BJCP CEP Sensory Training Class

1. Aceteldehyde
2. Acetic
3. Lactic
4. Almond
5. Papery
6. Butyric
7. lightstruck
8. Spicy
9. Vanilla

13. DMS
14. Diacetyl
15. Grainy
16. Metallic
17. Earthy
18. Caprylic
19. Infection
20. Indole

Acetaldehyde

Described as:

*Appropriate in American Lagers at low levels.

- Freshly cut green apples, leaves.
- Also: acetic/cidery
- Both taste & smell

Causes:

- As a natural product of fermentation as yeast rids itself of waste cabon dioxide, precursor to ethanol. (Fruity)
- As a conversion of ethanol via oxygen or bacteria. (sharper, acetic)

*also plays a role in the production of some acetate esters (see acetic)

Acetic/Sour

Lactic Acid: tastes/smells of sour milk

Causes: Produced by Lactobacillus & Pediococcus bacteria introduced through:

- Low mash temp
- Airborne infection
- Unsanitized equipment post boil
- Can be used to lower mash PH

Appropriate in Sour Ales

Acetic Acid: tastes/smells of vinegar

Nuttiness

Described as: Bitter almond, marzipan, walnut, beany, or sherry like.

Causes:

Appropriate in Old Ales & Barley Wines

- Oxidation, frequently in secondary or during bottling.
- Often in higher gravity beers
- Prolonged heat post fermentation
- Byproduct of some yeast strains

- Oxidized melanoidins

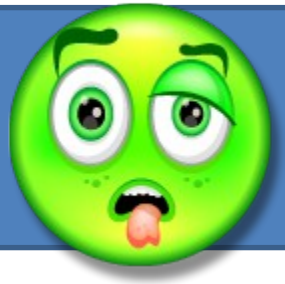
Oxidation

Described as (aroma & flavor): Cardboard, wet paper, rotten pineapple.

Causes:

- Produced as beer ages
- Hot side aeration
- Aeration introduced post fermentation
- Excessive aging

Butyric Acid



Described as (aroma & flavor): Rancid butter, putrid in high levels.

Causes:

- Produced by obligate anaerobic bacteria.
- Bacterial infection during production or packaging.
- Naturally occurs in animal fats (i.e. butter), develops in spent grain as well.

Light Struck

Described as (aroma & taste):

Skunk

Causes:

- Beer exposed to direct sunlight or ultra violet light.
- Use of clear/green bottles

(though brown is susceptible as well)

- Ultra violet and visible light reacting with

Phenolic

Described as: Clove like, spicy, smoky, band aid (aroma & flavor). Can also be vanilla.

Causes: Wild yeast, sanitation issues, certain yeast strains. Formed during fermentation from precursor, ferulic acid. Can also be extracted from grain husks due to over crushing, over sparging, or sparging with hot or alkaline water.

Fix: Proper sanitation, change yeast strain, proper sparging, adjust grain mill crush.

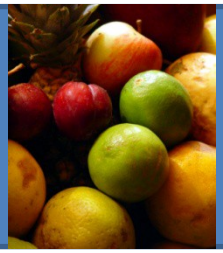
Appropriate in smoked beers, German wheat beers, some Belgian styles. (chlorophenols never appropriate)

Also **cholorophenols**: Plastic; medicinal.

Causes:

- chlorophenols in water Andrew Luberto 2012

Estery



Described as (aroma & Flavor):

- Ethyl Acetate: Fruity at low quantities. Solventy/nail polish remover at high
- Ethyl Hexanoate: Apple like
- Isoamyl acetate: Banana/ Pear
- Phenylethyl Acetate: flowery, honey, sweet

Appropriate in Ales, Dopplebocks, and Eisbocks.

Caused By:

- Certain yeast strains/yeast stress (present in all beers at some level)
  - Formed from combination of Ethanol and organic con ring fermentation
- Higher fermentation temps (in certain strains)
- Wild yeast, non food grade plastic (e. acetate)
- Higher wort gravity

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Fix:

DMS

- Described as (flavor & aroma): Cooked corn, cooked vegetables or shell fish/oyster (high concentrations), also
- tomato juice (darker beers).

Acceptable at low levels in Light Lagers, Pilsners, Cream Ales, Dark Amer. Lagers

DMS Continued

Causes:

- Bacterial infection
- Found in equipment or re-pitched yeast
- Low pitch rate or long lag phase can allow substantial growth.

Fix: Proper sanitation, clean/healthy yeast.

Causes:

- Precursors to DMS naturally present in malted grains. (S-Methyl-methionine/SMM)
- ineffective elimination of natural occurrence during brewing

Fix:

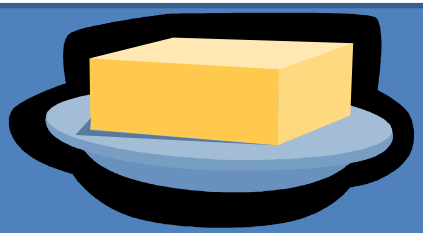
- Open, rolling boil for 1 hour
- Use wort chiller to cool quickly
- Proper pitching rates, clean/healthy yeast.

Quiz 1

Please pick any ***two*** of the following:

- DMS
- Estery
- Phenolic
- Light Struck
- Butyric Acid
- Oxidation
- Nuttiness
- Acetic/Sour
- Acetaldehyde

Diacetyl



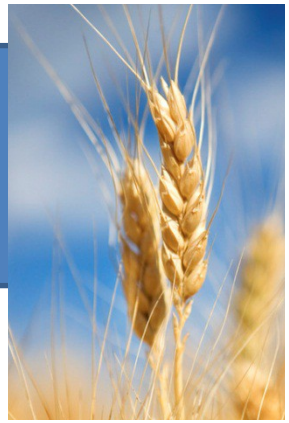
Described as(aroma, flavor, mouthfeel): Butter/butterscotch, slickness on palate.

Caused By:

- Natural fermentation product from converted sugars during early stages of fermentation.
  - Yeast strain (amino acid synthesis)
  - Lower fermentation temps
  - More prevalent with high adjunct ratio
  - Premature racking/fining/lagering
  - Mutated yeast strain
  - Dirty draft lines
  - Can be indication of bacterial (Pediococcus) spoilage.

Appropriate in lower levels in: Scotch ales, Dry Stouts, English Bitters, Czech Pils, Oktoberfests.

Grainy/Husky w/Astringent



Described as (aroma, flavor): cereal, grainy, husk.

Astringent: astringent, powdery, dry, grape skin, tea bag.

Appropriate in: Light Lagers, Pilsners, N. German alt, Brown/Robust Porter, Dry Stout, Wheat Beers. (Astringent never appropriate)

Causes:

- Excessive grain crush
- High corn/adjuncts
- High sparge temp/excessive sparging
- Boiling grains/improper decoction procedures (grainy/Husky)
- Excessive tannin extraction (astringent)
- Mash PH exceeds 6.0/alkaline water (astringent)
- Hopping rates & low dextrin content may also contribute to perception of astringency

Metallic

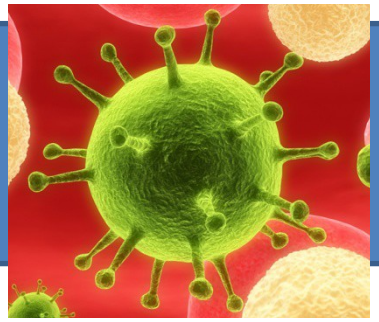
Described as (taste/odor):

- Metal/tin
- blood like

Causes:

- unprotected metals dissolved in wort
- Contact w/iron
- Lipids from malt or adjuncts

Infections



Described as:

- Earthy, damp soil, fresh dirt.
- Soapy, fatty, goaty, animal, sweaty. (caprylic)
  - May also be caused by breakdown of fatty acids in the trub, creating “soap”.
- Sour + buttery.

Fix:

Fecal/Indole

Described as: Farmyard, fecal, can be jasmine like in smaller amounts.

*not to be confused with farmyard/horsey aroma produced by Brettanomyces yeast.

Causes:
bacterial infection in water, equipment, and/or yeast. (only perceptible as fecal by half of population).

Hops

Described as (aroma, flavor, mouthfeel):

Largely dependent on variety. In this case floral.

Aroma hops: late addition hops or dry hopped. Extracted aromatic oils (terpenes, ketones, sesquiterpenes, etc)

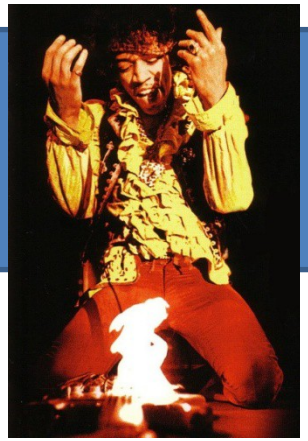
Bitter hops: early addition hops, isomerization of alpha acids (humulone, cohumulone, adhumulone, etc.) Should be clean/pleasant w/o harsh or astringent character

Fix: hop aroma, flavor, and bittering can be greatly controlled by many things including: amount, time of addition, variety, wort gravity, and water profile.

Hefeweizen

- Top fermenting Bavarian wheat beer which employs a specific yeast species (T. Delbrueckii) that produces desirable phenols (clove) and esters (bannana, bubblegum)
- Attenuation high/Flocculation low
- Temperature may play a factor in amount of ester/phenols (depending on the strain)
- Low diacetyl levels

Alcoholic



Alcoholic (aroma and mouthfeel/flavor):

Hot, alcoholic, vinous, warming sensation in mouth and throat. Can be solventy at high levels, paint thinner.

Causes: Fusel oils produced during fermentation. Factors include:

- high amount of fermentable sugars
- high fermentation temp
- low mash temp

Acceptable in higher ABV/ABW ales and lagers

Sulfury

Described as (aroma & flavor): Rotten eggs, sewer gas(hydrogen sulfide), burned matches(sulfur dioxide).

Causes: Sulfur Dioxide (SO2) produced during brewing process, Hydrogen Sulfide mostly produced by yeast during fermentation. Can also be mutant yeast, bacterial infection, interaction with Mercaptans

Acceptable in low levels in some Lagers

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Sweet

Described as (taste): Sugary, cloying, syrupy.

Causes:

- Low attenuation/cold crashing.
- Presence of maltose and maltotriose, may also include glucose and fructose.
- Additions of sucrose, lactose, or dextrin malts can also contribute.

Appropriate in stronger ales and lagers

Brettanomyces

- Yeast strain which produces fermentation compounds described as barnyard, horsey, horse blanket.
- Viewed as negative for many years, but has gained in popularity.
- Spreads easily, recommended to have separate soft rubber and plastic equipment.
- Unique in aerobic fermentation yeast characteristic

Quiz 2

Please pick ***two*** of the following:

- Brett
- Sweet
- Sulfury
- Alcoholic
- Hefeweizen
- Hops
- Fecal

For each choice, please *describe & discuss* characteristics, causes, and suggestions for control.

Sources

- Beer Judge Certification Program (BJCP). Accessed December 27th, 2012. <bjcp.org/study.php#trouble> & <bjcp.org/docs/OffFlavorFlash.pdf>
- Mosher, Randy. *Tasting Beer.* Massachusetts: Storey Publishing, 2009. Print.
- Noonan, Greg. *Brewing New Lager Beer.* Colorado: Brewers Publications, Rev. Edition 2003. Print