding 5.25 to 5.5 gallons into the fermenter after accounting for losses to hop and trub debris.

Grain Bill (infusion mash at 152F):

97% Two Row Malt

3% Midnight Wheat

(for exact grain amounts in pounds, utilize knowledge of your system efficiency, to obtain an OG of 1.076 to 1.078 for 6 gallons at flameout)

Hops:

1 oz Belma (substitute Amarillo or Azacca if you can't get Belma) Mash Hops

1 oz Amarillo First Wort Hop

1.5 oz Amarillo 15 min

1.5 oz Azacca 15 min

1.5 oz Amarillo flameout

1.5 oz Azacca flameout

1 oz Azacca dry hop for 10 days

1 oz El Dorado dry hop for 10 days

1 oz Azacca dry hop for 5 days

1 oz Citra dry hop for 5 days

Yeast:

Whitelabs 830 German lager yeast. Ferment at 52 to 55 F until gravity is approximately 1.015. Raise temp to low 60's for diacetyl rest and dry-hopping. Fine before keggling (BioFine used at TP, but gelatin could be used for homebrewers).

IBU's -about 65 to 70, depending on %AA of constituent hops.  
ABV – 8.1 to 8.2 %

Cheers!

Adam

## 2015 Monthly Style Schedule

Here are the styles for each month.

**August:** Mead (Categories 24, 25, and 26)\*\*  
**September:** Sour Ale (Category 17)  
**October:** Sweet Stout (Category 13b)\*\*  
**November:** Spice/Herb/Vegetable Beer (Category 21)  
**December:** Standard Cider and Perry (Category 27)

## Tastings at the July meeting (American Ale)

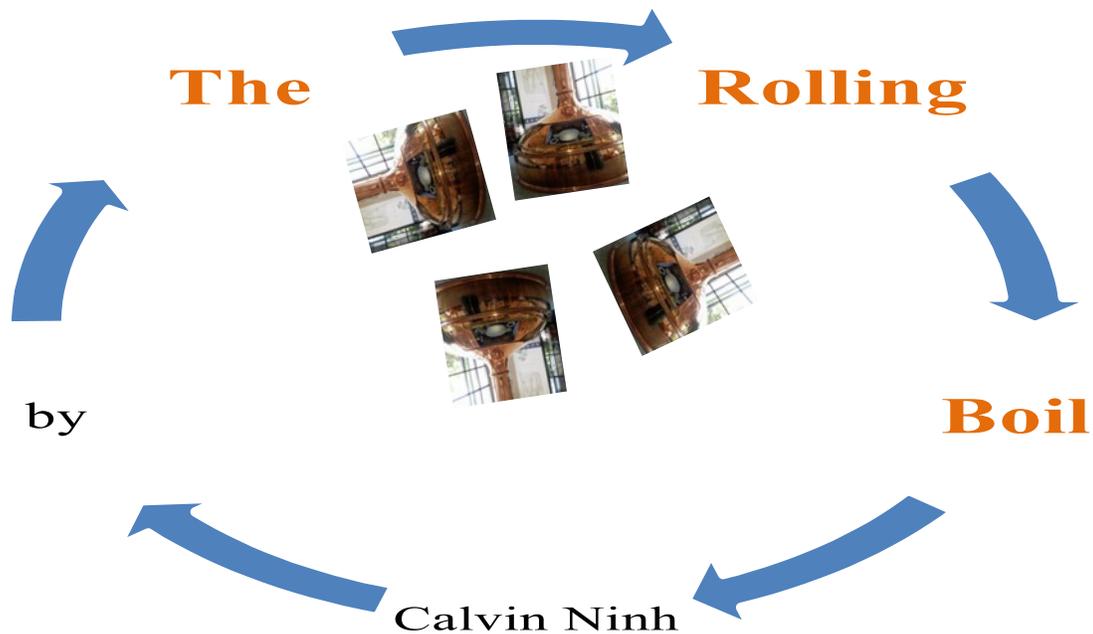
Andi S	Grapefruit Wheat
Tom P	Stout
Alfredo	Mexican Lager
Alex C	Belgian Strongish - Monster Brew
Jerome C	Black IPA
Richard H	Honey Pale Ale
Tim	Sour Robust Porter
Mamu	Porter
Rick A	Pale Ale
Dominic W	CaliPorter
Adam W, Julian S	Am IPA
Josh P	Citra SMASH Am Pale Ale
Enrique P	Belgian Golden Strong
Jesse F	Rogenbier
Jesse F	Barrel Aged RIS
Chris W	Gueze

One thing that I have been trying to do for several years is get activities going for our members that fall outside of our typical 2<sup>nd</sup> Tuesday of the month meetings. I know that there are some members out there that can't make Tuesday nights because of work or other personal commitments. With that being said, I am happy to state that a few of us have started meeting up weekly to play darts.



The deal is- we rotate houses, and “darts night” is held on either Thursday or Friday night, depending on which is better for the host. Ideally, we “throw” on Thursday nights because it seems like everyone has plans on Friday nights, but we are flexible. I’m sure you are shouting at the newsletter “Where’s the beer?”. Well.... everyone brings snacks and beer to share with the group. If you think this is something that you would be interested in participating in, please email me at [jsmith6051@yahoo.com](mailto:jsmith6051@yahoo.com) and I will be happy to invite you to our next “darts night.”

**Josh Smith**



Boiling is a brewing process step after mashing (or dissolving your extract) and before wort cooling. Many things happen to wort during this process. Brewers can control the flavor and aroma of the finished beer with considerations to what and how things occur at this step. Here are some things to think about.

### Simmer or Boil?

Boiling occurs when the liquid's vapor pressure equals the atmosphere's vapor pressure. Measuring vapor pressure is difficult. As a homebrewer, it is more practical to measure the wort's temperature to determine boiling. Looking at the liquid's movement is even easier.

Brewers want a rolling boil. During a boil, the water surface looks as if it is moving. A lot of steam emits from the kettle. Bubbles are forming under the liquid's surface and move to the surface (nucleation). Temperatures are more uniform throughout the kettle due to mixing. A rolling boil is lively, energetic, and useful to the brewer. The high temperature and convective liquid movement is needed to make quality wort.



On the other hand, a simmer is dull and boring. The wort is heating, although slowly. It still gets hot. Some steam is given off, but not as much. Bubbles may form, but not many are seen. Overall, not much action is happening. In this case, the lack of heating does not allow brewers to make good wort.



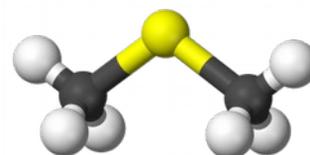
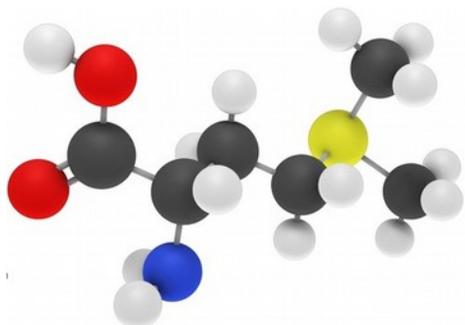
Many things factor into wort boiling. The heating source determines how fast you can get wort to boil. Using propane heater heats wort faster than using natural gas. It has a higher energy content [<http://www.propane101.com/propanevsnaturalgas.htm>]. Steam jacketed

kettles, induction heating, and direct firing are a few other heating methods not widely used by homebrewers. Those methods have different characteristics than burning gases. The kettle's shape, size, and metal composition affect heat transfer. Copper transfers heat energy to the wort faster than stainless steel. This is due to conductivity. Some metals, like copper, may leach into the wort. Many other metals, such as aluminum, are used as kettles. The wetted surface area acts as a pathway to transfer energy. Larger contact areas between wort and metal foster faster heating. Finally, the amount of wort affects boiling times. It is easier to boil 2 gallons than 5 gallons (or even 20 gallons for the enthusiasts!). Larger volumes take more energy to heat up.

Other than actually heating the wort, brewers give consideration to what and how things are done at this step. Some tasks are crucial to the taste of the final beer. Minding other things can be seen as being nit-picky and have a minor role in wort producing. Understanding the process and how your equipment works will give you better control on the beer's characteristics.

For the readers with little time: remember to have a rolling boil since it helps make good wort. As for those interested, below are some of the considerations brewers put into this process.

### SMM becomes DMS



It is  
and

S-methyl methionine (SMM) is a compound found in malted barley. more abundant in lightly kilned malts than darker malts. SMM is converted to dimethyl sulfide (DMS) at temperatures above 60 °C (around 140 °F). All-grain brewers should take a whiff of the grains extract in the mash tun right after mashing. A canned corn, vegetal, or cabbage aroma is usually noticed along with the sweet extract. Those aromas come from DMS.

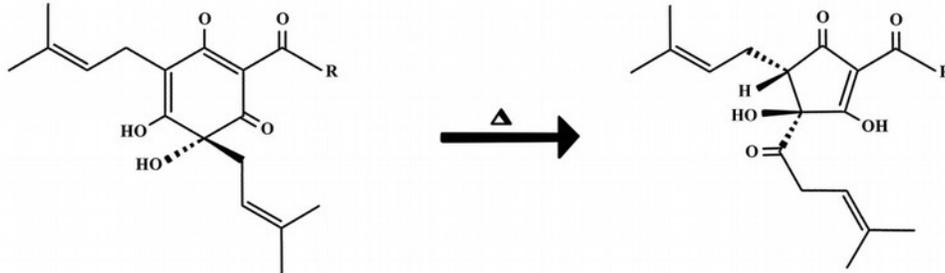
DMS is considered an off-aroma in most beers. Light lagers are allowed have low levels DMS according to the 2008 BJCP style guidelines. This is because light lagers are made with a majority of lightly kilned malts. Even when allowed in light lagers, DMS is not prevalent. It would be proper to remove the DMS if you make other styles of beer.

SMM is extracted from grains into the sweet wort. It continues to convert to DMS as long as the wort is hot. One way to control the amount of DMS is by how the wort is heated. A rolling boil drives off DMS into the surrounding air. A mellow simmer does not have the strength to push out the off-aroma. Along with the boil's vigor, brewers can control DMS levels by the boiling time. Most recipes I find say to boil the wort for 60 minutes. More cautious people boil wort for 90 minutes to remove DMS. Others can get away with a 45 minute boil depending on their equipment. DMS volatilizes out of wort as the wort boils. Longer boil times would drive out more DMS. The duration and liveliness of the boil is up to your level of DMS desired in beer.

## Isomerize $\alpha$ -acids

Adding hops to boiling wort adds bitterness to the beer. Bitterness is said to balance the sweetness of the wort. This bitter flavor is very noticeable in West Coast IPAs.  $\alpha$ -acids are contained in hops, which will become bittering substances when boiled.

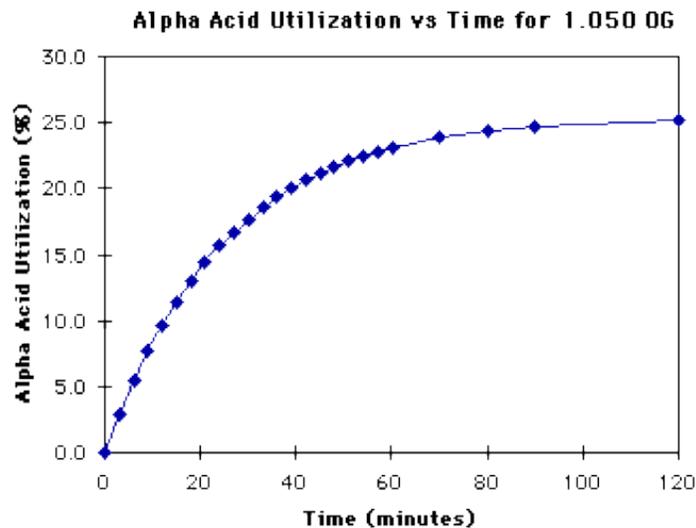
Wort is mostly water.  $\alpha$ -acids are not very soluble in water. When boiled,  $\alpha$ -acids isomerize to iso- $\alpha$ -acids. Isomerization is basically a change in the arrangement of a chemical's structure. The iso- $\alpha$ -acids are more soluble in water and taste bitter.



General structures for  $\alpha$ -acid (left) and iso- $\alpha$ -acid (right). Source: [beersensoryscience.wordpress.com](http://beersensoryscience.wordpress.com)

The  $\alpha$ -acids are converted to iso- $\alpha$ -acids at high temperatures. As temperature increases, the conversion occurs faster. This can be explained more with the Arrhenius equation (in general, higher temperatures increase reaction rates). A rolling boil will allow the reaction to proceed at its fastest rate. This is because the wort is at the hottest temperature. Therefore, you will extract more bitterness from hops with a good boil. Of course, a brewer can add more hops for more bitterness rather than boiling the wort. But adding more hops presents a brewer with more waste to clean up. Hops also sponge up wort and leave less beer in the end. More hop plant matter also contributes to more polyphenols in beer, leading to astringency and haze.

Boiling hops extracts bitterness over time. There is a point where more boiling will lead to no more bitterness gains. Hops have a limited amount of  $\alpha$ -acids and the wort becomes saturated over time. When saturated, the bitterness level stops increasing. Boiling wort beyond that point leads to wasted time and fuel.



[realbeer.com](http://realbeer.com)

$\alpha$ -acids also have anti-bacterial properties along with making beer taste and smell nice. They inhibit many Gram-positive bacteria. This allows beer to be stored longer for you to enjoy. A vigorous boil is

needed to enjoy the full potential of bittering hops.

## Concentrate the wort

Water evaporates as it boils. In producing wort, this affects the starting gravity. Some beers, such as barleywines and strong scotch ales, have high starting gravities. Rather than adding more malt or malt extract, brewers can boil off water.

Reducing the volume also concentrates other flavors, such as bitterness and melanoidins (discussed later). It is analogous to using one Kool-Aid pack in half a glass of water instead of a full glass. Also, keep in mind that longer boils may come with other consequences such as scorching the wort.

Boiling will reduce the final kettle volume (also the initial fermentation volume). In my first few all-grain brews, I remember making a recipe for 5.0 gallons of beer. In the end, I had a disappointing 4.5 to 4.7 gallons due to wort being boiled off. After that, I scale recipes to 5.5 gallons to make sure I have 5 gallons of beer at the very end. The extra 0.5 gallons was worth the extra pints of brew in the end.

It may seem like simmering the wort saves you beer volume. It would drive off less water. However, consider if you like vegetal, cabbage-like beer from the DMS that is not driven off during a lazy simmer. Also, check if you enjoy an IPA of tepid bitterness from the lack of isomerized  $\alpha$ -acids. I hope the volume to flavor trade-off brings you to the correct boiling method (hint: have a rolling boil).

## Remove volatile components

Evaporating the wort removes DMS. It also removes other compounds from the ingredients used. For example, hops provide volatile compounds, called essential oils, along with the  $\alpha$ -acids. Depending on the beer style, hop aroma may be inappropriate. Also, volatile hop compounds may also include sulfur and other unpleasant scents. Adding hops early in a boil removes the hop aromas since volatilization occurs throughout the boil. Again, a vigorous boil is effective in driving off aromas.

To preserve aromas, brewers can infuse the beer with hop aromas by adding hops late into the boil. Some people also add hops after the boil to extract maximum aroma. There are ways to control beer aroma. The boil plays a part.

## Sterilize the wort

Most organisms do not survive long when boiled. 20 minutes of boiling sterilizes wort. Unless a spoiled beer is desired, boiling the wort is a crucial step. Organisms surviving the boil will grow in the beer. They will cause contaminated characteristics such as butter, gym socks, and sharp acidity. Beer making is a clean process and having uncontaminated wort helps a brewer achieve desired flavors in the final product. In making beer, boiling wort sterilizes it and makes it good for yeast.

## Halt enzyme activity

Enzymes are active in mashing and can continue to act after sparging. Certain enzymes break down proteins and starches in malt. Boiling enzymes will denature them. This stops them from working on the residual sugars in sweet, unhopped wort. Denaturing enzymes allows brewers to set the desired levels of fermentable and non-fermentable sugars. Thus, destroying enzymes during the boiling affects mouthfeel (sweetness and dryness levels) and alcohol levels in the end. This will give consistent worts if you repeat a recipe.



## Color & flavor formation

Maillard reactions occur during the boil. It is a chemical reaction between amino acids and sugars to form melanoidins. This reaction is responsible for the colors and flavors of foods such as toasted bread and cooked meats. For beer, the sugars and amino acids come from the malt. This reaction occurs in malting, mashing, and boiling. Some brewers use long boils to make Scottish ales due to the flavors produced. Thus, you can vary the length of the boil to get the desired flavors into the final beer.

Color pick-up comes is similar with flavor formation (same chemical reactions). An extreme example is the color of bread and toast. Bread gets darker in color as it is heated. A beer usually gets darker in color as it is boiled longer and more intensely. Again, this is because reaction rates increase with temperature. Also, polyphenols oxidize in the boil. This also darkens the wort. A brewer should keep this in mind to achieve the desired beer color, especially when making a bright lager. It is said that people usually appreciate beer with their eyes first. So I would guess looks matter. The boil contributes to the looks of beer.

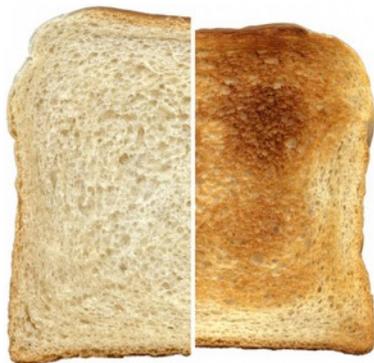


## Hot break formation

Proteins and polyphenols are present in wort. They are introduced by malt and hops. They combine in the boil to appear as flaky chunks seen after the boil. The flakes lead to hazy beers if they were not removed from wort. Removing them clears up the beer's appearance (remember, looks matter). Some brewers believe the hot break present in fermenting beer provides nucleation sites for carbon dioxide (CO<sub>2</sub>) released during fermentation. These sites allow CO<sub>2</sub> to bubble out and mix the fermenting wort. As a bubble moves to the liquid's surface, the liquid is pushed around the bubble. In beer, this allows yeast to move around in the fermentation vessel since yeast is suspended in the liquid. The mixing action affects fermentation rate since yeast and sugars are being brought together. Fermentation rate attributes to the end character of beer. On the other end, other brewers say wort clarity does not matter since break material is removed after fermentation anyway. Yeast will ferment whether a bubble moves them around or not. In either case, it is up to a brewer to decide if hot break affects beer. Break material forms during the boil and the brewer will have to deal with it afterwards.

## Remove oxalates

Many chemical reactions occur during the boil. One of them is calcium (from water) combining with oxalates (oxalic acid from malt) to form crystals. The calcium oxalate crystals are better known as beerstone. Removing beerstone in the mash and boil prevents future problems.



Beerstone can attach itself to the walls of equipment. This unsightly scale harbors microorganisms, allowing the microbes to contaminate beer. This is bad for beer flavor. Also, beerstone can also appear as tiny crystals in bottled beer. The crystals serve as nucleation sites, allowing bottled beer to gush up someone's arm after the cap is removed. The boil is the last step that beerstone should be produced and removed.

## Conclusion

A lot of things happen during the boil that affects the beer. Meticulous brewers put much consideration into their equipment, process, and technique to produce quality wort.

Anyone can be overwhelmed with the small details of the boiling process. For example, if a gets feedback that a beer's DMS level is excessive then the brewer can boil wort for a longer span of time. However, doing so adds color, flavor, and hop bitterness. To adjust hop bitterness, fewer hops can be used. Reducing hops can limit the desired aroma of the beer. Fixing one problem is not that easy since one thing affects another thing. Thus, people can see how one brewing step can be very convoluted.

**Minding the details of beer making makes people better brewers. But, keeping things simple with having a vigorous boil would make things easier and keeps the hobby fun. However you choose to set up your process and use your equipment is ultimately up to you. There is no ultimate, correct method to make beer. Finding ways to make things work is part of the homebrewing experience.**

## Nutrition vs the Home Brewer - Jackson

According to She Who Must Be Obeyed it is Bathing Suit-Bikini season. Translation "NO MORE fried food for you !! And cut down on the beer there BELLY BOY !" Hey what happened to I look good for my age? Answer: I cannot count that high. OOOOOUUUUUCCCCHHHHHH ! Since I only go running when I am being chased, I will have to come up with another plan. So what is the deal with a "BEER BELLY" ? ? ?

Ironically, beer does not contain fat ! There are two sources of calories in beer; alcohol and carbohydrates. As we know, malted barley and other grains are broken down by yeast during fermentation. The simple carbohydrates become alcohol. The long chain (complex) carbohydrates remain to give beer its body. In general, 60% of calories in beer come from alcohol and 40% come from carbohydrates.

Your body and liver LOVES alcohol ! As a matter of fact it prefers alcohol and processes it first. The liver converts alcohol into acetate which is released into your bloodstream and is instantly used to create energy (The rush-buzz you feel). The catch is that during this time the body stops burning fats into energy. And do not forget about the 40% of calories from carbohydrates. Instead of being consumed, they get stored as fat.

Alcohol has some other properties that contribute to the Beer Belly. Alcohol stimulates appetite. Encouraging you to eat at a time when all additional calories will be stored as fat. Alcohol slows down your metabolism by disrupting the Krebs cycle so fats can not be broken down at all. Alcohol is an empty calorie containing no nutrients. Alcohol promotes dehydration. Dehydration impedes muscle growth. Alcohol blocks the absorption of many important nutrients. And our little friend alcohol is known to lower testosterone and increase estrogen !

## Determining Calories in HomeBrew

Okay She Who Must Be Obeyed has a point. And yes moderation is the key. (Not something I am good at). So at least I want to know how badly I am doing. How many calories are in my HomeBrew? To determine you will need to know your **OG (Original Gravity)**, your **FG (Final Gravity)** and these formulas. These calculations are for 12oz quantities. One formula is for alcohol and one for carbohydrates.

Calories from Alcohol:

$$\frac{1881.22 * FG * (OG - FG)}{(1.775 - OG)}$$

Calories from Carbohydrates:

$$3550.0 * FG * [(0.1808 * OG) + (0.8192 * FG) - 1.004]$$

“Breakfast of Champions” – American Wheat Beer: (**OG = 1.058**), (**FG = 1.011**)

*Calories from Alcohol:*

$$\frac{1881.22 * 1.011 * (1.058 - 1.011)}{(1.775 - 1.058)} = \frac{89.39}{0.717} = 125 \text{ Calories from Alcohol}$$

*Calories from Carbohydrates:*

$$\frac{3550.0 * 1.011 * [(0.1808 * 1.058) + (0.8192 * 1.011) - 1.004]}{3550.0 * 1.011 * [(0.1912864) + (0.8282112) - 1.004]} = \frac{3550.0 * 1.011 * [0.0154976]}{3550.0 * 1.011 * [0.0154976]} = 55.62 \text{ or } = 56 \text{ Calories from Carbohydrates}$$

**125 Calories from Alcohol + 56 Calories from Carbohydrates = 181 Calories total per 12oz**