

GROWING HARVESTING AND PITCHING YEAST

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Growing Yeast

- ◎ Healthy yeast is the goal
 - Lots of weak yeast will not ferment the same as fewer healthy cells
- ◎ Ideally, start with a fresh culture
 - Plate, slant, vial or smack pack
 - Known stock, less chance of mutation
- ◎ Sanitation, careful handling
 - Watch drafts, dust, exposure to non-sanitized equipment
 - Critical, otherwise just buy more yeast

Growing Yeast

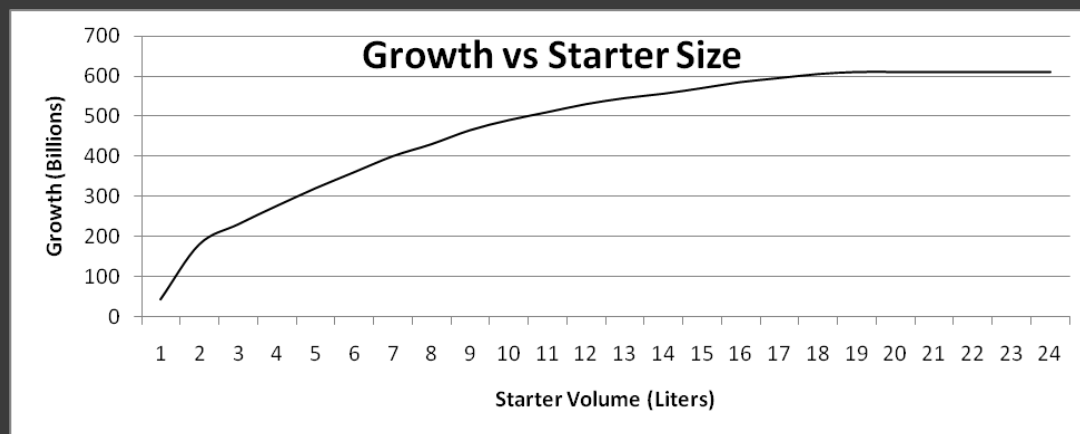
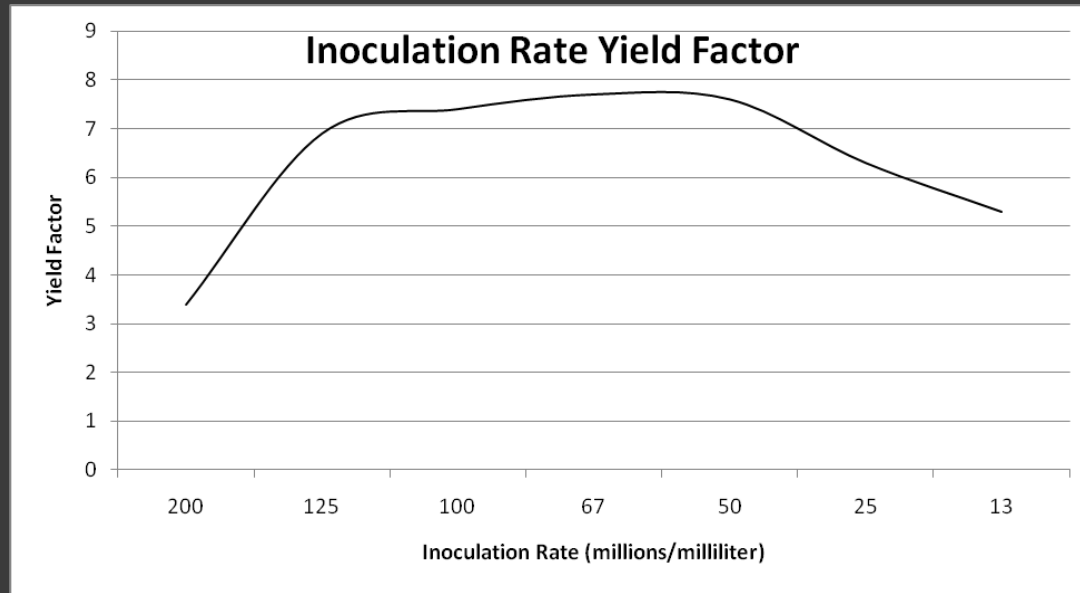
◎ Starter wort

- 5 – 10 °P (~1.020 – 1.040)
- Higher gravity harder on yeast
- No hops
- Nutrient that includes zinc
- O₂, well mixed, low CO₂, warm

◎ Starter volume

- Depends on size of culture
- Growth about 3 to 4 times, regardless of unlimited volume
- Yield factor, ideally balance handling with efficient growth

Yield Factor



Growing Yeast

⦿ Temperatures

- 65 °F (18 °C) – 75 °F (24 °C) for ale & lager
- Excessively warm can result in rapid growth but also weak cell membranes
- Pitching starter at high kräusen, keep starter within 5 – 10 °F (3 – 6 °C)
- Avoid rapid, large swings in temperature

Growing Yeast

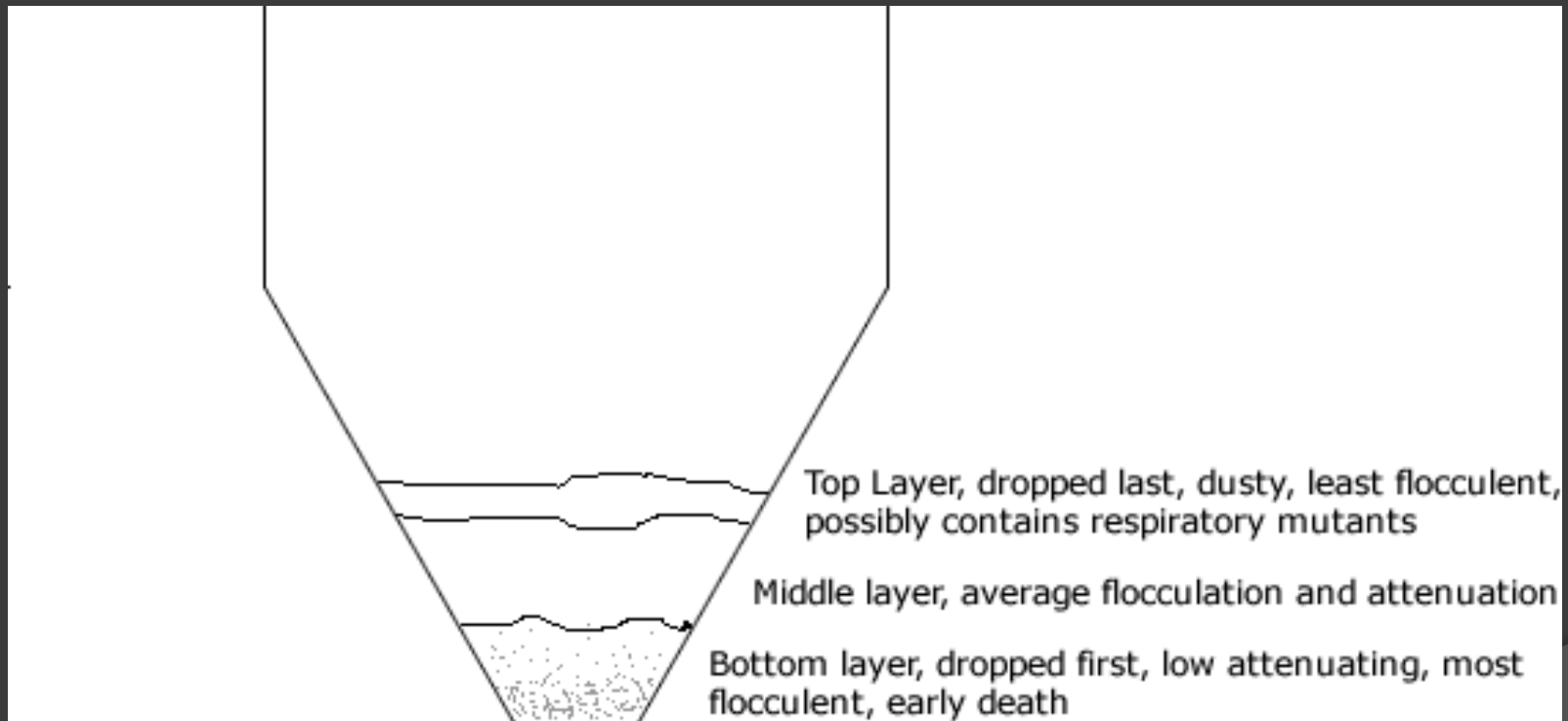
⦿ Timing

- Start a few days early
- Growth usually complete within 12 – 18 hours, depending on several factors
- Allowing the yeast to sit for 8 hours at temperature after complete allows them to build reserves
- Otherwise pitch at high kräusen
 - Limit to 5% of volume

Harvesting Yeast

- ◎ Healthy yeast from your beer?
 - Sometimes, chose healthiest fermentation
 - Initial health, mutations
 - Fermentation conditions
 - Sanitary methods
 - Not the entire yeast cake
- ◎ Timing
 - Too early, too late
 - Secondary
 - Top Cropping

Harvesting the Best Yeast



Homebrew Top Cropping



Harvesting Yeast

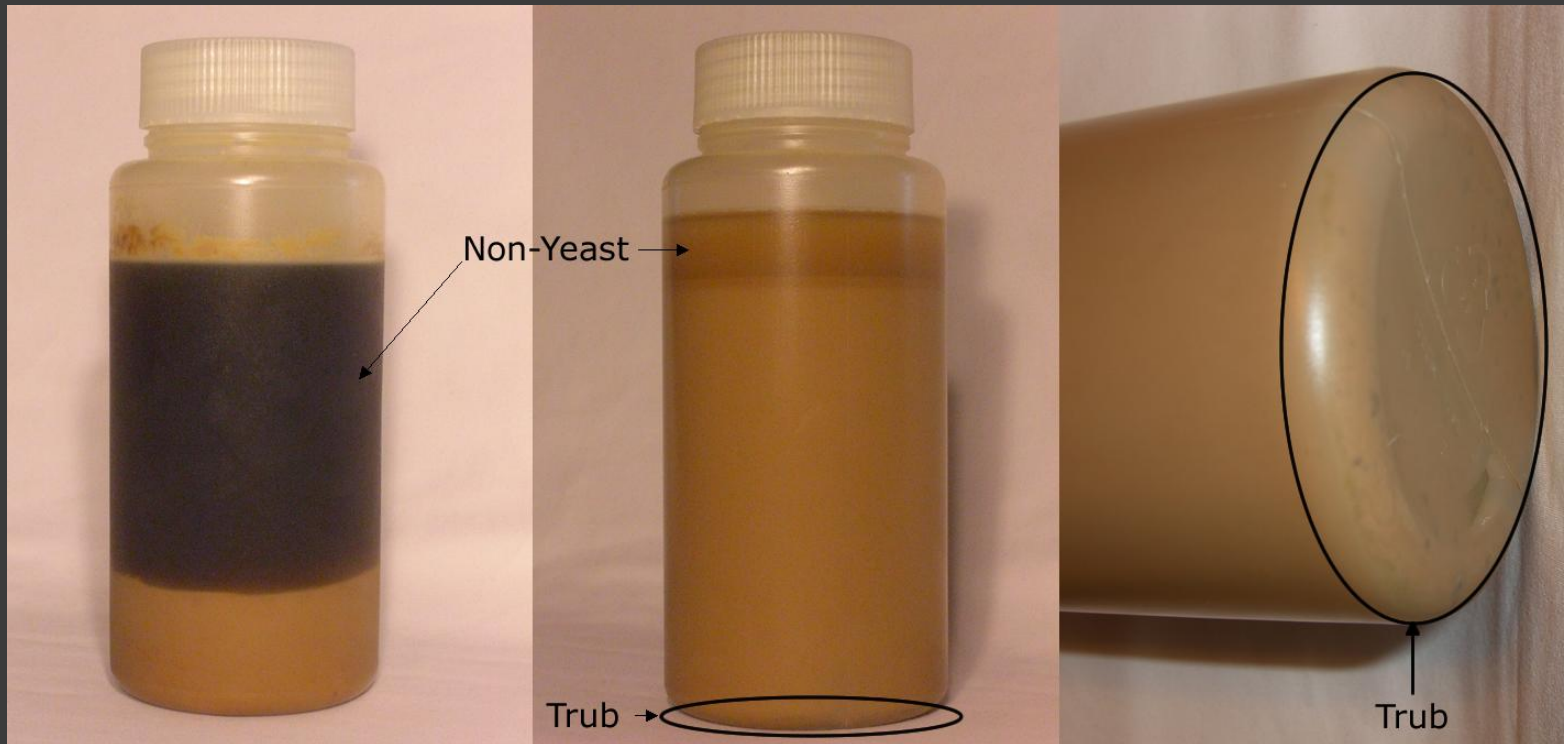
⦿ Storage

- Low temp
- Low pressure
- Short time
- Stirring? Feeding?

⦿ Cleaning

- Washing vs rinsing
- Harvesting clean yeast

Rinsing Yeast



How Much Yeast

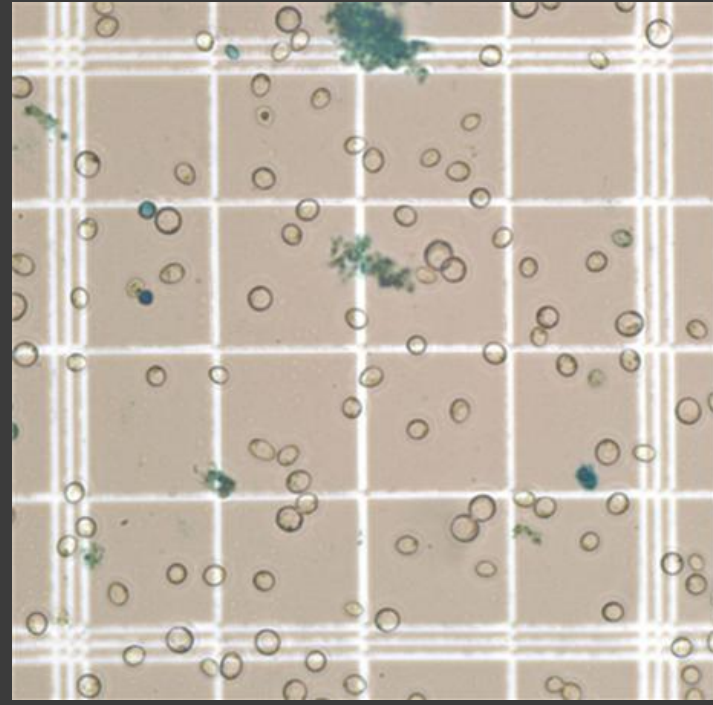
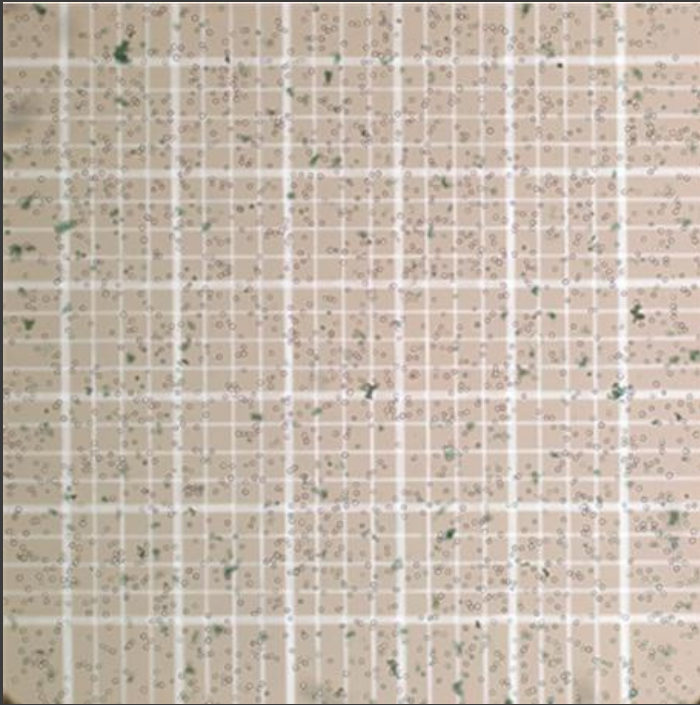
◎ Pitching rates

- (pitching rate) X (ml wort) X (°P) = cells needed
 - Ales 0.75 million/°P /ml
 - Lagers 1.5 million/°P /ml
- Depends on the beer, yeast, desired results
 - British ales, hefe, Belgian, lager
- www.mrmalty.com
- Start with a rate, be consistent, adjust from there
- Without consistency, you can't make intelligent change
- The number that gives you the best result is the right number

Measuring Yeast

- ⦿ Can't be consistent without measuring
 - Yeast can be tricky to measure
 - Clumping
 - Dilution makes it easier
 - Must be precise in dilution
- ⦿ Need to determine density first
 - Small errors in density are multiplied
 - Microscope & hemocytometer
 - Visually
 - Comparison with a known quantity
 - Vial: packed=8B, shaken=3B, add water for other values
 - Visually hazy
 - 13x100 mm glass tube $<10^6$ /ml is not visibly turbid
 - $> 10^6$ /ml is visibly cloudy

Hemocytometer View



Measuring Yeast

- Once density is known, you can measure
- By weight
 - 100 billion cells weighs ~8 grams, sans water and non-yeast
 - Need to know density of slurry
 - Repeatable when you have consistent trub and water
 - Better with larger volumes of yeast
- By volume
 - Graduated cylinder or other
 - Pumping
 - Other fancy gear

Pitching Yeast

- ◎ Sanitary
- ◎ Nutrition (zinc, oxygen, etc)
- ◎ Temperature
 - Too quick on cooling, dormancy
 - Very rapid cooling or heating, HSP
 - First 72 hours very important for flavor development
 - Temperature control is key
 - Start slightly low, raise several degrees F for the last 1/3 – 1/4 of fermentation

Q&A

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