

Fermentation MYTHBUSTERS

Neva Parker
Head of Laboratory Operations





Goals for Today

Let's clarify facts on:

Yeast physiology & storage

Yeast Starters & pitch rates

Fermentation





POP QUIZ!

Truth or Myth

1. If my yeast looks congealed, it has gone bad
2. I forgot to refrigerate my yeast so it is probably dead
3. I can freeze yeast at home
4. I can pitch a vial of yeast without a starter
5. I am propagating a lot of new yeast when I make a starter



POP QUIZ!

Truth or Myth

6. It is always better to err on the safe side and over-pitch rather than under-pitch
7. I shouldn't use an airlock when I make a starter
8. Even if I don't see krausen in my starter, I am still getting growth
9. Oxygen or air after fermentation has begun is bad for the beer
10. A secondary fermentation is always important to final beer

Truth or Myth?

If my yeast looks congealed, it has gone bad

MYTH





Let's talk about yeast baby

My yeast looks dark

My yeast smells sour

My yeast is gushing when I open the container





Truth or Myth?

I forgot to refrigerate my yeast so it is probably dead

MYTH

- Yeast are hardy
- Revitalization study:

Yeast kept at room temperature for 3 months

Used to brew beer

Did it work?

YOU BET!



Truth or Myth?

I can freeze yeast at home

TRUTH

Some considerations:

Use freshly propagated yeast

Store yeast as cold as possible: -20C

Use a cryoprotectant – glycerol, 15%

Non-frost free freezer (thawing and freezing)





Truth or Myth?

I can pitch a vial of yeast without a starter

TRUTH

Why does it work?

- Usually longer lag
- Laboratory-grown cultures
 - High sterol content
 - Healthy cell walls
 - Low-stress



Truth or Myth?

I am propagating a **MYTH** of new yeast when I make a starter

Starter Size	Original Cell Count	24 Hour Cell Count	48 Hour Cell Count
1L	52.2×10^6	64×10^6	73×10^6
2L	24.1×10^6	72×10^6	84×10^6

Cell count reported per ml

One vial of yeast from same lot

1.032 starting gravity

Flasks placed on shaker



Let's talk propagation...briefly

Growth Rate for 1L Starter: **Yield Factor 3**

Growth Rate for 2L Starter: **Yield Factor 9**

Growth Rate for fermentation: **Yield Factor 5-6**

Growth Rate for Typical Yeast Propagation: **Yield Factor 15-20**

Calculation: $\{(Final\ cell\ count - original\ cell\ count) / Change\ in\ Gravity\} / 10^6$



Why make a starter at all?

Increase yeast activity, shorten lag

High gravity beers

Yeast is close to expiration or is old





Truth or Myth?

It is always better to err on the safe side and over-pitch rather than under-pitch

Its more important to pitch the correct amount

1 million cells/ml/P?

- Re-pitching rates
- Commercial breweries handling yeast a lot
- Out-compete micro-organisms

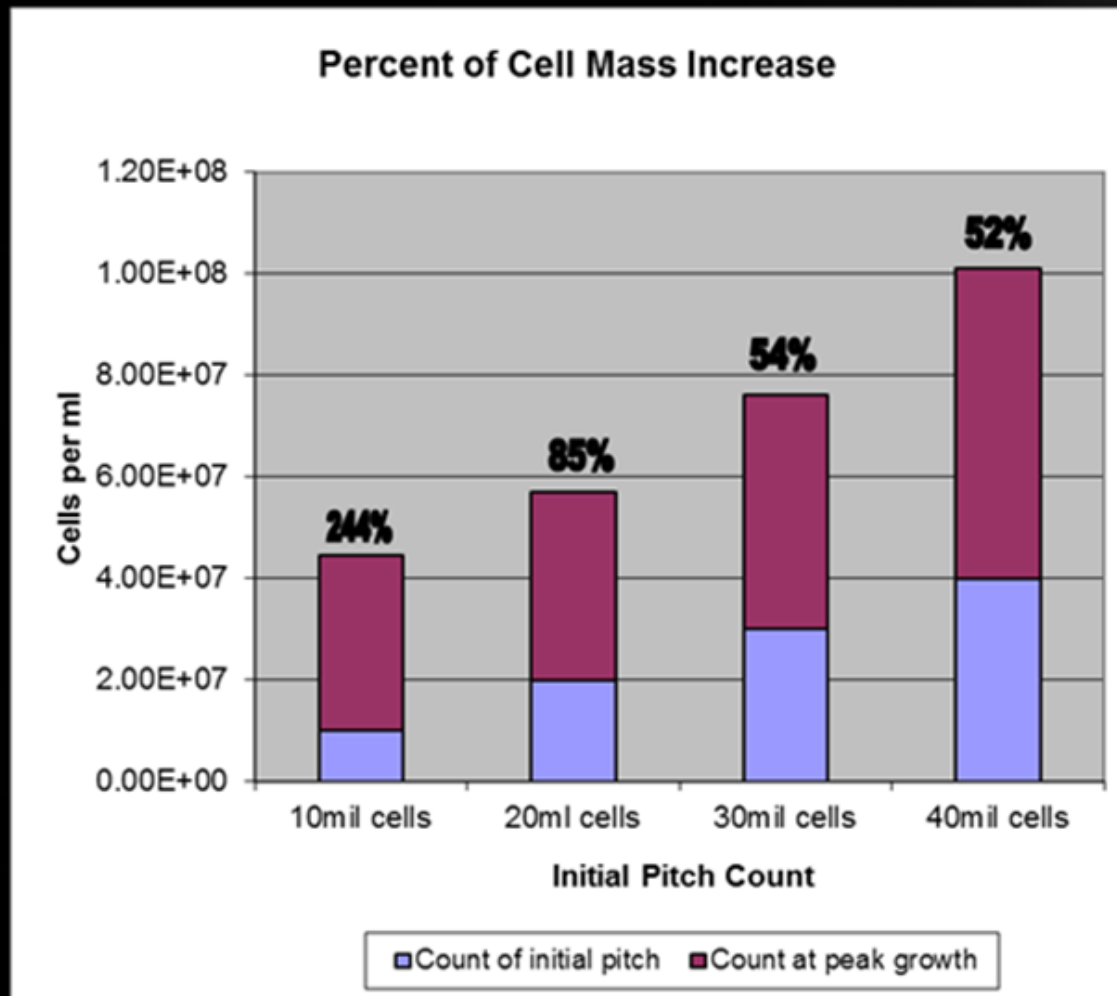


Let's talk about pitching rate

	10mil cells	20ml cells	30mil cells	40mil cells
Initial Gravity	18.7	18.7	18.7	18.7
	17.6	16.8	16.5	16
	13.2	12.5	12.1	12
	10.9	9.3	9.7	9.8
	9.1	8.7	8	8.2
	7.3	6.8	6.6	6.6
	5.9	5.9	5.8	5.8
Final Gravity	4.7	4.8	5.1	4.9



Let's talk about pitching rate





Let's talk about pitching rate



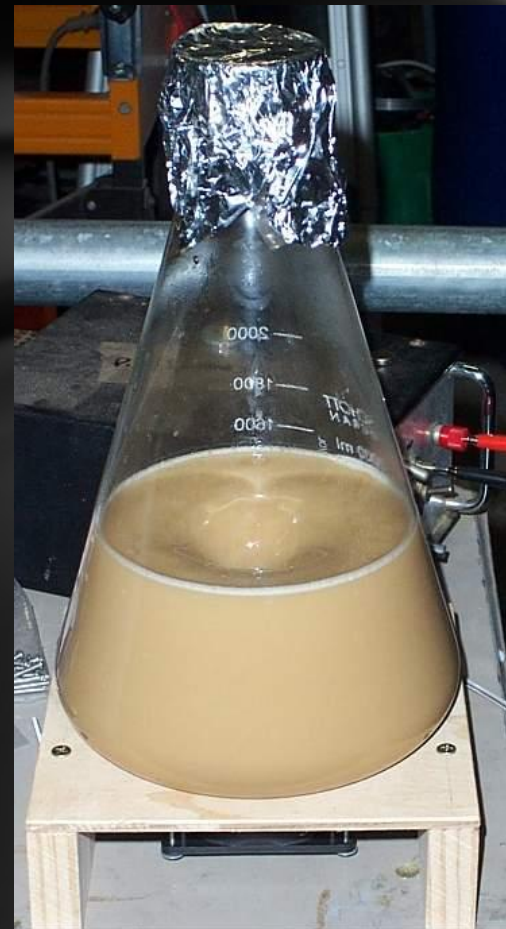


Truth or Myth?

I shouldn't use an airlock when I make a starter

MYTH

While not necessary, its okay to do





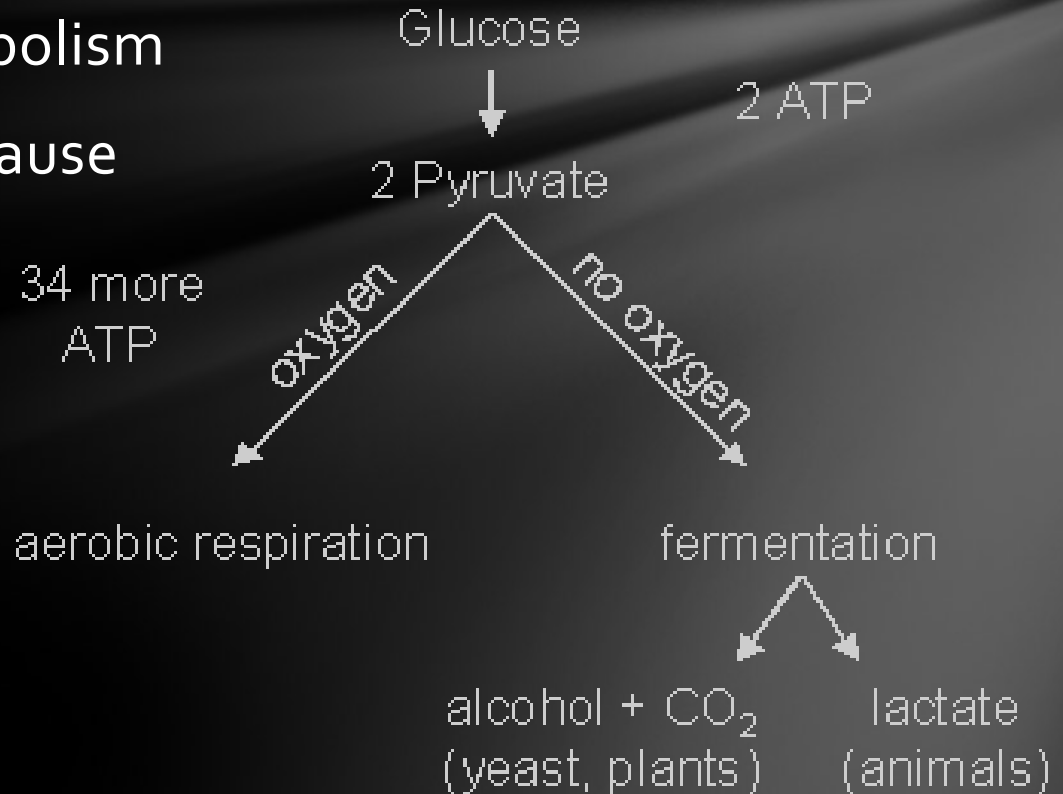
Truth or Myth?

Even if I don't see krausen in my starter, I am still getting growth

TRUTH

Aerobic vs. Anaerobic Metabolism

Less blow-off from CO₂ because cells are respirating





Truth or Myth?

Oxygen or air after fermentation has begun is bad for the beer

MYTH

Can help restart a sluggish fermentation

When is it okay to add oxygen, not okay?

Rule of thumb:

If gravity is over half of original, it is probably okay to oxygenate



A little more about oxygen

Potential flavor impacts from oxygen



Acetaldehyde production



Fusel alcohol production



Ester production



Truth or Myth?

A secondary fermentation is always important to final beer

MYTH

Why do it? More transfers, handling, risk for contamination

Can cause stuck fermentation if flocculent yeasts are left behind





Secondary fermentation

Yeast health? Off-flavors from yeast?

Biggest factor affecting yeast health at the end of fermentation

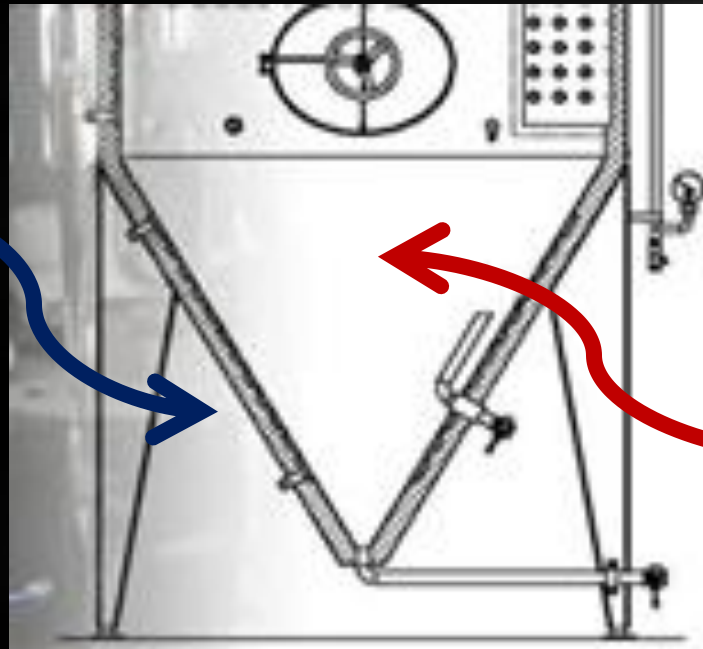
TEMPERATURE



Secondary fermentation

Commercial breweries – large conical fermentors

35°F



45°F!!

This causes viability decline and deterioration



Secondary fermentation

Most homebrew



Yeast is spread out and does not hold heat, stays healthy longer



What have we learned today?

Thank You!

QUESTIONS?

Neva Parker
Head of Laboratory Operations
nparker@whitelabs.com

