Crafting Cellarworthy Homebrew

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What is a vintage beer?

- Definition: A beer that has been aged for a year or more and has shown positive development during that time.
- Homebrewers are especially aware of the aging effects of a beer as they slowly work their way through a batch.

What makes a beer built to age?

- Needs to have one of the three "S"s
  - Strong (at least 8% ABV)
  - Sour (acidic)
  - Smoke
- The S's (high ABV, acidity, smoke phenols) essentially act as a preservative, slowing the aging
  - Buying time is critical to allow for the slow-to-emerge vintage flavors
  - Pot Roast analogy
  - Many of these flavors are oxidation-derived and it's important that the beer's inherent oxygen goes to developing these positive flavors, rather than the negative stale flavors

Why bother to age a beer?

- Mellow harsh aspects (e.g. booziness)

- Allow "vintage" flavors to develop
  - Sherry, amaretto, hazelnuts, candied pineapple, figs, etc

- Let a beer to integrate to allow the more subtle flavors to emerge
  - Flavors that were already there, but overshadowed

Why not age certain beers?

- Lose, fresh vibrant flavors
  - Hoppiness (bitterness, as well as flavor and aroma)
  - Bright Maltiness

- Development of stale flavors
  - Notably, trans-2-nonenal (cardboard, stale bread)
  - Occurs in all aging beers, but especially those not built to age

What beers are age-worthy?

- With all this in mind, it's only a very small percentage of beers styles that are ageable
- Certain styles lend themselves to aging
  - Barleywines (both American and English)
  - Imperial Stouts
  - Belgian Quads
  - Flanders Red
  - Lambics & Gueuzes
  - American Wild Ales
  - Rauchbiers

What to look for

- Not all beers within these styles are cellar-worthy though.
- Understand aging mechanisms to design and brew cellarworthy beers

Fusel Alcohols

- Can range from hot and solvent-like to fruity
- Often created when a yeast is stressed (temperature, high ABV, etc)
- With time can oxidize into aldehydes
  - Generally sweet tasting: caramel, amaretto, etc

- Or combine with acids to create esters
  - Generally fruity: apples, pears, bananas, pineapple, vinous
  - Important in a conditioning "wild" ale

- Therefore, a "fusely" presence in a young beer can be a good thing, leading to greater complexity when aged.

How to increase fusel alcohols?

- Often inevitable in most high gravity brews, but can be encouraged by:
  - Choosing fusel-apt yeast strains
  - Ferment on high end of suggested yeast temperature range
  - Pitch on the low end of suggested pitching rate of yeast

Beer Thinning

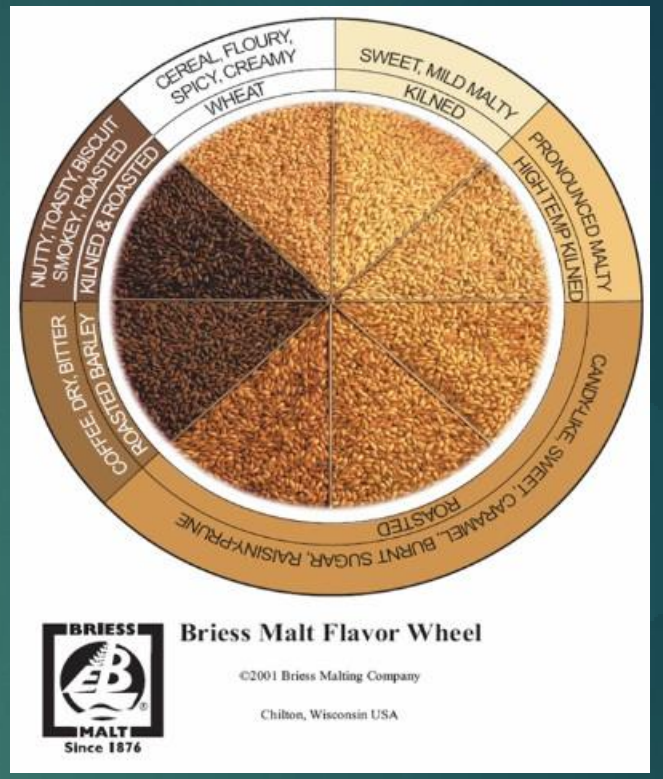
- Over time, a beer's sugars will be reduced via oxidation.
- As these sugars are oxidized, the byproducts adhere to the malt proteins, eventually causing them to fall out of suspension
- This results in thinning
- Important for beers to have high residual sugars when young so there will still be something left after aging

How to increase residual sugars?

- Look for yeast strains with low attenuation
- Choose a mash temperature that maximizes alpha amylase conversion (154-167 deg F) to create long chain sugars that won't be wholly fermented

Malt Melanoidins

- Melanoidins come from the kilning or kettle caramelization of malt
- Act as reductones, essentially "oxygen sponges"
  - As oxidized, flavors transform from maltiness to sherry or port
- This slows the oxidizing of the beer (staling) which is good
- Aim for rich malt character so there is still substantial maltiness left after initial oxidation



How to maximize melanoidins?

- Utilize high kiln base malts (Maris Otter, Munich, Vienna, etc), as opposed to 2-row with some crystal or caramel specialty malts
- Employ ultra-long boils (3+ hours) to ramp up kettle-carmelization derived melanoidins
- Consider decoction mashing

Hoppiness Fading

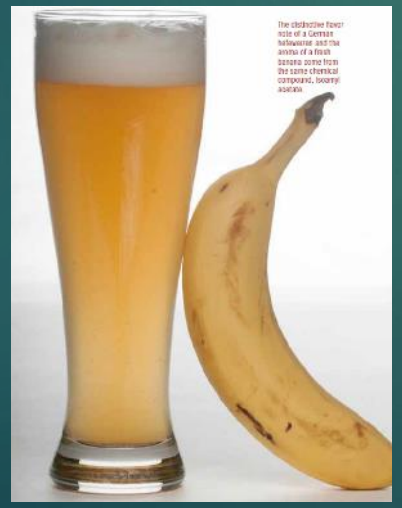
- All aspects of hops (bitterness, aroma, taste) fade over time
- Isomerized alpha acids often lead to stale flavors

How to Minimize Hop Fade

- Use hops with a high alpha-beta ratio (noble hops, etc). A resilient hop bitterness can be derived from oxidized beta acids (hulupones).
- Overdo the bittering aspects so there is still something left when the beer is drunk.
- Avoid making hop flavor or aroma a cornerstone of your beer design.

Ester Development

- The esters in a young beer
  - Pears, grape, apples, tree fruits, stone fruits, bananas
- Merge with the developing aldehydes to create dried fruit flavors
  - Figs, raisins, stewed plums, candied pineapple
- Look for beers to have a high ester profile when young to be able to develop dried fruit flavors later on

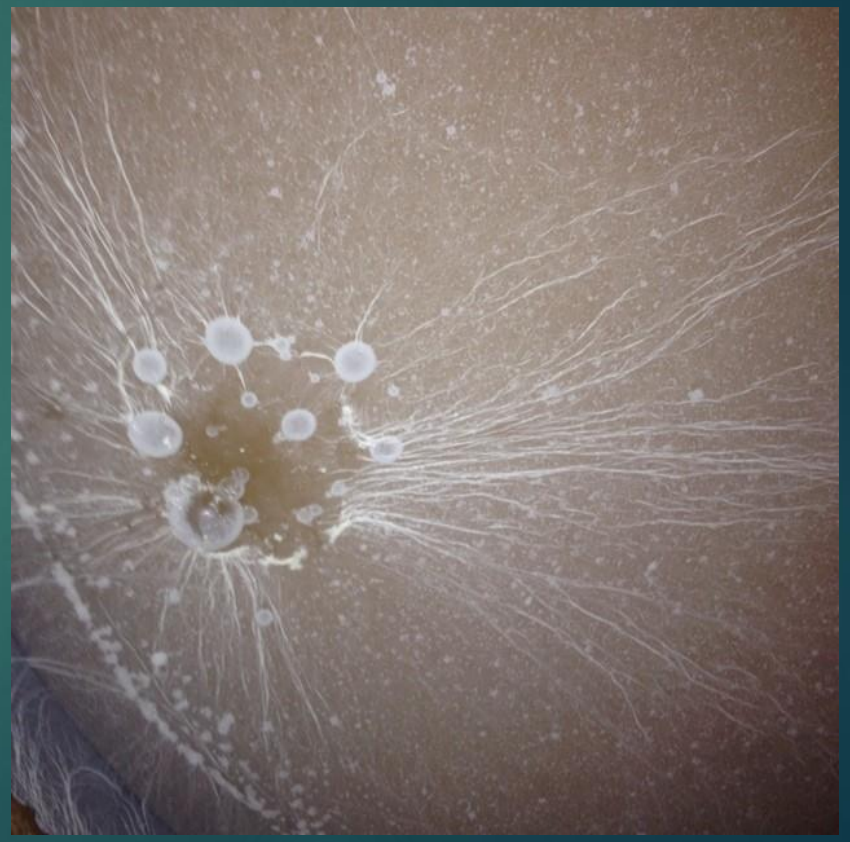


How to maximize ester presence

- Goes hand in hand with increasing fusel production:
  - Choose a yeast strain with high ester production
  - Ferment on high end of suggested yeast temperature range
  - Pitch on the low end of suggested pitching rate of yeast

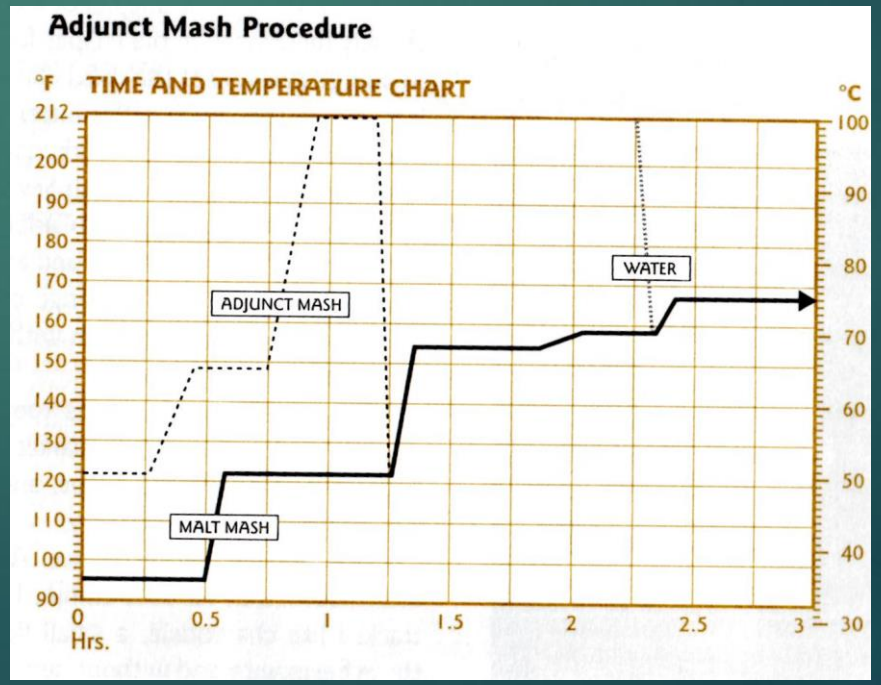
Brett Beers – Unfermentable Starches

- Brettanomyces is a slow-acting yeast that will (eventually) consume any and all fermentable sugars
- Brett beers will get very dry as they age
  - Complete fermentation can take years
- If designed for long term aging, brett beers should have some unfermentable starches (e.g. unmalted wheat) to maintain some body over time.
- This fermentation consumes residual oxygen, often eliminating most oxidation flavors in brett beers.



Brewing w/ Unfermentable Starches

- Use unmalted wheat (berries), rye, spelt, oats that have plenty of dextins
  - Mash using an American Adjunct Double Mash (see *Radical Brewing* pg 205) to maximize dextrins



Brett Phenols

- Brett can convert these traditional phenols (clove, pepper) into 4-EP and 4-EG phenols
  - 4-EP: horsey, barnyard, medicinal, vinyl (band-aid)
  - 4-EG: smoky, leather, bacon

- Be wary of young brett beers brewed with a mix of phenol-producing saccharomyces (e.g. Belgian) and Brett as these beers can become overwhelmingly "bretty" if cellared
  - Orval a classic example. After 3 or so years is essentially band-aid juice.

Autolysis

- The process where yeast cell walls break down and spill their guts into beer.
- Flavors vary, and seem to align with roasted malt levels
  - Dark Beers: Blood, Rust, Ink
  - Amber: Soy Sauce, Teryaki, Marmite
  - Pale: Toasted Nuts, *sur lie* (aged champagne)
- Can be due to:
  - High Heat
  - High Carbonation
  - High Acidity
- Minimize by reducing amount of bottled yeast as much as possible
  - Don't bottle/keg beer until it has plenty of time to complete fermentation and conditioning.

In Closing

- Keep these aging mechanisms and aspects in mind when designing and/or brewing a beer you're planning to age.
- Avoid the "older is better" trap, better too young, than too old

Questions?