Yeast 201

Stressin ‘bout yeast

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Yeast 101 Review

- One of 4 major ingredients in beer
- Yeast is a living organism
- Yeast consumes sugars to convert it into alcohol, CO_2, and other compounds
- Yeast is classified as part of the fungus kingdom
- Yeast can create unwanted off-flavors like Fusel Alcohols, Diacetyl, DMS, and Phenolic Compounds
- Fermentation Timeline

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Fermentation Timeline

- Lag Phase
  - 0- 15 Hours after pitching yeast
- Growth Phase
  - 4 Hours – 4 Days
- Stationary Phase
  - 3 – 10 Days

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Why do we want to keep our yeast happy?

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Environmental factors that can affect yeast

- Pressure
- Aeration
- Pitch Rate
- Temperature

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Do you feel the Pressure?

- What is pressurized fermentation
- How do you ferment under pressure
- Advantages of fermenting under pressure
  - No chance of Oxidation
  - Faster Fermentation
  - Reduces chances of off-flavors
- Downsides of fermenting under pressure
  - Higher pressure reduces yeast cell division (Less Growth)
- Some yeast like it some don’t

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Aeration

- Yeast need oxygen for reproduction
- Lack of dissolved oxygen causes many fermentation problems
  - Stuck Fermentation
  - Long Fermentation times
  - Underattenuated beers
  - Stress and off-flavors
  - Lower Viability in the next generation
- The proper amount of dissolved oxygen is 8 to 10 ppm for average wort and pitching rates
- For high-gravity beers, adding a second dose of oxygen between 12 and 18 hours can help fermentation speed and attenuation.
- How do you aerate your wort?

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Aeration Chart

White Labs ran an experiment injecting pure oxygen into 5.3 gallons (20 L) of 1.077 wort using a 0.5 micron stainless steel sintered stone and the flow rate of 1 liter per minute.

Method of Aeration	Observed O_2 PPM
Shaking, 5 minutes	2.71 ppm
30 seconds, pure 0_2	5.12 ppm
60 seconds, pure 0_2	9.20 ppm
120 seconds, pure 0_2	14.08 ppm

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Pitch Rate

- What is the average pitch rate?
  - Ales Yeast - Cells to pitch = (.75 million) X (milliliters of wort) x (Degrees Plato of the wort)
  - Lagers Yeast - Cells to pitch = (1.5 million) X (milliliters of wort) x (Degrees Plato of the wort)
  - Example (750,000) X (20,000) X (11) = 165,000,000,000
- Under Pitching vs Over Pitching
- How do you increase your yeast pitch rate?

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Temperature

- Exothermic
- Typical Fermentation Temperatures
  - Ales 55°F – 70°F
    - Kveik Yeast 77°F - 104°F
  - Lagers 40°F – 54°F
- Cold vs Warm Fermentation
- How do you control fermentation temperature

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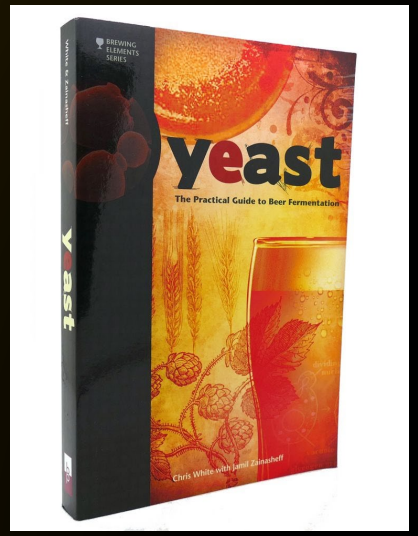
Review – How can we keep our yeast happy?

- Pressure
- Aeration
- Yeast Pitch Rate
- Temperature

- Yeast the Book



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Questions?

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Brewing Temperature Experiment

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Hefeweizen

- Recipe for 5.5 Gallon Batch
  - 6lbs White Wheat Malt
  - 4lbs Pilsner Malt
  - 4oz Melanoidin Malt
  - 0.5oz Tettnang @60 min
  - 1 oz Tettnang @ 10 min

- 1.052 OG
- 1.011 FG

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Hefeweizen

White Labs WLP300 - Hefeweizen Ale Yeast

- Attenuation: 72% - 76%
- Flocculation: Low
- Fermentation Temp: 68 º - 72º

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Fermentation Comparison

Warm 74°F

- Day 1 – 74° - Lag Phase
- Day 2 – 74° - Growth Phase – High Krausen
- Day 3 – 74° - BLOWOUT!!
- Day 4 – 74° - Slowing Down
- Day 5 – 74° - Stationary Phase - Low Activity
- Day 6 – 74° - Low Activity
- Day 7 – 74° - No Activity

Cold 63°F

- Day 1 – 65° - Lag Phase
- Day 2 – 62° - Little Activity
- Day 3 – 64° - Growth Phase - High Krausen
- Day 4 – 64° - Almost Blew
- Day 5 – 62° - Stationary Phase - Low Activity
- Day 6 – 62° - Low Activity
- Day 7 - 61° - No Activity

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Can you taste a difference?

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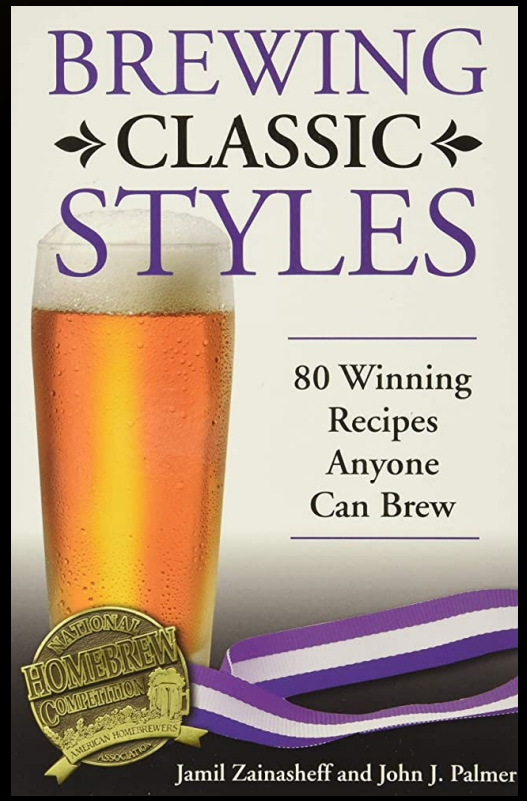
Can’t Stand The Heat - Kölsch

Basic Kolsch Recipe

- 95% Pilsener Malt
- 5% Vienna Malt
- 24 IBU Hallertauer Mittelfrueh – 60 min
- German Ale / Kolsch (White Labs WLP029)

- OG 1.046
- FG 1.006



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Can’t Stand The Heat - Kölsch

White Labs WLP029 – German / Kölch Ale

- Attenuation: 72% - 78%
- Flocculation: Medium
- Fermentation Temp: 65 º - 69º

Alternate Yeasts

- Wyeast 2565
- Fermentis Safale US-05

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Can’t Stand The Heat - Kölsch

Warm Fermentation

- Fermentation Temp: 75 º
- Sous Vide water bath for temperature control

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Can’t Stand The Heat - Kölsch

Cool Fermentation

- Fermentation Temp: 65 º
- Fermentation chamber (freezer) with temperature control

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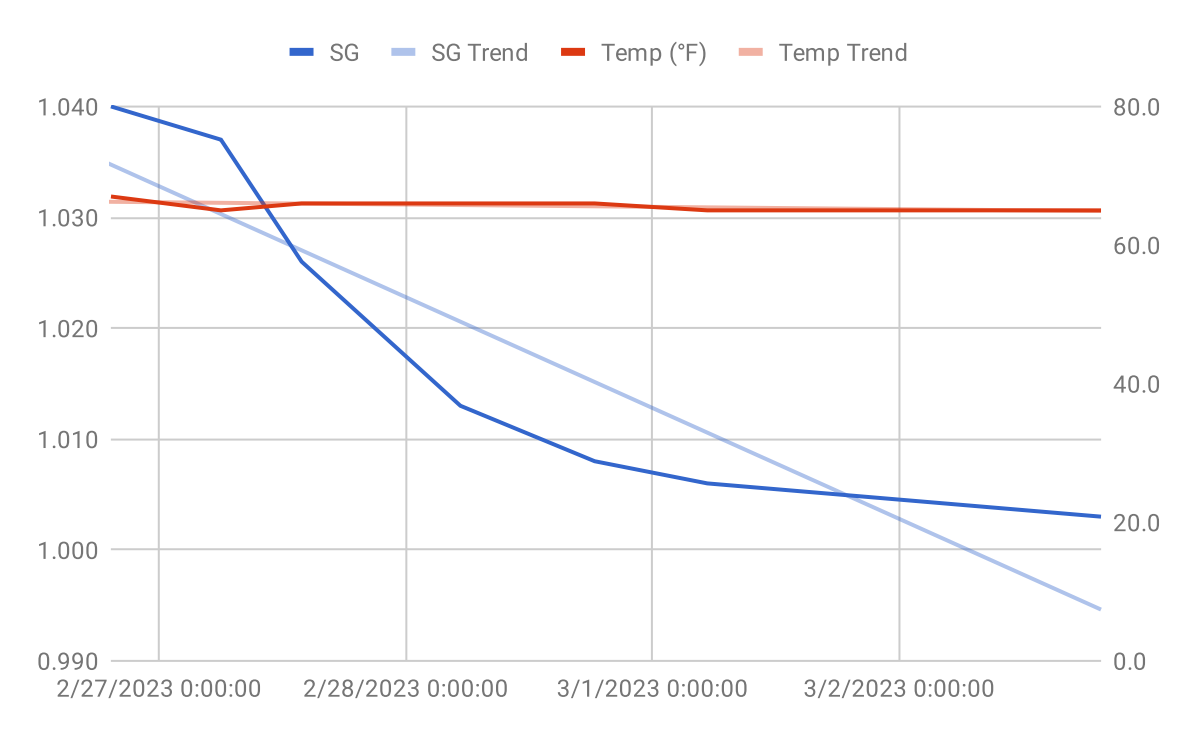
Can’t Stand The Heat - Kölsch



Cool Fermentation

- Fermentation Temp: 65 º
- Fermentation chamber (freezer) with temperature control

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Can you taste a difference?

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Thank You!

April

- Happy Hour - April 20th 5 PM @ Fibonacci Brewing Company
- Weeks Black IPA w/ Spruce Tips Release Party – April 21st 5PM @West Side Brewing
- Commercial Calibration - April 26th 8 PM

May

- BIG Brew Day – May 6th 8 AM @ MBW High Street
- Happy Hour – May 18th 5PM @ Northwood Cider Company
- Monthly Meeting – May 21st 7PM @ MBW Champion Mill
- Commercial Calibration – May 24th 8 PM

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