

# BEER MAKING AT HOME

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In this short document, we will first describe how beer is made by most commercial breweries. This will be a quick overview as the process is somewhat complicated. Since most homebrewers do not follow this complicated process (known as "all-grain" brewing), we will next describe an easier technique based on the use of "beer kits" and "malt extract". This will include a short description of some simple ingredients that can be used to supplement these extracts. The last section is a short list of some classic world beer styles.

## **What is Beer and how is it traditionally made?**

Beer is a fermented beverage that has been made by man (and/or woman) for thousands of years. There are even serious academic researchers who suggest, without laughing, that mankind may have shifted from a nomadic lifestyle to a more settled one in order to more easily tend the barley crops needed to make beer.

The fermentation process relies on adding yeast to a sugar solution. The yeast then processes the sugar, creating alcohol and carbon dioxide (CO<sub>2</sub>). In beer, the main sugar source is traditionally malted barley.

Malted barley is barley grain which has been allowed to begin germinating or sprouting. In this germination process, the starches and proteins present in the grain begin to be broken down by enzymes in the grain. The maltster stops the malting process at an appropriate time and then dries and perhaps roasts the grain for the brewer's use.

The brewer then continues the enzymatic reduction of the starches and proteins in a process known as "mashing". Barley malt is crushed to expose the inside of the kernel. These crushed grains are then steeped in water at an appropriate temperature, usually around 145-158 degrees Fahrenheit. The enzymes continue to reduce the proteins and starches by breaking them down into smaller molecules. The starches eventually become sugars in the mash.

After the mash is finished, the spent grains must be filtered from the water by a process known as "sparging" or "lautering". This is usually done by some sort of large straining device - similar in spirit to a colander for draining pasta. The major difference is that in draining pasta, you keep the pasta and throw out the water. In making beer, you throw out the grains and keep the liquid. This liquid is now called "wort" or sometimes "sweet wort". Whatever it's called, it is now essentially a solution, consisting mainly of the sugar called maltose.

The wort is now boiled. During the boil, hops are added to provide a bitter flavor to offset the sweetness of the malt. After boiling, the brewer's yeast is added or "pitched" into the wort. The yeast then ferments the beer, reducing a majority of the sugars into alcohol and carbon dioxide.

After fermenting, the beer is flat and needs to be carbonated. Most commercial brewers do so by actually injecting CO<sub>2</sub> under pressure into the beer before packaging. For homebrewers, the most common method is "priming". This involves adding a measured amount of sugar (usually corn sugar (dextrose)) to the beer just before bottling. This extra sugar is then fermented by the remaining yeast. The resulting CO<sub>2</sub> can not escape the bottle, so it dissolves into the beer, creating carbonation.

## **Homebrewing technique**

Most homebrewers do not perform the grain-grinding, mashing and sparging steps described above. Instead, they rely on a brewery to do those steps. The brewery then stops short of boiling the wort. Instead, it concentrates the wort down into a syrup or a powder called "malt extract". Liquid malt extract combined with hops and other flavors appropriate for a particular beer style is often called a "beer kit".

Malt extract is very easy to use and with some care can be used to produce excellent beers. A more detailed instruction sheet will be provided, but the extract brewing process involves six basic steps:

1. Dissolve the extract in water and boil the resulting mixture (wort).
2. Cool the wort and dilute to the desired volume in a food-grade plastic fermenting bucket or a glass carboy.
3. Pitch the yeast, seal the fermenter, and wait for 7-10 days or so.
4. Prime the beer and put it into bottles.
5. Wait for it to carbonate. Approx. 2-3 weeks usually.
6. Drink it and smile.

### **Basic Equipment needed**

- Stock pot (4 or 5 gallon steel, aluminum, or ceramic)
- Fermentation lock (airlock, bubbler)
- Siphon Equipment (plastic tubing)
- 5 gallon food-grade plastic bucket (for bottling purposes)
- Bottles and bottle caps
- Bottle Capper
- Instruction book
- Household bleach for sanitizing
- Funnel (if using a glass carboy)
- Hydrometer (optional)
- Fermentation Vessel - (5 to 7 gallon glass or food-grade plastic )
- Thermometer (optional)

### **Specialty Grains and Hops**

You can add more flavor dimensions and experiment with more flavors by using "specialty" grains and hops in conjunction with malt extracts and kits. Specialty grains are created from malted barley. After malting, the grains are roasted under varying conditions and temperatures to provide different flavors. Specialty grains are very easy to use - simply crack them open and steep them in hot water for a while. (The hot water leaches the colors and flavors out of the grains.) Then remove the grains and proceed to heat the water and add extracts as noted above.

Crystal Malt - Lightly roasted while still wet from the malting process. It provides some caramel coloring and a malty or nutty sweetness.

Chocolate Malt - Roasted to a dark brown color. Provides a slight roasted flavor and a bitter-sweetness reminiscent of unsweetened chocolate.

Black Patent Malt - Highly roasted, very dark. Provides a significant acrid almost burnt flavor to beer.

Roasted non-malted barley - Highly roasted, very dark. Provides more coffee overtones than black patent does.

The hop plant is grown mainly in Germany, Great Britain, Czechoslovakia, and the United States. The use of hops can provide many different effects for the beer brewer.- When boiled for a long time (45-60 minutes), hops release a distinct bitterness into your beer. This is usually desirable in order to counterbalance the sweetness from the malt. If boiled for shorter times ( 5- 15 minutes), volatile, aromatic oils are released into the beer to add flavors and aromas.

### **Different Beer Styles**

Most of the large American breweries make beer of one particular style known as American Lager. This is a fairly thin, watery concoction with very subtle flavors. In many other countries with rich brewing heritages, there are many different beer styles with widely varying tastes.

#### **British**

Bitters and Pale Ales - Copper colored beers with a noticeable bitter bite.

Porters - A very dark beer. Some have a chocolate-y silkiness while others have a sharper roastiness.

Stouts - Can be sweet or dry. Guinness is a dry stout with a roasted, almost coffee-ish flavor. Sweet stouts tend to have more of a chocolate note, with much less of the roasted flavor.

Brown Ales - Sweeter, darker and less bitter than Pale Ales, but usually lighter in color and body than Porters.

#### **German**

Pilsner (Actually this style originated in Czechoslovakia) - a light colored beer with a silky malt smoothness balanced by a crisp hop bitterness. When properly made, a wonderfully refreshing beer.

Bock - Usually dark, a strong, sweet, and malty beer.

Oktoberfest - A medium brown beer which is also sweet and malty, but not to the degree that bocks are.

Weizen - Made with both barley malt and wheat. The yeast used for this style creates spicy and fruity flavors. A very refreshing beer on a hot day.

#### **Belgium**

The Belgian brewers are incredibly diverse and inventive, brewing a wide range of unique beer styles.

Lambics - A sour, but strangely satisfying beer, often made with raspberries (Framboise) or cherries (Kriek).

Trappist Ales - Beers made by Trappist monks. The actual styles may vary, but they tend to be light, flavorful and deceptively strong.

Wit - A beer made with both barley malt and wheat. Usually, spices such as coriander are added.