

Yeast Handling, Storage, & Maintenance

Kara Taylor

Technical Laboratory Manager

White Labs, San Diego CA

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Yeast Handling – What Do We Mean?

Best practices for working with yeast

- Maintaining a pure culture
 - Avoiding contamination by bacteria, wild yeast, or cross-contamination of brewing strains
- Maintaining a healthy culture
- Minimizing stress to yeast

How Use Liquid Yeast Multiple Times?



How Many Strains?

How Many Generations?

How Collect and Re-Use?

How Keep it Healthy and Clean?

Do I Need a Lab?

Yeast Maintenance

Consistent pitch rate

- Fermentation speed
- Flavor profile
- Identification of problems early

Pitch the right amount of yeast for your beer!
Weight, volume, % yeast solids

Yeast Maintenance

Re-pitching yeast – what to expect

- How many generations? – conditions & strain
 - Ales: 8-10
 - Lagers: 3-5
 - Wheat & Belgian: 3 or less
- First generation vs. later generations – why the differences?

Yeast Collection & Harvesting



Yeast Collection & Harvesting

- Generally, at end of fermentation, within 1-2 days of FG
- Hazy and highly hopped beers-
 - Pre-dry hop
 - If harvesting before terminal may experience low yield
- Low flocculant strains
 - Hefe and Belgian strains
 - Using aides like added pressure (5 psi head pressure) to help encourage flocculation
 - Agents like Biofine

Yeast Collection & Harvesting

How should yeast be collected?

Top Cropping

Benefits

- Yeast rises at a time of high vitality and viability
- Free from trub – better shelf life
- Faster turnaround time for yeast collection

Disadvantages

- Beer & yeast are exposed to environment

Yeast Collection & Harvesting

How should yeast be collected?

Top Cropping – Best practices

More flocculent yeast = better top croppers

- Timing – 48-72 hours
- Location – past first layer (protein)
- Skim yeast with a paddle, shovel, or bucket which can be sterilized (stainless steel)

Yeast Collection & Harvesting

How should yeast be collected?

Bottom Cropping

Benefits

- Equipment design lends well to bottom cropping
- Some strains can't be cropped from top

Disadvantages

- Breakdown of yeast happens faster – stress from hydrostatics, alcohol, temperature
- High percentage of trub
- Turnaround time to collect yeast is longer

Yeast Collection & Harvesting

How should yeast be collected?

Bottom Cropping – Best practices

- Timing – end of fermentation, depending on strain
 - Remove as soon as possible without risking integrity of beer
- Discard the first runnings
- Use only the middle pack

Yeast Collection & Harvesting

Stratification of yeast during collection

Beer →

Healthy yeast →

Trub and dead yeast →



Yeast Collection & Harvesting

How should yeast be collected?

Cone to cone?

Need to visually verify yeast

- Color
- Trub
- Concentration
- Contamination analysis



Aber instrument

Collection Options

Yeast Storage

Showing all 2 results



SABCO Bright – 15.5 Gal.
\$380.00



White Labs 'Ferm-Flask' by
SABCO
\$1,500.00-\$1,800.00





Smaller Scale

1) Harvest yeast

← BEER

← GOOD YEAST

← DEAD YEAST/ TRUB



2) Add sterile water and swirl

← BEER/WATER

← TRUB/DEAD YEAST

← GOOD YEAST

} POUR OFF

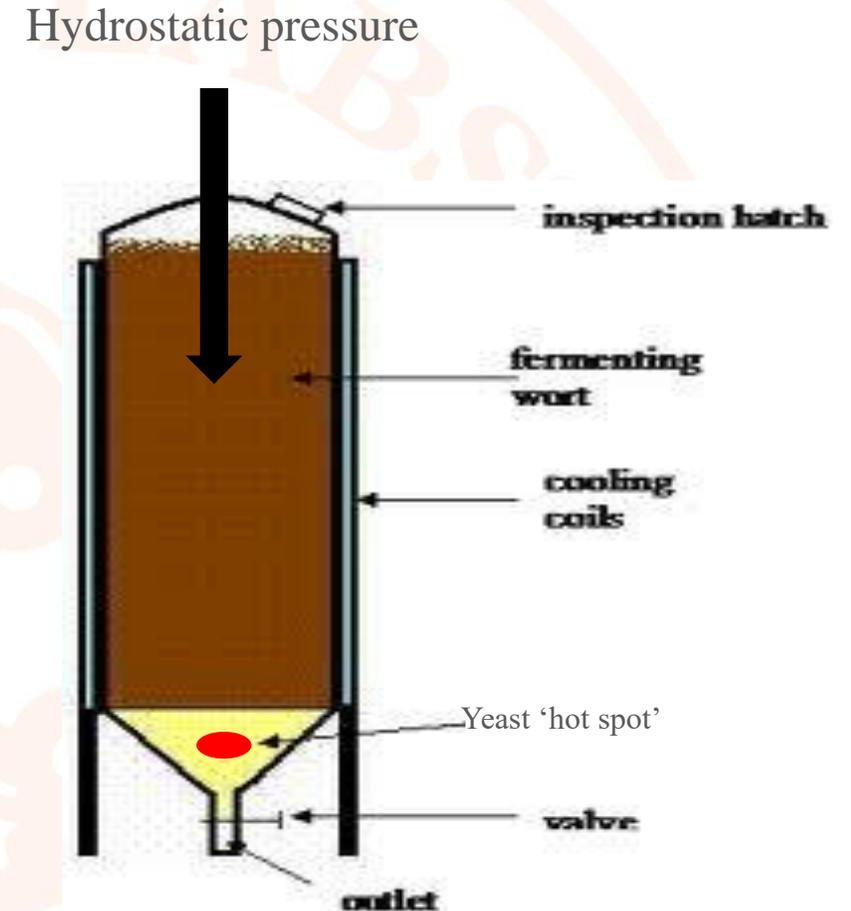
Storage

Cone storage can be stressful

- Hydrostatic pressure
- Inhospitable environment – alcohol
- Temperature in the cone

Storage Medium:

- On beer, wort, or water?
- Beer – no transfer; great short term if under 6% alcohol
- Wort – short term; carbohydrates present can be harmful
- Water – best long term solution because it's neutral



Storage

Considerations for yeast storage:

Objective:

Keep metabolic activity to an absolute minimum in order to preserve viability and vitality

1. Chilling the yeast

Chill yeast to between 2 - 4 °C

- Keep metabolic activity to an absolute minimum

If colder than 2°C

- Risk of freezing the yeast
- Irreparable cell damage and subsequent death

Storage

Considerations for yeast storage:

1. Chilling the yeast (cont'd)

If warmer than 4°C

- Alcohol toxicity
- Limited nutrients
- Depletion of glycogen
- Loss of viability / vitality

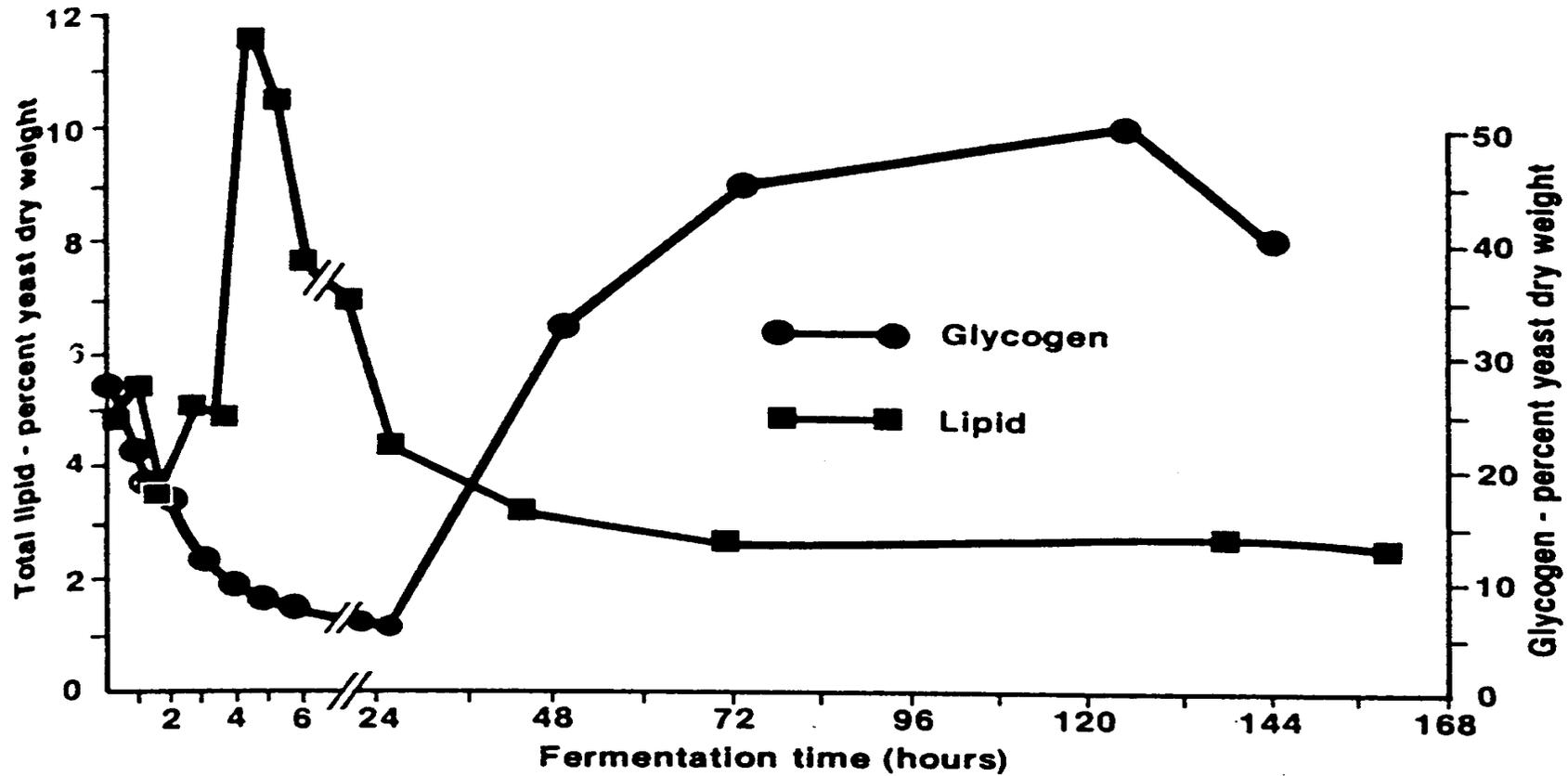
Storage

Considerations for yeast storage:

2. Glycogen and lipids

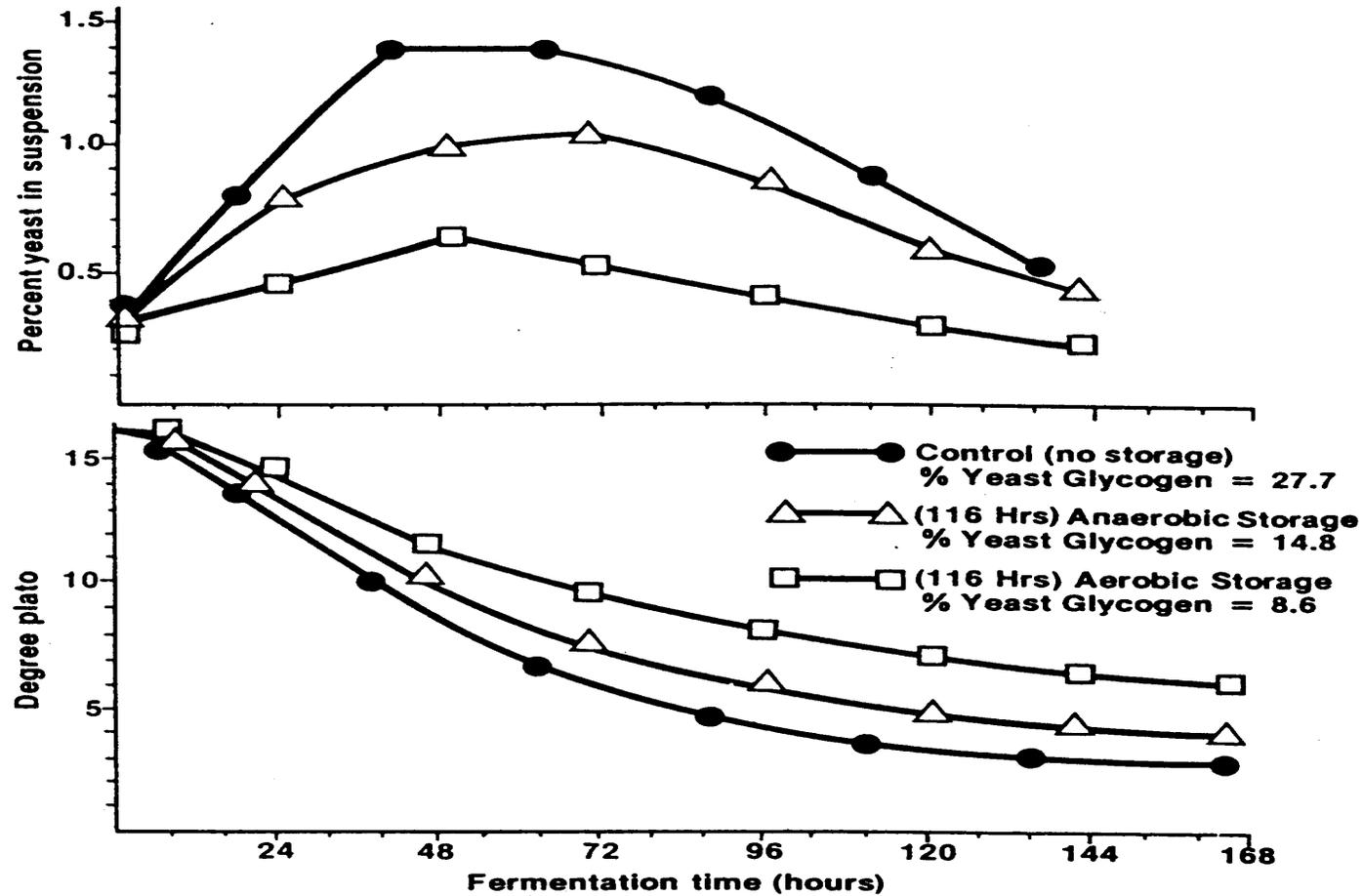
- Glycogen is the major reserve carbohydrate stored within the yeast cell.
- “Store” of to sustain the cell during periods of starvation
- In the presence of oxygen, glycogen is rapidly mobilized to fuel lipid (sterol and unsaturated fatty acids) synthesis.

Yeast Glycogen and Lipid during a 16 ° P Lager Fermentation



C.R. Murray, T. Barich and D. Taylor
MBAA Technical Quarterly, 21 (4) 1984

The Effect of Yeast Glycogen Concentration at Pitching on a 16⁰ P Lager Fermentation



C.R. Murray, T. Barich and D. Taylor
MBAA Technical Quarterly, 21 (4) 1984

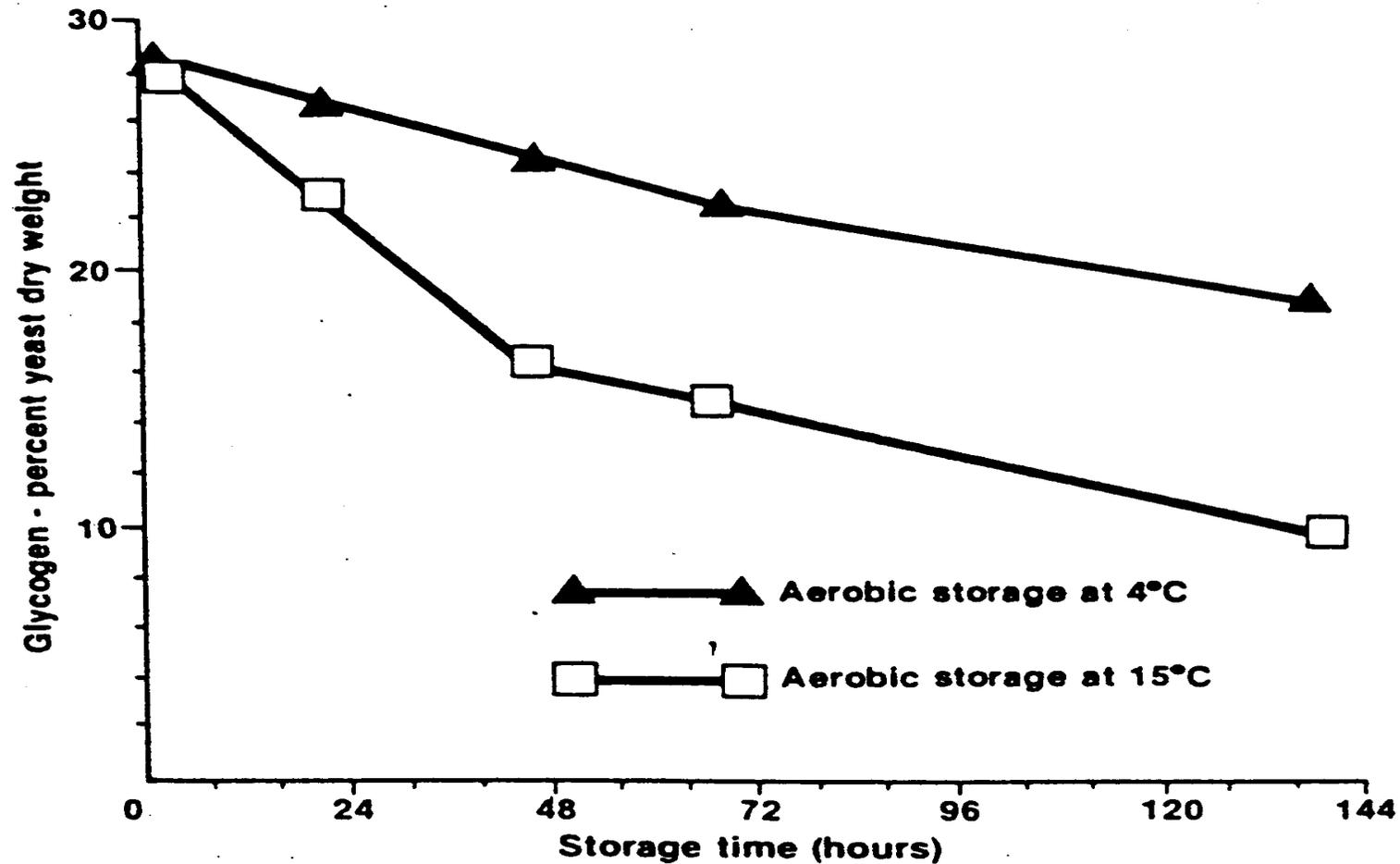
Storage

Considerations for yeast storage:

3. Temperature of storage

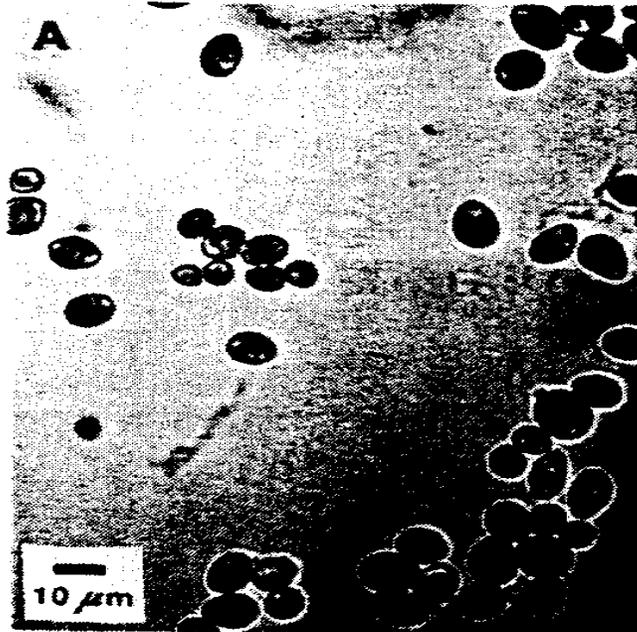
- Temperature must be maintained uniformly at $\sim 4^{\circ}\text{C}$
 - Yeast mixers - no “hot spots”
- Temperature affects glycogen storage

The Effect of Yeast Storage Time and Temperature on the Concentration of Intracellular Glycogen



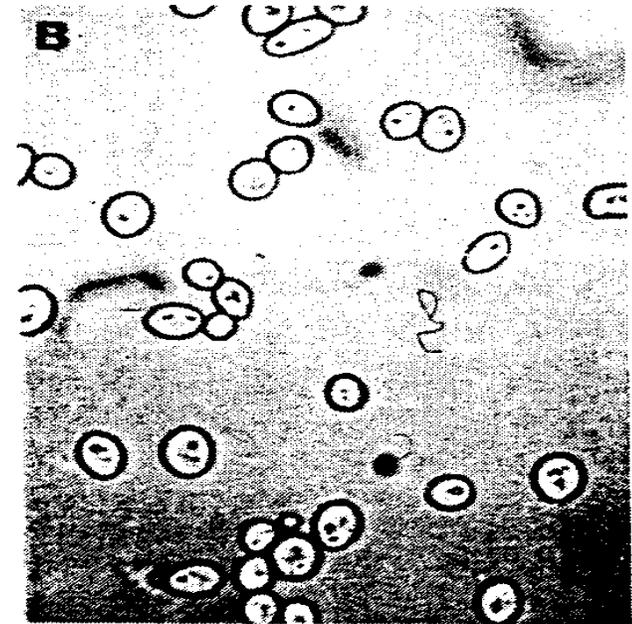
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Photomicrograph of *Saccharomyces pastorianus* stained with Lugol's iodine



Fermentation Vessel
(48 hrs)

(A) Yeast removed from a 16⁰ P Lager fermentation 48 hrs after pitching.



Storage Tank
(5 days)

(B) Yeast which has been stored aerobically at 6⁰ C for five days

Storage

Considerations for yeast storage:

5. Time

- Store yeast for as short a time as is possible
 - Recommended 1-3 days, ideally
 - Up to 2 weeks, with exceptions
- Petite mutants increase with increasing storage time
- Glycogen reserves will be slowly but surely reduced
- Ethanol stress

Storage

Considerations for yeast storage:

5. Time (cont'd)

The actual time that yeast can be stored without significant deterioration is influenced by:

- Yeast strain
- Process conditions (O.G., alcohol)
- Viability / vitality of the yeast
- Storage conditions

Storage

What can I do if I need to store it longer than recommended?

- Revitalizing, in some cases
- Best practices:
 - Feed the yeast some fresh wort to activate the cells
 - Add concentrated wort (~20P) to make up 5% of total volume of yeast/wort
 - Hold at room temp for 12 hours
 - Allow dead cells to drop to the bottom and decant the active yeast into fermentation

Summary

- Harvest yeast as soon as the bulk of the yeast has separated from the beer
- Chill rapidly to ~ 4°C and maintain that temp
- De-carbonate
- Exclude air
- Store for as short a period as possible
- Pitch accurately
- Evaluate the culture before using/reusing
- Keep it clean

Thank you for listening!
Questions?

Kara@whitelabs.com