



Common Off-Flavours in Beer

There are many flavors that contribute to the overall character of a beer. Some of these flavors have been previously described as malty, fruity, or bitter. When it comes time to figure out why a beer tastes bad though, we need to get more specific. In this section we will discuss several different flavors that can be perceived and what could cause each.



Acetaldehyde

A flavor of green apples or freshly cut pumpkin; it is an intermediate compound in the formation of alcohol. Some yeast strains produce more than others, but generally it's presence indicates that the beer is too young and needs more time to condition.



Alcoholic

A sharp flavor that can be mild and pleasant or hot and bothersome. When an alcohol taste detracts from a beer's flavor it can usually be traced to one of two causes. The first problem is often too high a fermentation temperature. At temperatures above 28°C, yeast can produce too much of the higher weight fusel alcohols which have lower taste thresholds than ethanol. These alcohols taste harsh to the tongue, not as bad as cheap tequila, but bad nonetheless.

Fusel alcohols can be produced by excessive amounts of yeast, or when the yeast sits too long on the trub. This is one reason to move the beer off of the hot and cold break when the beer is going to be spending a lot of time in the fermenter.



Astringent

Astringency differs from bitterness by having a puckering quality, like sucking on a tea bag. It is dry, kind of powdery and is often the result of steeping grains too long or when the pH of the mash exceeds the range of 5.2 - 5.6. Oversparging the mash or using water that is too hot are common causes for exceeding the mash pH range. It can also be caused by over-hopping during either the bittering or finishing stages. Bacterial infections can also cause astringency, i.e. vinegar tones from aceto bacteria.

The brown scum that forms during fermentation and clings to the side of the fermentor is intensely bitter and if it is stirred back into the beer it will cause very astringent tastes. The scum should be removed from the beer, either by letting it cling undisturbed to the sides of an oversize fermentor, or by skimming it off the krausen, or blowing off the krausen itself from a 5 gallon carboy. I have never had any problems by simply letting it cling to the sides of the fermentor.



Cidery

Cidery flavors can have several causes but are often the result of adding houw sugar to a recipe. One component of a cidery flavor is acetaldehyde which has a green-apple character. It is a common fermentation byproduct and different yeasts will produce different levels of it depending on the recipe and temperature. Cidery flavors are encouraged by warmer than normal temperatures and can be decreased by lagering.

If it is caused by aceto bacteria, then there is nothing to be done about it. Keep the fruit flies away from the fermentor next time.



Diacetyl

Diacetyl is most often described as a butter or butterscotch flavor. Smell an unpopped bag of butter flavor microwave popcorn for a good example. It is desired to a degree in many ales, but in some styles (mainly lagers) and circumstances it is unwanted and may even take on rancid overtones. Diacetyl can be the result of the normal fermentation process or the result of a bacterial infection. Diacetyl is produced early in the fermentation cycle by the yeast and is gradually reassimilated towards the end of the fermentation. A brew that experiences a long lag time due to weak yeast or insufficient aeration will produce a lot of diacetyl before the main fermentation begins. In this case there is often more diacetyl than the yeast can consume at the end of fermentation and it can dominate the flavor of the beer.



Dimethyl Sulfides (DMS)/ Cooked Vegetable Flavors

Like diacetyl in ales, DMS is common in many light lagers and is considered to be part of the character. DMS is produced in the wort during the boil by the reduction of another compound, S-methyl-methionine (SMM), which is itself produced during malting. When a malt is roasted or toasted, the SMM is reduced beforehand and does not manifest as DMS in the wort, which explains why it is more prevalent in pale lagers. In other styles, DMS is a common off-flavor, and can be caused by poor brewing practices or bacterial infections.

DMS is continuously produced in the wort while it is hot and is usually removed by vaporization during the boil. If the wort is cooled slowly these compounds will not be removed from the wort and will dissolve back in. Thus it is important to not completely cover the brewpot during the boil or allow condensate to drip back into the pot from the lid. The wort should also be cooled quickly after the boil, either by immersing in an ice bath or using a wort chiller.

When caused by bacterial infection, DMS has a more rancid character, more liked cooked cabbage than corn. It is usually the result of poor sanitation. Repitching the yeast from an infected batch of beer will perpetuate the problem.



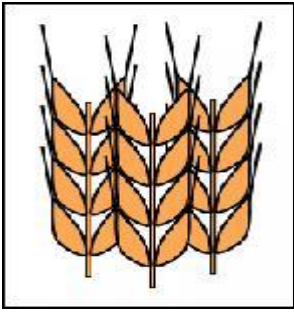
Estery / Fruity

Ales are supposed to be slightly fruity, and Belgian and German wheat beers are expected to have banana flavor components, but sometimes a beer comes along that could flag down a troop of monkeys. Esters are produced by the yeast and different yeast strains will produce different amounts and types. In general, higher fermentation temperatures produce more esters. Next batch, contrive to lower the fermentation temperature by a few degrees.



Grassy

Flavors reminiscent of chlorophyll and fresh cut grass occasionally occur and are most often linked to poorly stored ingredients. Poorly stored malt can pick up moisture and develop musty smells. Aldehydes can form in old malt and can contribute green grass flavors. Hops are another source of these green flavors. If the hops are poorly stored or not properly dried prior to storage, the chlorophyll compounds will become evident in the beer.



Husky / Grainy

These flavors are akin to the astringent flavors produced from the grain husks. These flavors are more evident in all-grain beers due to poor grain crushing or sparging practices. If the grain husks are shredded during crushing by the use of a Corona grain mill for instance, these husk flavors are more likely to be extracted during the sparge. Follow the same procedures recommended to prevent astringency to correct the problem.

Grainy flavors can also be contributed by highly toasted malts. If you are making your own toasted malts, allow them to age at least two weeks after crushing so the harsher aromatic compounds can dissipate. Cold conditioning the beer for a month or two will often cause these harsh compounds to settle out with the yeast.



Medicinal

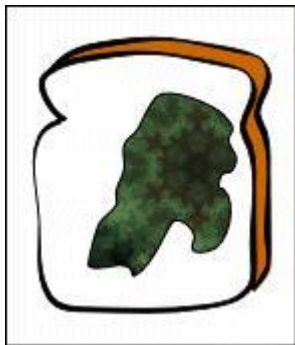
These flavors are often described as medicinal, Band-Aid™ like, or can be spicy like cloves. The cause are various phenols which are initially produced by the yeast. Chlorophenols result from the reaction of chlorine-based sanitizers (bleach) with phenol compounds and have very low taste thresholds. Rinsing with boiled water after sanitizing is the best way to prevent these flavors.



Metallic

Metallic flavors are usually caused by unprotected metals dissolving into the wort but can also be caused by the hydrolysis of lipids in poorly stored malts. Iron and aluminum can cause metallic flavors leaching into the wort during the boil. The small amount could be considered to be nutritional if it weren't for the bad taste. Nicks and cracks ceramic coated steel pots are a common cause as are high iron levels in well water. Stainless steel pots will not contribute any metallic flavors. Aluminum pots usually won't cause metallic flavors unless the brewing water is alkaline with a pH level greater than 9. Shiny new aluminum pots will sometimes turn black when boiling water due to chlorine and carbonates in the water.

The protective (grayish) oxides of aluminum can be enhanced by heating the clean pot in a dry oven at 122°C for about 6 hours.



Moldy

Molds are quickly recognized by their smell and taste. Black bread molds and mildew can grow in both wort and beer. Contamination is likely if the wort or beer is exposed to musty or damp areas during fermentation. If the infection is caught early enough, it can often be removed by skimming or cleaning of the surface before it significantly contaminates the batch. Chances are though that the spores have contaminated the batch and it could crop up again.



Oxidized

Oxidation is probably the most common problem with beer including commercial beers. If the wort is exposed to oxygen at temperatures above 28°C, the beer will sooner or later develop wet cardboard or sherry-like flavors, depending on which compounds were oxidized.



Soapy

Soapy flavors can be caused by not washing your glass very well, but they can also be produced by the fermentation conditions. If you leave the beer in the primary fermenter for a relatively long period of time after primary fermentation is over ("long" depends on the style and other fermentation factors), soapy flavors can result from the breakdown of fatty acids in the trub. Soap is, by definition, the salt of a fatty acid; so you are literally tasting soap.



Solvent-like

This group of flavors is very similar to the alcohol and ester flavors, but are harsher to the tongue. These flavors often result from a combination of high fermentation temperatures and oxidation. They can also be leached from cheap plastic brewing equipment or if PVC tubing is used as a lautering manifold material. The solvents in some plastics like PVC can be leached by high temperature



Skunky

Skunky or cat-musk aromas in beer are caused by photochemical reactions of the isomerized hop compounds. The wavelengths of light that cause the skunky smell are the blue wavelengths and the ultraviolet. Brown glass bottles effectively screen out these wavelengths, but green bottles do not. Skunkiness will result in beers if the beer is left in direct sunlight or stored under fluorescent lights as in supermarkets. In beers which use pre-isomerized hop extract and very little flavoring hop additions, the beer will be fairly immune to damage from ultraviolet light.



Yeasty

The cause of this flavor is pretty easy to understand. If the yeast is unhealthy and begins autolyzing it will release compounds that can only be described as yeasty. Also if the beer is green, too young, and the yeast has not had time to settle out, it will have a yeasty taste. Watch your pouring method too, keep the yeast layer on the bottom of the bottle.