Homebrewing Troubleshooting Guide

Beer Aroma Symptoms

Alcoholic Aroma or Flavor

Cause: Depending on the style of beer, an alcoholic aroma or flavor may be desirable. Certain styles of beer have a higher alcohol content which contributes to the unique aroma and/or flavor of that style.
The cause for an alcoholic aroma or flavor is a high starting specific gravity. In other words, there is a relatively large amount of fermentable sugar which is converted into alcohol during the fermentation process. The specific gravity can be checked with a hydrometer prior to pitching the yeast then again just before bottling to determine the alcohol level.

Corrective Action: None if appropriate for style; otherwise, use less malt or corn sugar next time. You could also add more water before pitching the yeast to dilute the wort.

Green Apple (Acetaldehyde) Aroma or Flavor

Cause: Acetaldehyde is produced during fermentation. It is very common in a young beer. It is more evident in the aroma and flavor when either cane or corn sugars are used. Normally the acetaldehyde will dissipate over time as the sugar is further fermented. Sometimes it is caused by bacteria due to poor sanitation procedures.

Corrective Action: Age the beer another week or two; if the acetaldehyde disappears, then there is no problem. Otherwise, reduce or eliminate the use of cane or corn sugar (substitute DME if necessary). Always watch your sanitation procedures throughout the process.

Buttery or Butterscotch (Diacetyl) Aroma or Flavor

Cause: Sometimes a desireable trait, diacetyl is produced by the yeast and also by bacteria. It is present in the fermentation process and normaly decreases over time.

Corrective Action: Do not stop the fermentation process short. Leave the beer ferment for 7 to 10 days. Higher fermentation temperatures decrease the level of diacetyl. Always watch your sanitation procedures throughout the process.
Tip: To identify exactly what diacetyl smells like, take a whiff of some imitation butter extract.

Cooked Vegetable or Cabbage Aroma or Flavor

Cause: The cabbage or cooked vegetable aroma/flavor is caused by wort spoilage due to long lag times in chilling the wort before pitching the yeast.

Corrective Action: Chill the wort quicker before pitching the yeast.
There are many different styles of wort chillers on the market and they are easy to build at home. Read All About Beer's article on Building an Immersion Chiller.
Another cost effective method (if you ferment in buckets) is to freeze a couple of 20 oz plastic pop bottles filled with water. Make sure to remove the labels and clean off the glue. Sanitize the outside of the frozen bottles, make sure cap is on tight, and place in the hot wort. Use a sanitized pair of tongs to carefully remove the bottles when the wort is cool.

Chlorophenolic Aroma

Cause: The chlorophenolic or chlorinelike aroma is caused by chlorine introduced in the brewing process.

Corrective Action: Avoid using chlorinated water and rinse your chlorine sanitizer completely.

Sweet Corn Like Aroma or Flavor

Cause: Dimethyl sulfide or DMS, similar to cooked vegetable, is commonly caused by wort spoilage due to long lag times in chilling the wort before pitching the yeast. DMS can also be a symptom of a bacterial infection.

Corrective Action: Chill the wort quicker before pitching the yeast. Always watch your sanitation procedures throughout the process.
There are many different styles of wort chillers on the market and they are easy to build at home.
Another cost effective method (if you ferment in buckets) is to freeze a couple of 20 oz plastic pop bottles filled with water. Make sure to remove the labels and clean off the glue. Sanitize the outside of the frozen bottles, make sure cap is on tight, and place in the hot wort. Use a sanitized pair of tongs to carefully remove the bottles when the wort is cool.

Fruity Aroma or Flavor

Cause: A fruity or estery aroma is a byproduct of fermentation which is more pronounced at warmer fermentation temperatures. Some fruityness is acceptable in certain styles of ales. The strain, as well as the quantity, of yeast often determines the degree of fruitiness that is imparted to the beer. The fermentation of cane or corn sugar may also contribute to the degree of fruitiness. Beer styles with higher alcohol content also exhibit fruity esters.

Corrective Action: Any one or more of the following may reduce the amount of fruitiness:

- Ferment at a lower temperature.
- Change yeast type.
- Reduce or eliminate the use of corn sugar (substitute malt extract).

Hop Bitterness, Flavor and Aroma

Cause: The style of beer being brewed determines the amount of hop bitterness, flavor and aroma that is technically acceptable. If you are not brewing to style then your taste buds determine what is acceptable.

Hop Bitterness is a function of the alpha acid of the hops used, quantity and the amount of time they are boiled. Normally hops used for bittering are boiled between 30 minutes and 1 hour. Just about any variety of hop can be used for bittering.

Hop Flavor is again determined by the quantity of hops used. Normally hops used for their flavor are boiled for 10 to 20 minutes therefore reducing the bitterness contribution. Each variety of hop contributes a different flavor to the beer which could be floral, fruity, spicy, herbal.

Hop Aroma comes from volatile oils in the hop which dissipate very quickly in the boil. Hops used for aroma are usually added at the very end of the boil (less than 2 minutes boiling time).

Corrective Action:

Bitterness:

To reduce the amount of bitterness,

- Use less hops.
- Use a variety with a lower alpha acid.
- Boil for a shorter time.
- To increase the amount of bitterness, do the opposite.

Flavor:

To decrease the strength of the hop flavor use less hops. Likewise, use more hops to increase the flavor. Try other varieties to achieve a different flavor. You can even use a few different varieties to get a more complex flavor profile.

Aroma:

As with flavor you can increase or decrease the amount of hops to increase or decrease the aroma. Also, you can change the variety to achieve a different aroma. Some brewers add the hops to the secondary to get a stronger hop aroma; this is known as dry hopping.

Light Struck (skunky)

Cause: A chemical reaction occurs when hops are exposed to ultraviolet light creating a skunky aroma (often called catty in Europe). Skunkiness is very common in green or clear glass bottles but can also occur in brown bottles. Certain varieties of hops are more sensitive to ultraviolet light.
Corrective Action: Store your hops in a cold dark place; your freezer works best. Bottle in brown bottles and store your beer in a cold dark place.
If you still have skunky beer, you can always buy a gas mask.

Stale/Oxidized

Cause: A winey, wet cardboard, papery, rotten vegetable/pineapple, sherry or baby diaper type of aroma or flavor is a sign of an oxidized, stale or old beer. Over time the symptoms get worse. Any oxygen that is introduced in the brewing process will eventually show up. Temperature accelerates the process of oxidation.

Corrective Action: It is very important to keep oxygen to a minimum in all stages of the brewing process (except when pitching yeast). Store your beer cold to slow down the effects of oxygen introduction.

Phenolic

Cause: Phenolic aromas and flavors such as medicinal, listerinelike, band-aidlike, etc. are most often caused by bacteria due to poor sanitation. Sometimes it is caused by using chlorinated water or improper rinsing of cleaners and sanitizers. Phenols can also be extracted from the grain husks if your sparge temperature is too high.

Corrective Action: Always watch your sanitation procedures throughout the process. Use filtered or boiled water when possible. Keep sparge temperature down.

Solventlike

Cause: An aroma or flavor like acetone or laquer thinner is usually caused by high fermentation temperatures.

Corrective Action: Keep fermentation temperature constant and within range of your yeast strain.

Sour/Acidic

Cause: A pungent aroma or taste of vinegar or lemon is caused by a bacterial infection due to poor sanitation techniques. It can also be caused by excessive use of citric acid.

Corrective Action: Always watch your sanitation procedures throughout the process.

Sulfurlike

Cause: An aroma like rotten eggs or burning matches is usually caused by certain strains of yeast during fermentation. It is sometimes caused by bacteria or yeast autolysis (yeast digesting itself).
Corrective Action: Always watch your sanitation procedures throughout the process. Sulfuric aroma usually dissipates over time and is driven off by CO2 production and higher fermentation temperatures. Rack the beer off of the yeast sediment a few days after fermentation is complete to avoid yeast autolysis.

Yeasty

Cause: A yeasty aroma and/or flavor is usually caused by too much yeast in suspension. It is sometimes caused by the beer sitting on the yeast sediment too long after fermentation is complete.

Corrective Action: Try using some finings to help settle out the yeast more effectively. Rack the beer off of the yeast sediment a few days after fermentation is complete to avoid yeast autolysis.

Beer Bottle Symptoms

Sediment

Cause: It is common for fruit and specialty beers to have too much sediment in the bottle; however, it is not common for most other beer styles. Too much sediment is often caused by poor racking techniques. Excessive sediment is more of a cosmetic problem; when non-homebrewing friends see it they cringe because they think it's something that will harm them. Sediment is actually yeast that has dropped out of suspension along with other particles that resulted from the brewing process. Excessive sediment sometimes leads to cloudy beer because it gets stirred up when transporting or pouring. Drinking it will not harm you but it's best to try to get as little in the bottles as possible.

Corrective Action: When transferring the beer from primary to secondary, primary to bottling bucket, or secondary to bottling bucket make sure you use the cap on the end of the racking cane. The cap keeps the tube elevated off of the sediment so less will be transferred with the beer. It also helps to use a racking tube holding clamp which keeps the tube stationary. If you have to move the fermenter around before the transfer, give the beer time to settle before transferring it to the new vessel.

The proper use of one or more of the following clarifying agents (finings) will also aid in reducing bottle sediment. When used properly, none of the following finings will add flavor to your beer.

Irish Moss is a type of seaweed that can be added to the boil. It is manufactured in different forms such as powder, tablets and dried/crushed. Irish Moss helps drop out some proteins by coagulating with them during the vigorous boil.

Gelatin is manufactured from animal hooves and helps drop out yeast and other particles in the fermenter. Use 1/2 tsp for 5 gallons of beer after fermentation is complete. Dissolve the gelatin into 1/2 cup of boiling water, add to beer then wait a day or two before bottling.

Isinglass (fish bladders) helps to drop out yeast after fermentation is complete.

Polyclar are small plastic beads which attach to yeast and tannins and drop them out of suspension. Although polyclar works well for clarification, it has been known to reduce head retention.

Tip: Some commercial beers have sediment containing live yeast. You can try to culture the yeast from the bottle.

High/Low Bottle Fill

Cause: A bottle which is filled too high (less than 1/2" of head space) may gush when opened. A bottle which was filled too low (more than 1-1/2" of head space) may go bad prematurely due to oxidation.
The cause for either a high or low fill is an improper bottling technique.

Too Low

Too High

Corrective Action: Try to keep the temperature of the bottles close to the temperature of the wort to prevent excessive foaming when filling.
Practice...practice...practice!
If you are still getting inconsistent fills after many batches, you may want to try using a different bottle filler.

Ring Around the Bottle Neck

Cause: Most probably bacterial infection due to poor sanitation technique. If the beer has a ring but smells and tastes fine, the ring may have been caused by the priming solution which was not completely mixed.

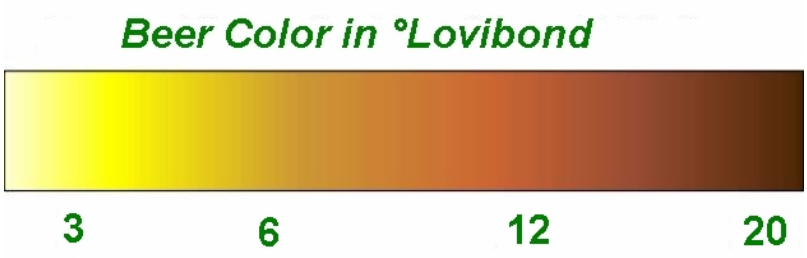
Corrective Action: Refer to sanitation practices and/or try using a different type of sanitizer such as iodophor.

Beer Appearance Symptoms

Color Too Light or Dark

Cause: A beer that is too light in color (as per style guidelines) does not have enough specialty malts added. Beers that are too dark have too much specialty malts, incorrect malts or caramelized during the boil. If you are not entering a competition and like the flavor of your beer, don't change a thing.

Corrective Action: Follow the recipe according to the style guidelines to achieve the proper color; ie. substituting Caramel-60 for Caramel-120 won't work. When adding extract to the boil, remove the pot from the heat to avoid caramelizing the wort and avoid a darker than expected beer.



Cloudy/Hazey/Floating Things

Cause: Some beer styles such as hefe weizen are suppose to be cloudy. Haze is caused by a shortened protein rest, high grain temperature, incomplete conversion, incomplete hot break, bacterial infection or by excessive sediment that has been stirred up. Floating things are most likely yeast and may be perfectly normal depending on the stage of fermentation.

Corrective Action: Follow proper mashing techniques and keep sparge temperature down. Several finings can be used to help reduce or eliminate cloudyness and haze. Longer storage time in the fermenter and bottle also helps drop the yeast out of suspension and packs the sediment. Always watch your sanitation procedures throughout the process.

Excessive or No Head

Cause: In general, half of the head of a beer should remain in the glass one minute after pouring. Some beer styles will have a thicker or darker head than others. Excessive head can be caused by a bacterial infection or over priming. No head is caused by dirty glassware, under priming, not enough dextrose or bacterial infection.

Corrective Action: Always watch your sanitation procedures throughout the process. Make sure the glass your beer is poured into is clean. For a 5 gallon batch, 3/4 C corn sugar or 1-1/4 C DME is usually plenty for priming the bottles. Try adding some maltodextrin powder, wheat, flaked barley or carapils malt to improve your head retention without affecting the color or flavor.

Beer Flavor Symptoms

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Corrective Action: None if appropriate for style; otherwise, use less malt or corn sugar next time. You could also add more water before pitching the yeast to dilute the wort.

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Corrective Action: Age the beer another week or two; if the acetaldehyde disappears, then there is no problem. Otherwise, reduce or eliminate the use of cane or corn sugar (substitute DME if necessary). Always watch your sanitation procedures throughout the process.

Astringent

Cause: A drying puckering flavor like chewing on a grape skin. Tannins are extracted from grains when it is boiled, oversparged, sparged with hard water or mashed too long.

Corrective Action: Keep sparge temperature down. Don't boil grains, keep the temperature under 170 degrees F. Mash only as long as necessary to complete the conversion.

Bitter

Cause: Bitterness is appropriate in a lot of different beer styles. If your beer is too bitter for the style it is usually because too much hops were used or the improper type of hop was used for the style. Bitterness can also come from grain husks and is sometimes confused with astringency.

Corrective Action: Use the appropriate variety and quantity of hops for the style of beer you are making. Pay close attention to the alpha acid content of your hops and adjust your recipe accordingly.

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Corrective Action: Do not stop the fermentation process short. Leave the beer ferment for 7 to 10 days. Higher fermentation temperatures decrease the level of diacetyl. Always watch your sanitation procedures throughout the process.
Tip: To identify exactly what diacetyl smells like, take a whiff of some imitation butter extract.

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Hop Flavor is again determined by the quantity of hops used. Normally hops used for their flavor are boiled for 10 to 20 minutes therefore reducing the

bitterness contribution. Each variety of hop contributes a different flavor to the beer which could be floral, fruity, spicy, herbal.
Hop Aroma comes from volatile oils in the hop which dissipate very quickly in the boil. Hops used for aroma are usually added at the very end of the boil (less than 2 minutes boiling time).

Corrective Action:

Bitterness:

To reduce the amount of bitterness,

- Use less hops.
- Use a variety with a lower alpha acid.
- Boil for a shorter time.
- To increase the amount of bitterness, do the opposite.

Flavor:

To decrease the strength of the hop flavor use less hops. Likewise, use more hops to increase the flavor. Try other varieties to achieve a different flavor. You can even use a few different varieties to get a more complex flavor profile.

Aroma:

As with flavor you can increase or decrease the amount of hops to increase or decrease the aroma. Also, you can change the variety to achieve a different aroma. Some brewers add the hops to the secondary to get a stronger hop aroma; this is known as dry hopping.

Light Struck (skunky)

Cause: A chemical reaction occurs when hops are exposed to ultraviolet light creating a skunky aroma (often called catty in Europe). Skunkiness is very common in green or clear glass bottles but can also occur in brown bottles. Certain varieties of hops are more sensitive to ultraviolet light.

Corrective Action: Store your hops in a cold dark place; your freezer works best. Bottle in brown bottles and store your beer in a cold dark place.
If you still have skunky beer, you can always buy a gas mask.

Metalic

Cause: Metallic flavors are caused by the wort and beer coming in contact with metal. It is sometimes caused by metal in the water supply.

Corrective Action: Make sure you are using a stainless steel or ceramic brewing pot. Check the quality of your bottle caps and dispensing equipment if using kegs. Filter your water if necessary.

Phenolic

Cause: Phenolic aromas and flavors such as medicinal, listerinelike, band-aidlike, etc. are most often caused by bacteria due to poor sanitation. Sometimes it is caused by using chlorinated water or improper rinsing of cleaners and sanitizers. Phenols can also be extracted from the grain husks if your sparge temperature is too high.

Corrective Action: Always watch your sanitation procedures throughout the process. Use filtered or boiled water when possible. Keep sparge temperature down.

Salty

Cause: A poor water supply is often the cause. Sometimes brewers add brewing salts in excess.

Corrective Action: Use filtered or bottled water if necessary and do not add excessive amounts of brewing salts.

Solventlike

Cause: An aroma or flavor like acetone or laquer thinner is usually caused by high fermentation temperatures.

Corrective Action: Keep fermentation temperature constant and within range of your yeast strain.

Sour/Acidic

Cause: A pungent aroma or taste of vinegar or lemon is caused by a bacterial infection due to poor sanitation techniques. It can also be caused by excessive use of citric acid.

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Corrective Action: It is very important to keep oxygen to a minimum in all stages of the brewing process (except when pitching yeast). Store your beer cold to slow down the effects of oxygen introduction.

Sulfurlike

Cause: An aroma like rotten eggs or burning matches is usually caused by certain strains of yeast during fermentation. It is sometimes caused by bacteria or yeast autolysis (yeast digesting itself).

Corrective Action: Always watch your sanitation procedures throughout the process. Sulfuric aroma usually dissipates over time and is driven off by CO_2 production and higher fermentation temperatures. Rack the beer off of the yeast sediment a few days after fermentation is complete to avoid yeast autolysis.

Sweet

Cause: An incomplete fermentation will result in an overly sweet beer. An improper mash will also yield more unfermentable sugars leading to a sweet beer. An improper balance of hops for the beer style being brewed will also cause a beer to be too sweet.

Corrective Action: Make sure fermentation is complete before bottling. Use proper mashing techniques and make sure the conversion is complete. Pay close attention to the alpha acid content of your hops and adjust your recipe accordingly to archive the desired sweetness (or bitterness) for the style you are brewing.

Yeasty

Cause: A yeasty aroma and/or flavor is usually caused by too much yeast in suspension. It is sometimes caused by the beer sitting on the yeast sediment too long after fermentation is complete.

Corrective Action: Try using some finings to help settle out the yeast more effectively. Rack the beer off of the yeast sediment a few days after fermentation is complete to avoid yeast autolysis.