How to Brew, Blend and Maintain an Acid Beer

PRESENTED BY: JEFFREY CRANE

37th Annual American Homebrewers Association®
National Homebrewers Conference

BREW'S UP
SAN DIEGO
JUNE 11-13, 2015
Presentation Overview

• Biography
• Purpose of an Acid Beer
• Brewing an Acid Beer
• Maintain an Acid Beer
• Blend an Acid Beer
Biography

• Quality Engineer – *Risk Adverse*

• Husband/Father/Homeowner – *Time Constrained*

• Homebrewer – *Creativity/Resourcefulness*

• Barrel Program Director at Council Brewing - *Consistency*
Purpose of an Acid Beer

A *blending component*

- Add acidity (Lactic acid)
  - Fine tune acidity on long term sour beers
  - Increased acidity enhances fruit flavors
  - Slight additions add a “crisp”
  - Lower pH helps color stability

- Add a “House” Flavor
  - With the use of distinct Brett strains
  - Small additions to all beers to help beer evolve
# Brewing an Acid Beer

<table>
<thead>
<tr>
<th></th>
<th>Hot Side Souring</th>
<th>Cold Side Souring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
<td>Sour Mash</td>
<td>Sour Wort/Kettle Souring</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td>High*</td>
<td>Med*</td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td>Temperature Control Equipment</td>
<td>Plastic Items</td>
</tr>
<tr>
<td><strong>Complexity</strong></td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Acidity</strong></td>
<td>Good, Limited</td>
<td>Good, Limited</td>
</tr>
<tr>
<td><strong>Notes</strong></td>
<td>Fast, Target a Specific Acidity</td>
<td>Cont. Acidity/Complexity</td>
</tr>
</tbody>
</table>

*Biography
Purpose of an Acid Beer
**Brewing an Acid Beer**
Maintain an Acid Beer
Blend an Acid Beer

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**Berlin and Beyond: Sour Mashing and Its Applications**

Saturday, June 13 | 2:00 pm – 3:00 pm

**Wild and Spontaneous Fermentation at Home**

Saturday, June 13 | 10:15 am – 11:15 am
Bacteria (gram positive)

Producer of Lactic Acid (yogurt type sourness)

Presence of certain hop acids will inhibit growth

New strains have been made available or discovered (i.e. older references mostly apply to L. Delbrueckii)

Each strain has its own optimum acid producing (growth) conditions

Ferment both in the presence or absence of oxygen but prefers reduced levels

Homofermentative—produces only lactic acid
  ◦ Acidiophilus (99F), Delbrueckii (100F)

Heterofermentative - produces both lactic acid, ethanol and CO2
  ◦ Brevis (75)

Facultatively Heterofermentative – homolactic with high sugar, heterolactic with low sugar
  ◦ Plantarum (59F)
Lacto Strain Source

Commercial Cultures

- L. Delbrueckii
- L. Brevis
- L. Brevis, L. Plantarum
- L. Delbrueckii?

Probiotics

- L. Acidophilus
- L. Plantarum 299v

Cultured Dregs

- Sour/Tart Saisons
- Berliner Weisse
- Gose

- Biography
- Purpose of an Acid Beer
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Possible Acid Beer Cultures

Each of these breweries packages a sour beer containing lacto and no pedio

Look for Berliner Weisse, Gose or Tart/Sour Saisons
Building up Dregs

Lacto Focus
- 2-10x faster growth than yeast
- Doesn’t need oxygen (use airlock)
- IBU sensitive
- Higher temperature
- Don’t decant – not good flocculation
- Low gravity – 1.020 – 1.040

Dreg Procedure
1. In bottle/small flask – ~3 oz – <1 week
2. In bottle/small flask - ~15 oz – ~1 week
3. In 1 gal glass jug – ~100 oz – 4-8 wk
Achieving a House Flavor

**Brettanomyces based**
- Ferment in low pH environments
- High attenuation
- Slow fermentation rate

- Adjust over time
  - More yeast – less acid
  - Many strains to
  - Commercial Sources, Dregs, Native

- **ESCARPMENT**
  - Yeast laboratories

- SOUTHYEAST LABS
  - Bioregional Eukaryota

- **RVA**
  - Yeast Labs LLC

- **Milk the Funk wiki**

- **The Yeast Bay**

- **Bootleg Biology**

- **Biography**
- **Purpose of an Acid Beer**
- **Brewing an Acid Beer**
- **Maintain an Acid Beer**
- **Blend an Acid Beer**
Brettanomyces

- Yeast (not a bacteria)
- More complex than Saccharomyces
- If oxygen is present (aerobic), produce acid (acetic, citric)
- If oxygen is not present (anaerobic), can still ferment
- Does not need to metabolize sugars/carbohydrates to produce new flavors.
- Long-term flavors depend on existing precursors
- Contain enzymes that can breakdown complex carbohydrates
- Forms a pellicle in presence of O2
Wort Production

- No IBUs
- Pale color
- Highly fermentable
- Low to Mid Gravity
- No Boil Needed – Pasteurize ~ 180F

- Don’t Aerate
- High protein
- High starch
- Lower pH to 4.5
- Cool to 90 – 100F

Tip: Use second runnings
Maintain an Acid Beer

- Any vessel that is airtight
- Reduce headspace
- Limit tastings to avoid oxygen
- Plan blending sessions around brew sessions

Apple Juice (5-10%)
- Malolactic fermentation for greater acidity
- Maintain viability

Good General Sour Brewing Guidelines
# Blending Logistics

## Rustic Saison

<table>
<thead>
<tr>
<th>Component Name</th>
<th>Farmers Gold</th>
<th>Acid Beer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>pH</td>
<td>4.25</td>
<td>3.15</td>
</tr>
<tr>
<td>SRM</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Original Gravity</td>
<td>1.050</td>
<td>1.035</td>
</tr>
<tr>
<td>Peak Temperature</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Barrel Aged?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Final Gravity</td>
<td>1.007</td>
<td>1.002</td>
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<tr>
<td>Blend pH</td>
<td>3.89</td>
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<tr>
<td>Blend SRM</td>
<td>5</td>
<td></td>
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<tr>
<td>Blend ABV</td>
<td>5.6%</td>
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## Tart Saison

<table>
<thead>
<tr>
<th>Component Name</th>
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<th>Acid Beer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>2.5</td>
<td>1</td>
</tr>
<tr>
<td>pH</td>
<td>4.25</td>
<td>3.15</td>
</tr>
<tr>
<td>SRM</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Original Gravity</td>
<td>1.050</td>
<td>1.035</td>
</tr>
<tr>
<td>Peak Temperature</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Barrel Aged?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Final Gravity</td>
<td>1.007</td>
<td>1.002</td>
</tr>
<tr>
<td>Blend pH</td>
<td>3.62</td>
<td></td>
</tr>
<tr>
<td>Blend SRM</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Blend ABV</td>
<td>5.3%</td>
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</tr>
</tbody>
</table>

## Sour Saison

<table>
<thead>
<tr>
<th>Component Name</th>
<th>Farmers Gold</th>
<th>Acid Beer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>pH</td>
<td>4.25</td>
<td>3.15</td>
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<tr>
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<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Original Gravity</td>
<td>1.050</td>
<td>1.035</td>
</tr>
<tr>
<td>Peak Temperature</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Barrel Aged?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Final Gravity</td>
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<td>1.002</td>
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<tr>
<td>Blend pH</td>
<td>3.42</td>
<td></td>
</tr>
<tr>
<td>Blend SRM</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Blend ABV</td>
<td>5.0%</td>
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</tbody>
</table>

Blending Calculator Available Online
(Based on Mad Fermentationist Original Version)
Blend with an Acid Beer

Acid Beer is the Salt of the Sour Blending World

The best sour beer is only capable with blending Process (Team Based):

1. Taste focus beer you want to perfect
2. Get vision for the final beer
3. Gather sensory and data on possible components
4. Set flavor targets and use measurements to get you close
5. Cool/Carb Blends – Tweak if needed

Practical Blending and Post-Fermentation Adjustments for the Homebrewer

Friday, June 12 | 10:15 am – 11:15 am
Blending Examples

Rustic Farmhouse beers
- Tartness helps increase drinkability
- Controlled Brett flavors

Long term aging beers
- Lower pH can bring new flavors out

Quick Oud Bruin
- Acid beer + Belgian Dubbel/Quad
- Control acidity

Fruited Beers
- Color stability
- Enhances fruit impact

Guinness
- Heightens yeast esters
Acknowledgements:
- Curtis and Liz Chism
- Matt Humbard
- Michael Tonsmeire
- Milk the Funk Facebook Group