



**YAKIMA
CHIEF
- HOPS -**



Common Off Flavor Training

Tommy Yancone-Technical Brewer

Overview

- Welcome & Introductions
- Purpose of training
- Guided tasting
- Off flavor discussion (What? Why? How?)



How to optimize your training experience

| | | | | |
|--|--|--|--|--|
| <p style="text-align: center;">SAMPLE NO.</p> <div style="border: 1px solid black; width: 80px; height: 20px; margin: 0 auto;"></div> <p style="text-align: center;">ACETALDEHYDE SOLVENT, GREEN APPLE, SQUASH</p> <p><small>ROOT CAUSES: Incomplete fermentation, autolysis SOLUTIONS: Ensure proper pitch rates of healthy yeast, krausen if necessary NOTES:</small></p> | <p style="text-align: center;">SAMPLE NO.</p> <div style="border: 1px solid black; width: 80px; height: 20px; margin: 0 auto;"></div> <p style="text-align: center;">DIACETYL ARTIFICIAL BUTTER, BUTTERSCHOTCH</p> <p><small>ROOT CAUSES: Premature cold crashing, unhealthy yeast/low pitching rate, infection, hop creep SOLUTIONS: Perform a VDK (diacetyl) test before cold crashing/packaging. Increase fermentation temp. for 1-3 days at the end of primary fermentation. NOTES:</small></p> | <p style="text-align: center;">SAMPLE NO.</p> <div style="border: 1px solid black; width: 80px; height: 20px; margin: 0 auto;"></div> <p style="text-align: center;">DIMETHYL SULFIDE (DMS) CANNED OR CREAMED CORN, COOKED VEGETABLES</p> <p><small>ROOT CAUSES: Low vigor boil, covered boil, short boil SOLUTIONS: Boil vigorously for at least 60 minutes. Ensure your kettle is not covered during the boil. NOTES:</small></p> | <p style="text-align: center;">CONTROL BEER</p> | |
| <p style="text-align: center;">SAMPLE NO.</p> <div style="border: 1px solid black; width: 80px; height: 20px; margin: 0 auto;"></div> <p style="text-align: center;">ISOVALERIC ACID CHEESE, SWEATY SOCKS</p> <p><small>ROOT CAUSES: Oxidized hops SOLUTIONS: Only use cold stored, purged and sealed bags of hops. Ensure proper sanitation. NOTES:</small></p> | <p style="text-align: center;">SAMPLE NO.</p> <div style="border: 1px solid black; width: 80px; height: 20px; margin: 0 auto;"></div> <p style="text-align: center;">LACTIC ACID sour, sour milk</p> <p><small>ROOT CAUSES: Improper or ineffective sanitization practices SOLUTIONS: Ensure proper cleaning and sanitization of all equipment. NOTES:</small></p> | <p style="text-align: center;">SAMPLE NO.</p> <div style="border: 1px solid black; width: 80px; height: 20px; margin: 0 auto;"></div> <p style="text-align: center;">OXIDATION PAPER, CARDBOARD, SWEET SHERRY</p> <p><small>ROOT CAUSES: Post fermentation oxygen exposure SOLUTIONS: Minimize oxygen pick up by purging with CO₂ when possible. Store beer cold, drink it in a timely manner. NOTES:</small></p> | |  <p style="text-align: center;">aroxa</p> |
| | | | | |

Directions:

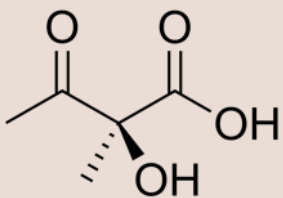
1. Taste the control sample
2. Taste the test sample as directed by the instructor
3. Reveal and discuss the off flavor
4. Record the sample number in the correct off flavor box

Taste Sample #283

Diacetyl (2,3 Butanedione)-283

- Aroma & Flavor-Artificial butter or butterscotch, slick mouthfeel in high concentrations
- Rarely a desirable compound
- Sometimes referred to as “VDK” along with 2,3 Pentanedione
- Natural part of the fermentation process
- Can be a very common off flavor in beer
- Has a very low odor threshold

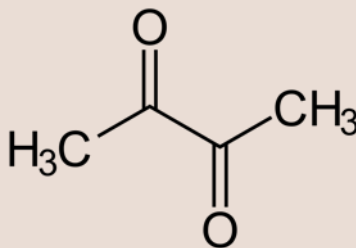
α -acetolactate



No aroma

oxidation

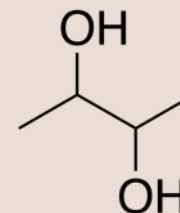
Diacetyl



Butter

Time
Yeast

2,3 Butanediol

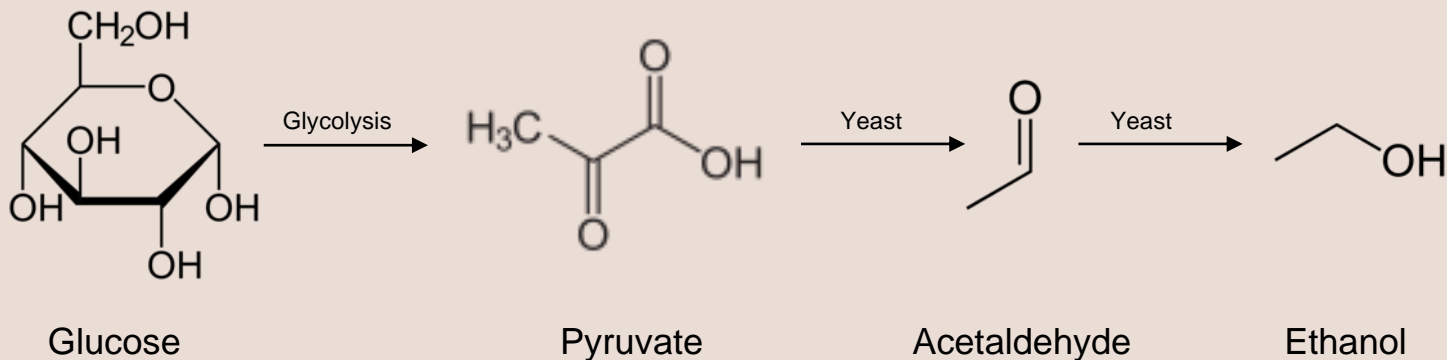


No aroma

Taste Sample #770

Acetaldehyde-770

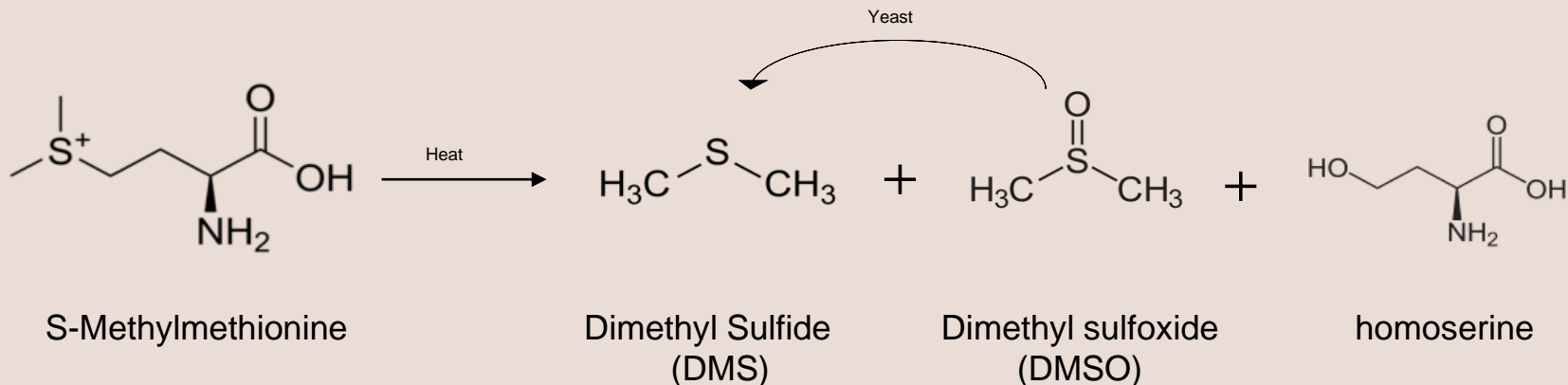
- Aroma & Flavor-Solvent/Green Apple/Squash
- Usually a yeast based off flavor
- Precursor in the conversion of glucose to ethanol
- High acetaldehyde levels indicate either an incomplete fermentation, or unhealthy yeast
- Make sure you are pitching enough yeast, make a starter if necessary



Taste Sample #965

Dimethyl sulfide (DMS)-965

- Aroma & Flavor-Cooked or creamed corn or cooked vegetables
- Very low threshold
- Is usually present in all beers at some point
- S-methylmethionine, which is present in barley gets converted into DMS during the malting process
- Kilning for longer, or roasting at higher temperatures will reduce the amount of SMM present in the malt
- Its low boiling point (~100F) makes it easy to volatilize DMS by boiling



Taste Sample #521

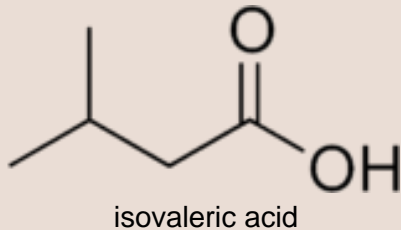
Oxidation-521

- Aroma & Flavor-Sweet, paper, cardboard, sherry
- Produced when beer is exposed to oxygen
- The rate of oxidation is determined by oxygen level, temperature, hopping level, and time
- There is no way to produce a 0ppb O₂ beer
- Bottle conditioning can help, since yeast will clean up most of the oxygen at packaging
- Make sure you purge your kegs completely
- This beer is only a few weeks old, but has been sitting in a hot car for 5 days

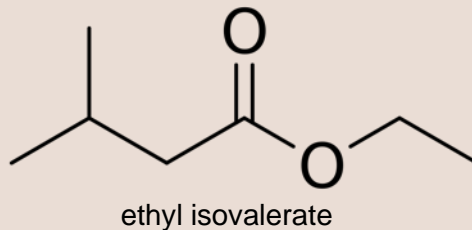
Taste Sample #448

Isovaleric acid-448

- Aroma & Flavor-Cheesy, parmesan, sweaty
- Usually derived from hops
- Isovaleric acid is produced during the oxidation of alpha acids in hops
 - This can be caused by poor processing methods, or improper storage
- Can also be derived from Brettanomyces strains
- IVA is desirable in aged hops



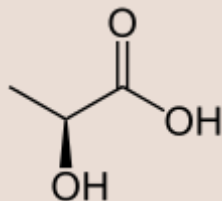
fermentation + aging →



Taste Sample #191

Lactic acid-191

- Aroma-Usually not present, unless in high quantities
- Flavor-Clean sour
- Desired in sour beers, but an off flavor in other styles
- Less flavorful than other acids such as acetic or butyric
- Lactic acid is produced by lactic acid bacteria which are used in yogurt and other fermented foods
- LAB is relatively easy to kill with sanitizer or heat, but if cold side equipment isn't sanitized properly
- The low pH/alcoholic/hoppy nature of beer will help prevent infection by LAB, but it is still possible



Any Questions?

Thank You to the Yakima Chief Hops employees who volunteered to make this session a success:

Tiffany Pitra

Bri Valencourt

Megan Yusi

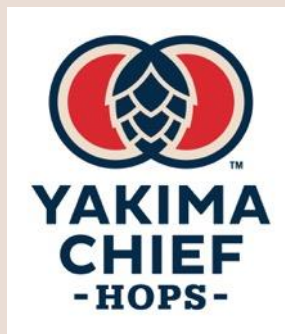
Jaryl Pence

Kristin Lindsey

Wade Brummett

Victoria Garza

Kayla Thomas



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