

In pursuit of flavor

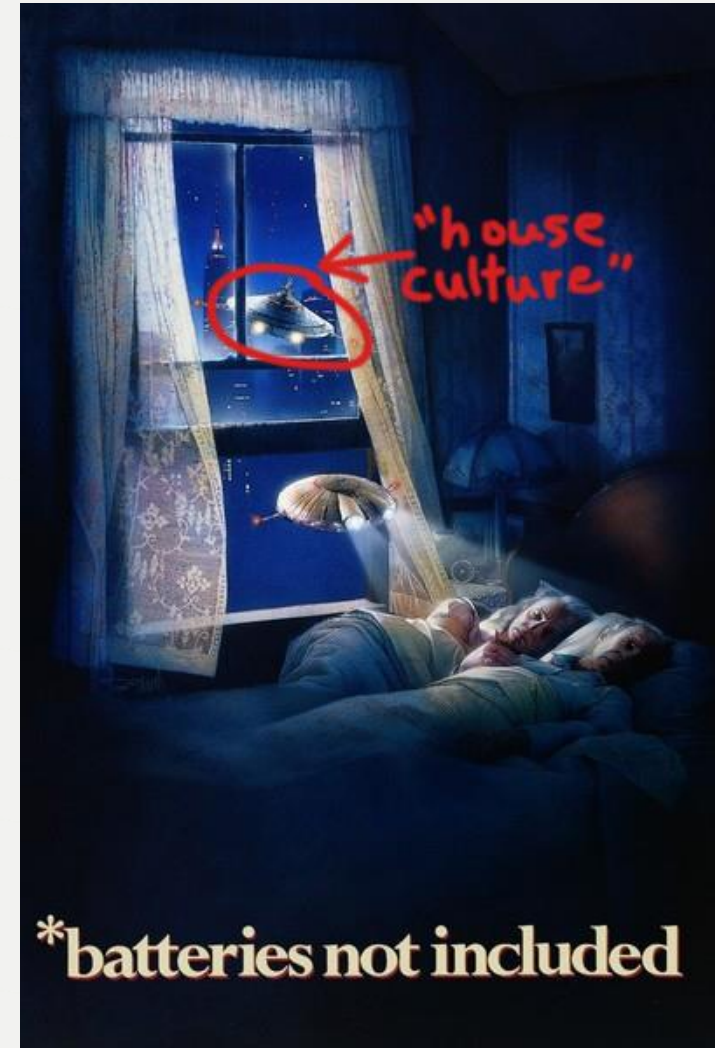
A presentation that aims to contribute to a greater understanding of sour beer production.



*What's NOT Included?

How to make sour beer

- Too many variables!
- Kettle sour – acid is easy
- Sanitation
 - Brewers should know how to be clean
 - Brett is yeast
 - Bacteria is a threat



What is included?

A little bit about our **sour** program

What is sour beer?

- Personal bias and preferences play a large role

What drives flavor?

Common off flavors and how to prevent them

Flemish Red
Sour Blonde
Lambic Tart Saison
Fruited Sour Ale
Berliner Weisse Faro
Gose Geuze
Oud Bruin



Sour beer at Smog City Brewing

First large format
"Benny"
2015



First Sour Barrels
2013

Dedicated sour facility
opened 2017



Sour beer at Smog City Brewing - Oak

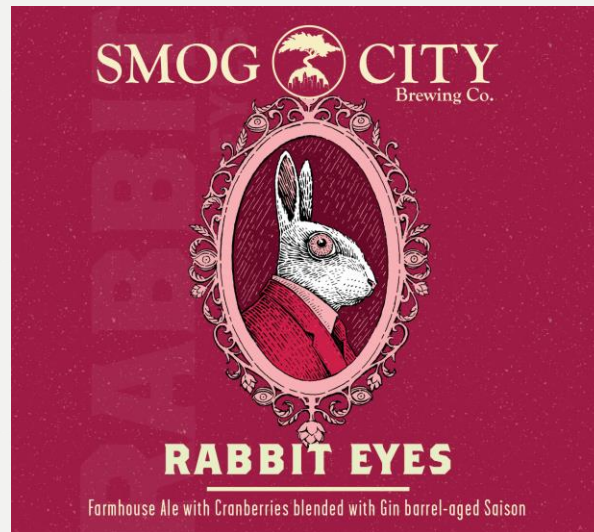


180 Standard Wine • 40 - 500L Puncheons • 3 - 30 HL Foudres • Room to Grow!



Sour beer at Smog City Brewing

- Interpretations of classic styles
- Creatively Inspired, Exceptionally Balanced
- Taste today->



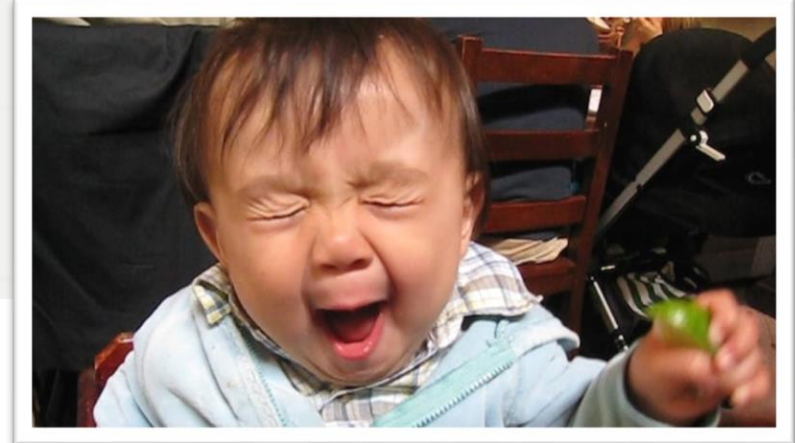
What does Porter think sour beer is?

Any beer where **acidity** takes the place of bitterness – there are no rules

- Sour beer, Wild beer, Mixed Culture, Spontaneous...
- Nomenclature

Drinkability important- AKA **balance**

- Some like it SOUR!
- Less sour = more saleable
- The best sour beers *have* acidity but are not defined by it



What's important to making great sour beer?

Success relies on:

- A trained palate
- Ability to recognize off flavors and their origin
 - i.e. Lactic vs. Acetic →

Biases and preferences

- Phenols

Balance is important

- Intention
- Knowing when to dump



VS



What drives flavor in Sour Beer?

Sour beer gives us the ability to achieve flavor and aromas not possible with traditional brewing ingredients, processes, and pure brewers yeast.

What's in the toolbox?

- Wort composition
- Lactic Acid Bacteria & Mixed Cultures
- BRETTANOMYCES
- Adjuncts & Additions



What drives flavor in Sour Beer?

Wort Composition

- Give the microorganisms what they need to produce what we want
- Proteins important! = Amino Acids
 - Nourish Brett and Bacteria during aging
- Dextrins: see Brettanomyces
- Flavor & Non-Traditional Grains
- Hops and...



What drives flavor in Sour Beer?

Microorganisms:

- Lactic Acid Bacteria (LAB) is the main driver of acidity
 - All produce lactic acid, but also other things
 - Integral to the complexity of well made sour beer
 - Oenococcus and the MLF
 - Malic acid in: Apricots, Blackberries, Blueberries, Cherries, Grapes, Peaches, Pears, Plums
- Mixed Cultures
 - Suppliers, Blends, Ratios, how they're treated
 - Know your supplier (plug for East Coast Yeast, Yeast Bay)
 - Pilot Brew!
 - Experiment, Taste, and Take Notes!



What drives flavor in Sour Beer?

Brettanomyces

- Main driver of flavor and aroma in complex sour beer.
- The great modifier & attenuator
- Feed me dextrins
- What strain(s) do I use?

Develop knowledge in house

- Small scale trials are fun!
- Stressed Brett, not the most complex

Multiple fermentations

- Clean or mixed culture primary in Stainless/Foudre
- Barrel or extended aging
- Fruiting or blending in Stainless
- Refermentation in the bottle



What drives flavor in Sour Beer?

Adjuncts and Additions – Sexification

- What's your approach? Inspiration?
- Build on the character of the beer

Fruit Considerations

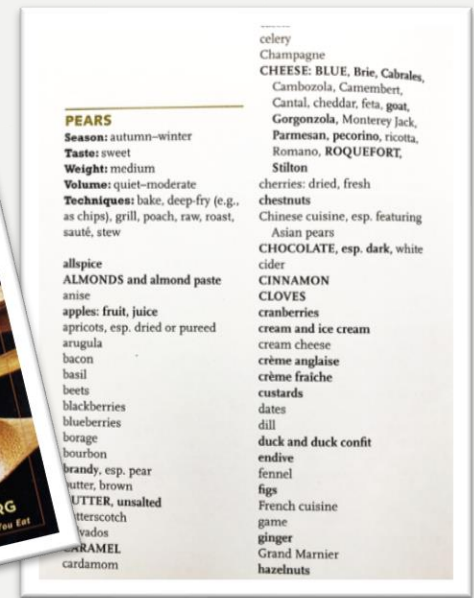
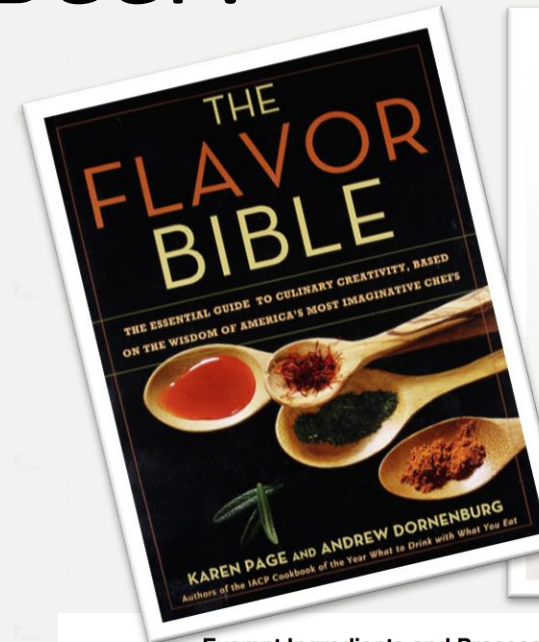
- Whole, fresh, frozen, pureed, dried, juice
- VARIETY
- Small batch testing- Flex Tanks
- FLAVOR



What drives flavor in Sour Beer?

Herbs & Spices

- Complement fruit or Brett character?
- More experimentation
- Flavor Bible ->
- Source: Starwest-botanicals.com



TTB and FDA GRAS

- **Generally Recognized As Safe**

The beer you begin with has to be good

Exempt Ingredients and Processes Determined to be Traditional Under TTB Ruling 2015-1

TTB Ruling 2015-1
Attachment 1

Exempt Ingredients Under the Conditions of TTB Ruling 2015-1

Industry members are responsible for ensuring that all ingredients, including any parts of fruit, used in the production of malt beverages or beer are wholesome products suitable for human food consumption and comply with applicable ingredient safety regulations of the Food and Drug Administration.

INGREDIENT	DESCRIPTION/LIMITATION
AGAVE	Whole, juice, puree, or concentrate. Does not include extracts, essential oils, or syrups.
ALLSPICE	As outlined in FDA's GRAS listing at <u>21 CFR 182.10</u> . Spices may be whole or ground. Does not include extracts, essential oils, or syrups.
ANISE	As outlined in FDA's GRAS listing at <u>21 CFR 182.10</u> . Spices may be whole or ground. Does not include extracts, essential oils, or syrups.
APPLES	Whole, juice, puree, or concentrate. Does not include extracts, essential oils, or syrups.



Off flavors in Sour Beer

Too SOUR and Controlling acidity

- Acid creep – “I wanna have control”
- Hops
- Barrel or wood cleaning
 - Hot water, steam, rinse
- Blend it!

TA vs pH

- What kind of acid are we talking about?
- Now that we have our acid under control...



Off flavors in Sour Beer

- Acetaldehyde
 - Green apple, bruised apple, sweet lacquer, hot garbage
 - Brettanomyces in Old Barrels
 - Old unhealthy Sacch strains
 - Aging too long, too warm
 - **Exposure to oxygen**
- Curable? Most of the time, yes!
 - Brett sees AA as food left on their kids plate
 - Often found in combination with Ethyl Acetate which makes it even harder to pick out



Off flavors in Sour Beer

- Ethyl Acetate

- Nail polish remover
- Indicative of excess acetic acid
- Old or dry barrels with too much headspace or dry staves
 - If you find EA in one barrel, taste all barrels of that batch!
- Cannot be refermented or scrubbed with CO2
- Blending
- Low levels = fruity, pear, touch of candy



Off flavors in Sour Beer

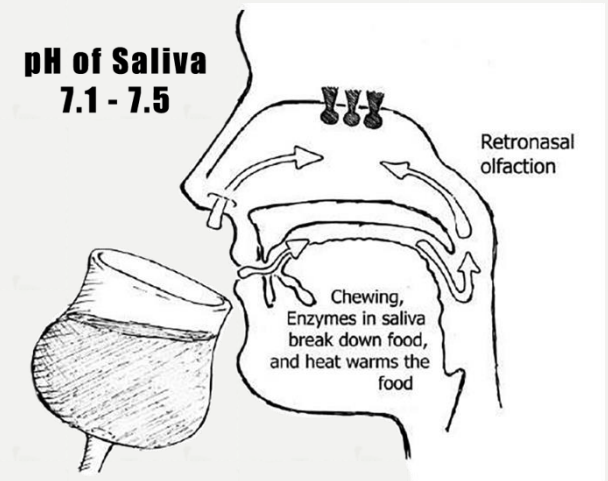
- Diacetyl
 - Most common off flavor in sour beer
 - Buttery, Butterscotch, Slick
 - Normal in all fermentations
 - Pedio = Diacetyl
 - The janitors name is Brett
- **MOST INEXCUSABLE!**
 - Forced diacetyl test:
 - Heat sample to 140-160F
 - Cover and cool to room temp
 - Evaluate, with friends!



Off flavors in Sour Beer

Tetra-Hydro-Pyridine or **THP**

- Mousey, Cheerios, Bready, Corn Chips, Raw bread dough
- Sensed retronasally
 - Your saliva vs. her saliva
- Dearth of information:
 - Where it comes from, what makes it
 - Milk the Funk, Sour Hour
- Oxygen is the enemy to all beer!
- Does it go away?



Key takeaways to remember:

- The best sour beers are balanced and *not* defined by their acidity
- Eliminating off flavors is the first step in producing great sour beer and requires a trained palate.
- Making great sour beer consistently requires experimentation, education, and experience.



Where do you go for more information?

- Consult the all knowing internet!
 - *Milk The Funk Wiki*
 - SourBeerBlog.com – great articles on off flavors, palate training
 - Embrace the Funk
 - Sour Hour podcast on the BN
- Read a book!
 - Flavor Bible – Page & Dornenburg
 - American Sour Beer – Michael Tonsmire
 - Wood and Beer – Bouckaert and Cantwell
 - Wild Brews – Jeff Sparrow

Email me: porter@smogcitybrewing.com

