

FERMENTATION OVERVIEW

Beginning of Fermentation

Fermentation should begin within 48 hours. The more fresh, healthy yeast you add to the fermenter, the shorter the lag phase (the amount of time before fermentation begins). During the most active stage of fermentation, you may see the fermentation lock bubble.

Blow off

Blow off occurs when there is so much krausen that it can not be contained by the fermenter. Certain strains of yeast, described in yeast profiles by the phrase "top cropping" are prone to blow off. High temperature and other environmental factors can also cause a fermentation to blow off.

Krausen is filled with sugars, proteins and spent hops, and it can be quite messy. On rare occasions, it can plug up the stopper causing the carboy to explode! That's why it is extremely important to deal with blow off when you notice it occurring.

We have included a large-diameter blow off tube that you can use if you experience blow off. To use this tube, remove the stopper, and insert the blow off tube directly into the neck of the carboy -- no stopper is needed. Place the other end of the tube into a bucket of water. This prevents anything from entering the fermenter, and is functionally equivalent to your fermentation lock. The krausen is expelled into the bucket. When blow off stops, replace the stopper and fermentation lock.

End of Fermentation

During the fermentation, the specific gravity will steadily drop until the fermentation ends, at which point it will remain the same. After the beer has been in the primary fermenter for one week, you should start taking hydrometer readings to see if it has completed fermentation. It's okay to open the fermenter to get a sample with the thief. When you take two identical readings on consecutive days, then the fermentation is complete.

One of the advantages of using a glass carboy as your fermenter is that you may omit the hydrometer readings, if desired. The primary fermentation is finished when the thick, yeasty head (called "krausen" that forms on the beer falls back. You will also notice the beer starting to clarify, and particles settling out. There will be little or no activity in the fermentation lock.

See the section titled "Using a hydrometer" for more details.

SECONDARY FERMENTATION

Secondary fermentation takes place after primary fermentation. It is a conditioning period that improves clarity and flavor before the beer is packaged in bottles or kegs. This extra step is necessary when brewing strong, high-gravity ales or any kind of lager, although any beer will benefit from a secondary fermentation.

How it works

Once primary fermentation subsides, the beer must be transferred to the secondary fermenter to separate it from the large amount of yeast and precipitated solids that have collected in the bottom of the primary - prolonged exposure to this material (called “trub”) can lead to rubbery, soapy, or sulfury flavors and aromas. During secondary fermentation there will be little to no visible yeast activity. The beer will look still and quiet as yeast cells and protein molecules gradually settle out of suspension - this creates a layer of fine sediment at the bottom of the carboy and leaves the beer much clearer than before (and means less solids in the bottom of each bottle once the finished beer is packaged). On a microscopic level, the yeast cells, which have metabolized all or almost all of the wort sugars, reabsorb some of the volatile compounds they produced in the primary and begin to go dormant. This reduction of “fermentation character” results in cleaner, smoother flavor and aroma in the finished beer.

Procedure

- Sanitize siphoning equipment, five gallon glass carboy, rubber stopper, and an airlock.
- Carefully siphon the beer from the primary fermenter into the sanitized five gallon carboy, being careful to disturb the sediment at the bottom of the primary as little as possible. Refer to the siphoning section for detailed instructions on siphoning.
- Fill the airlock with a small amount of water (about a tablespoon), insert it into the rubber stopper, and seal the carboy.
- Place the carboy in a dark, quiet spot where it will be out of the way. There may be renewed yeast activity for a day or two, but after that it should be quiet and still.

The Right Vessel for the Job

During the secondary fermentation, it's critical to protect the beer from exposure to oxygen. This kit contains a five-gallon glass carboy for the secondary fermenter. When sealed with a rubber stopper and an airlock, glass carboys are airtight and non-permeable to keep beer fresh; using a carboy of the same volume as your batch size minimizes air in the headspace.

When to do it

Beer is ready for secondary fermentation as soon as the primary fermentation subsides. The beer should be at or near final gravity (refer to the section on Using a Hydrometer). If you are using a glass primary fermenter, monitoring the krauesen is usually accurate enough for ale brewing: transfer the ale to the secondary any time after the krauesen starts to fall back into the beer. For lagers, it's best to check the gravity with a hydrometer.

How long does secondary fermentation last?

“As long as it needs to.” Yeast selection, temperature, and the beer itself are some of the variables that determine this. Use the following rules of thumb:

ALES: Three to seven days for every .010 points of original gravity. Subtract 1.000 from the OG reading before attempting this calculation. For example, for an ale with an OG of 1.040, the secondary fermentation should last between 12 and 28 days.

$$[(1.040 - 1.000) / 10] \times 7 \text{ days}$$

$$[.040 / .010] \times 7 \text{ days}$$

$$4 \times 7 \text{ days} = 28 \text{ days}$$

$$[(1.040 - 1.000) / .010] \times 3 \text{ days}$$

$$[.040 / .010] \times 3 \text{ days}$$

$$4 \times 3 \text{ days} = 12 \text{ days}$$

HIGH-GRAVITY ALES: seven to ten days for every 0.010 points of original gravity.