Small Batch Beer Brewing

SUMMARY

There are four basic steps to brewing beer. The first step is the **mash**, which is usually an hour-long soaking of the crushed grains at a specific temperature. This is followed by the **sparge** which is a draining and rinsing of the grains, which leave the brewer with the maltose-sweetened liquid known as wort. In the third step the wort is brought to a **boil** and kept boiling for one hour or more, during which hops are added at various points for the purposes of bittering as well as flavor and aroma. The final step is **cooling** the wort to room temperature (or slightly cooler) and pitching the yeast. That's the brewing process, which then is followed by a 2-4 week fermentation. Finally the fermented wort can be considered beer at which point it is ready to bottle or put in a keg.

WHAT'S NEEDED

Before you get started with of the brewing steps you need to assemble a few key pieces of equipment, pick a recipe, and find some ingredients! You can find all of those things on the internet, and also at your local homebrew shop (in KW The Local Kitchener sells everything needed to get started brewing small batches of beer).

The main equipment needed for small batch brewing is:

- 2 gallon stockpot (or larger).....$20-60
- 2 gallon food grade bucket with tight-fitting lid .....Find for free at health/bulk food stores
- 12 inch Auto siphon and hose.....$12
- Bottle filler.....$4
- Hydrometer $6
- Graduated cylinder or "Thief" $4-8
- Air lock and bung.....$3

To drink your beer you'll need bottles but here you have a few options:

- Swing top "Groslch" style bottles
- Plastic bottles with screw caps
- Glass beer bottles with crown caps

If you go the route of using glass beer bottles the best are the non-twist-off bottles with a lip about 1.5 centimeters below the top of the bottle. To put caps on these bottles you'll also need a bottle capper ($20) and crown caps ($5 for 100). There's generally no need to buy bottles, just choose a style and find a good craft beer that comes in those bottles and get enough to hold 4-5 litres of beer. If you have friends that drink beer ask them to start saving bottles for you. It's best if all of your bottles are the same size and style because it will be easier to store and organize them.

The Steps of Brewing a Small Batch of Beer

THE MASH

The goal of the mash is to create the optimal environment for the enzymatic conversion of starches into fermentable sugars. With malted barley this is typically done in the temperature range of 148°F to 156°F. Mashing on the lower end of this range will give you more fermentable sugars creating a beer that finishes drier, while mashing on the higher end creates more un-fermentable sugars leaving you with more malt presence in the final beer. Typically most beer recipes have you mash right in the middle temperature range at 152°F to give a bit of both worlds—some malt presence while still finishing fairly dry.
The mash is conducted by mixing the crushed grains with preheated water. This water, known as the hot liquor, is heated about 10-15 degrees hotter than the target mash temperature so that when the water and grains mix they even out at the target temperature. The mash is stirred until thoroughly mixed and then held at this temperature for one hour. Typically the mash is contained in a nylon brewing bag (like a large tea bag) or a mash tun which is a container or pot that has a false bottom to allow the wort to be drained while leaving the spent grains behind.

THE SPARGE

While the mash served the purpose of creating fermentable sugars from the malted grains, the sparge frees the liquid containing those sugars (the wort) from the mash, allowing you to proceed with brewing.
The wort will flow from the grains most freely if the temperature is around 170°F. To raise the temperature of the mash a calculated amount of boiling water is stirred into the mash at the end of the hour. This is when the sparge begins. If using a brewing bag, the bag is lifted out of the mash and allowed to drain. If using a mash tun, the wort is drained from the vessel and poured back over the grains to allow smaller particles to be filtered out by the grains themselves (known as recirculating). As the clarified wort is collected additional hot water (170°F) is added to the grains to rinse them of additional sugars, until sufficient wort has been collected for the recipe.

THE BOIL

While there are several purposes for a 60 minute boiling of the wort, the traditional reason was to sterilize it. However, it also serves to clarify, concentrate, and most importantly extract hop bitterness. Hops are typically added at the beginning of the boil to impart bitterness, in the last 10-20 minutes for flavour, and near the very end (and after) for aroma.

THE COOL DOWN

Before yeast can be added to help convert the sweet wort into delicious beer, the temperature must be brought down to around room temperature, 60-70°F. This can be down by immersing the entire kettle in an ice bath or by using some sort of wort chiller, like a long coil of copper with tap water flowing through it to act as a heat exchange.
The purpose of chilling the wort as quickly as possible is to limit the opportunity for wild microorganisms to come into contact with the wort and possibly contaminate it. Additionally, a rapid chilling of the wort helps promote clarity in the final product.
Once cooled, the beer is transferred to a sanitized fermenter (a large bucket with a tight lid and airlock, or a glass carboy), the yeast is pitched and stirred thoroughly, and fermentation is begun.

BEER

Once it has fermented the final product is beer. However, to truly enjoy it you need to either bottle it or keg it. If bottling, a small amount of sugar is added to help the yeast carbonate the bottle. In a keg carbonation can be added artificially. Either way, the beer is yours to share and enjoy!