APPLICATION DATA

# **Turbocharging alcohol production** with waste bananas

Lyte Gro

# We turn waste bananas into **microbial growth enhancers**

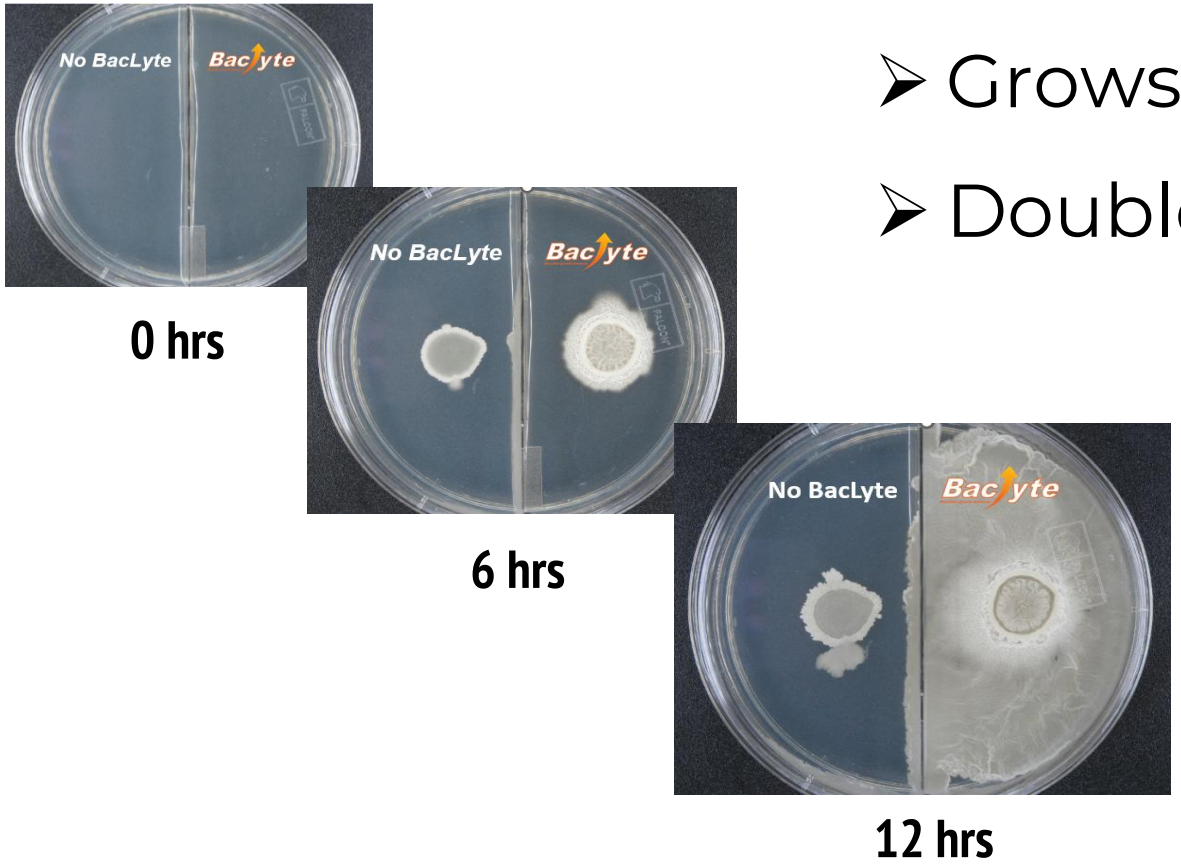
**Activity only in bananas**
80+ other plants tested

Granted US and European patents for core technology

Multiple application-specific patents pending

# BACLYTE - STEROIDS FOR MICROBES

A simple additive that promotes faster & more abundant growth




- Grows microbes faster
- Doubles number in culture

**Competition:**

- Physical expansion – costly and takes time
- Quorum Sensing Inhibitors – expensive chemicals

**BacLyte is a natural, food-grade and scalable product**

# Propagreater yeast accelerator

- Propagreater is a simple, low-tech and easy to apply product
- Requires no expensive equipment or changes to existing production protocols.
- Simple 6-hour yeast incubation step prior to the start of production fermentations
- One litre of Propagreater is required for each kilo of dried yeast used in the fermentation or it can be added at 5% v/v into a wet rolling propagation mix
- Tip the whole mix into fermentation after 6 hours
- Accelerated yeast gets going straight away

- **Reduces run time by 30-60%**
- **Increases yield by 10% - 20% (distilling)**
- **Improves organoleptic profile of alcohol**

- **Increases throughput and profitability**
- **Enables feedstock and water savings (distilling)**
- **Can increase output without CAPEX**

# Distilling Data

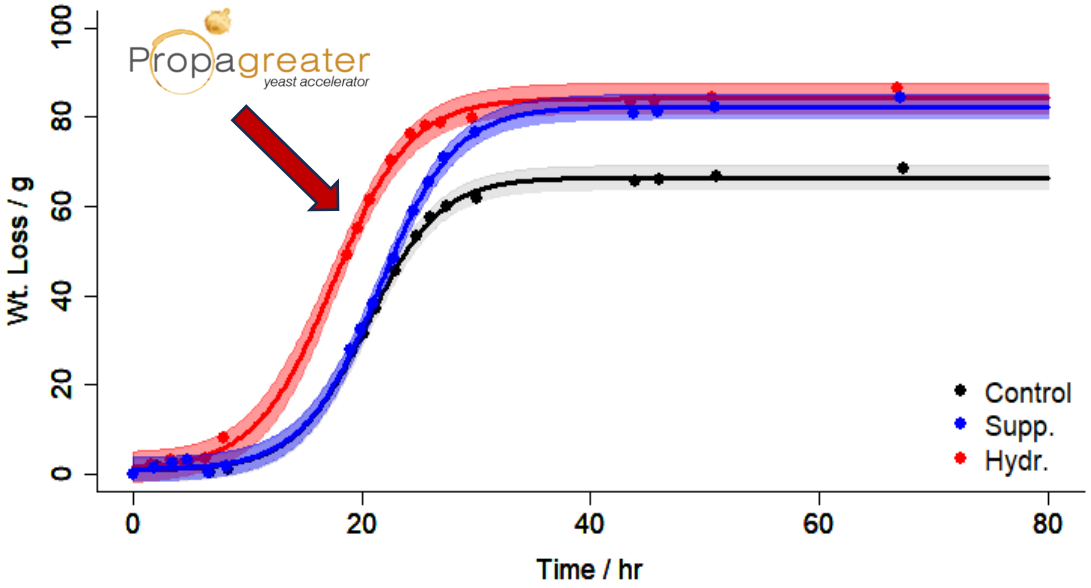
LyteGro

# Heriot Watt hydration & supplementation study

(Potato fermentation - vodka)

This study was performed as part of LyteGro's patent validation work using a potato fermentation protocol provided by Chase Distillery. The study compared the effects of direct supplementation of the fermentation with BacLyte @ 5% (Blue) vs hydration of yeast driving the fermentation for 6hrs with Propagreater (5% BacLyte plus YPD (Red)) vs a standard potato fermentation control. Weight loss has been measured as a surrogate of alcohol production.

*Fitted models of weight loss vs. fermentation time*




The model shows that supplementation of the fermentation at 5 % produces a significantly ($p < 0.05$) greater weight loss during fermentation. Supplemented fermentations lost on average 83 g during fermentation, compared with 67 g lost during the control fermentation, an average increase of 25 % in weight loss.

This result correlates well with the yield of alcohol recovered from distillate which was increased from 0.15 LPA to 0.19 LPA in "low wines" samples, an increase of 25%.

This in turn shows the supplement's ability to produce more alcohol during fermentation compared to a standard control.

Using a hydration scheme such as that outlined showed significant ($p < 0.05$) reductions in the lag phase of fermentation with an average decrease in lag time of 3.7 hr.

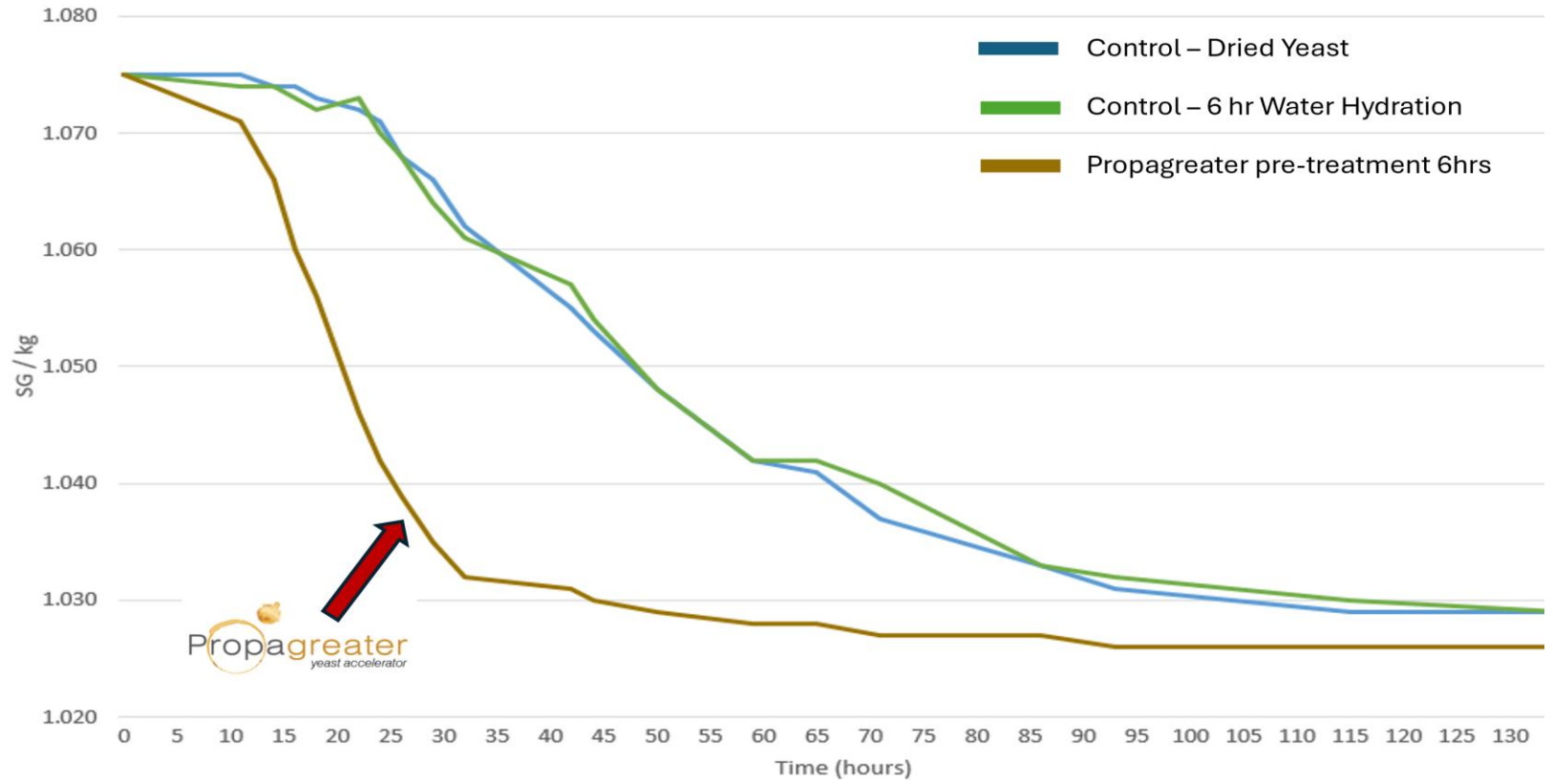
**Propagreater is a fermentation supplement which has been shown to increase the growth and efficiency of yeast metabolic processes thereby increasing the yield of ethanol during alcoholic fermentation, resulting in a 25 % increase at 5 % supplementation. Furthermore, Propagreater has also been shown to significantly ($p < 0.05$) decrease fermentation time via reduction of the lag phase of fermentation.**

*Dr Struan Reid, Dept of Brewing & Distilling, Heriot Watt, December 2019*

# The Oxford Artisan Distillery trial data

(Mixed grain - whisky)

70% rye, 20% wheat and 10% malted barley

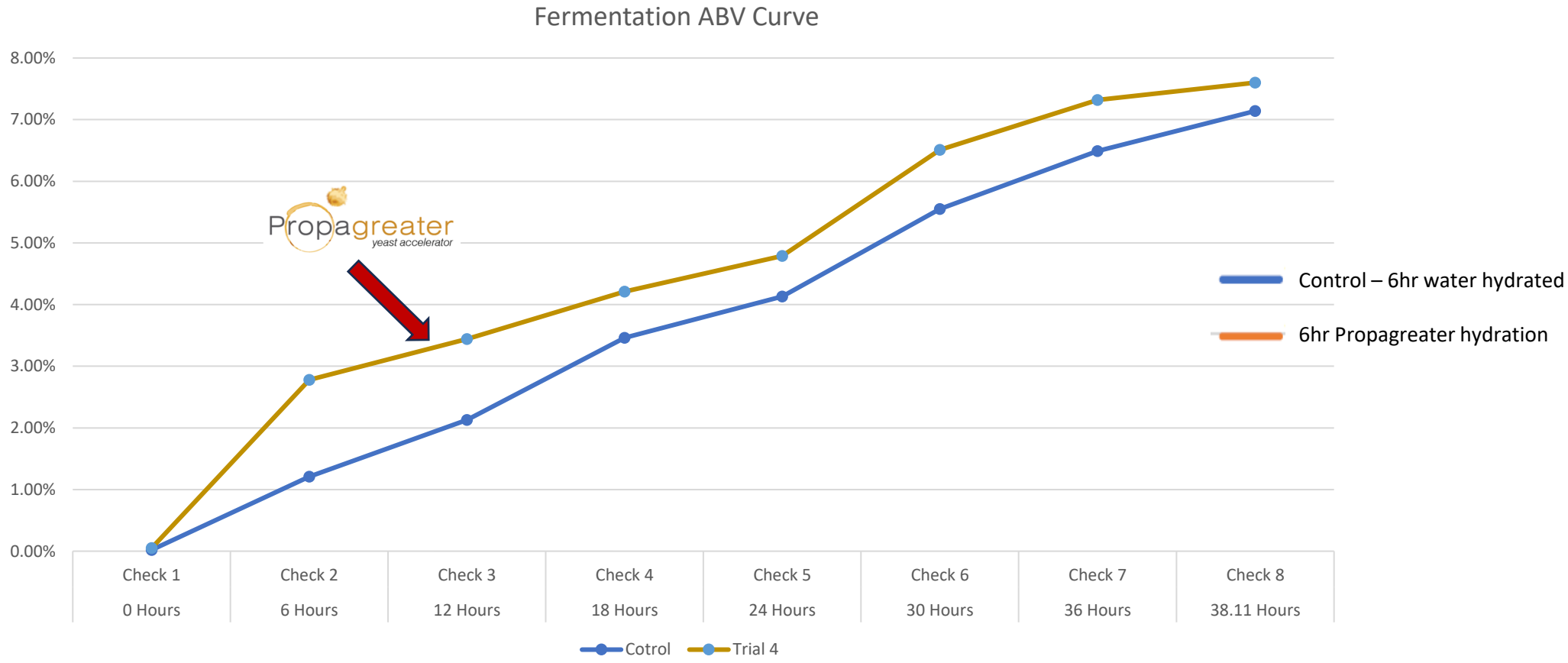



**Overall, Propagreater suggested a beneficial effect in shortening lag phase and quickly increase fermentation. Propagreater's presence in trials brought about the highest performance in fermentation speed – with 100% of the control yield produced in 30hrs rather than in 100hrs it took the control. Use of Propagreater also resulted in an increase in alcohol yield of around 10%**

Chico Flores, Head Distiller, March 2021

# Chase Distillery trial data

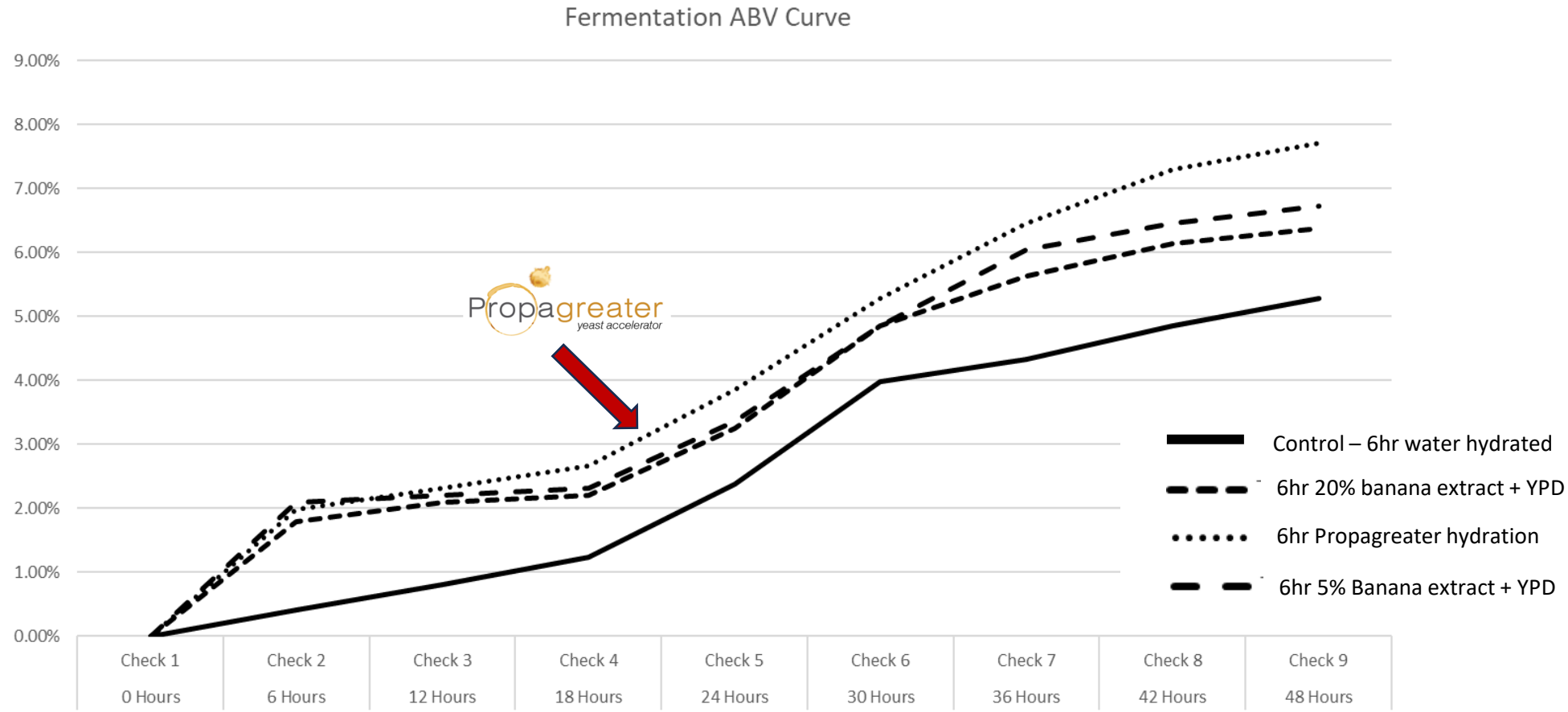
(Potato fermentation - vodka)




**Significant reduction in lag phase and acceleration of the initial fermentation rates seen with Propagreater, as well as an increased yield of around 0.6% ABV (8.5% increase) above control**

# Chase Distillery trial data

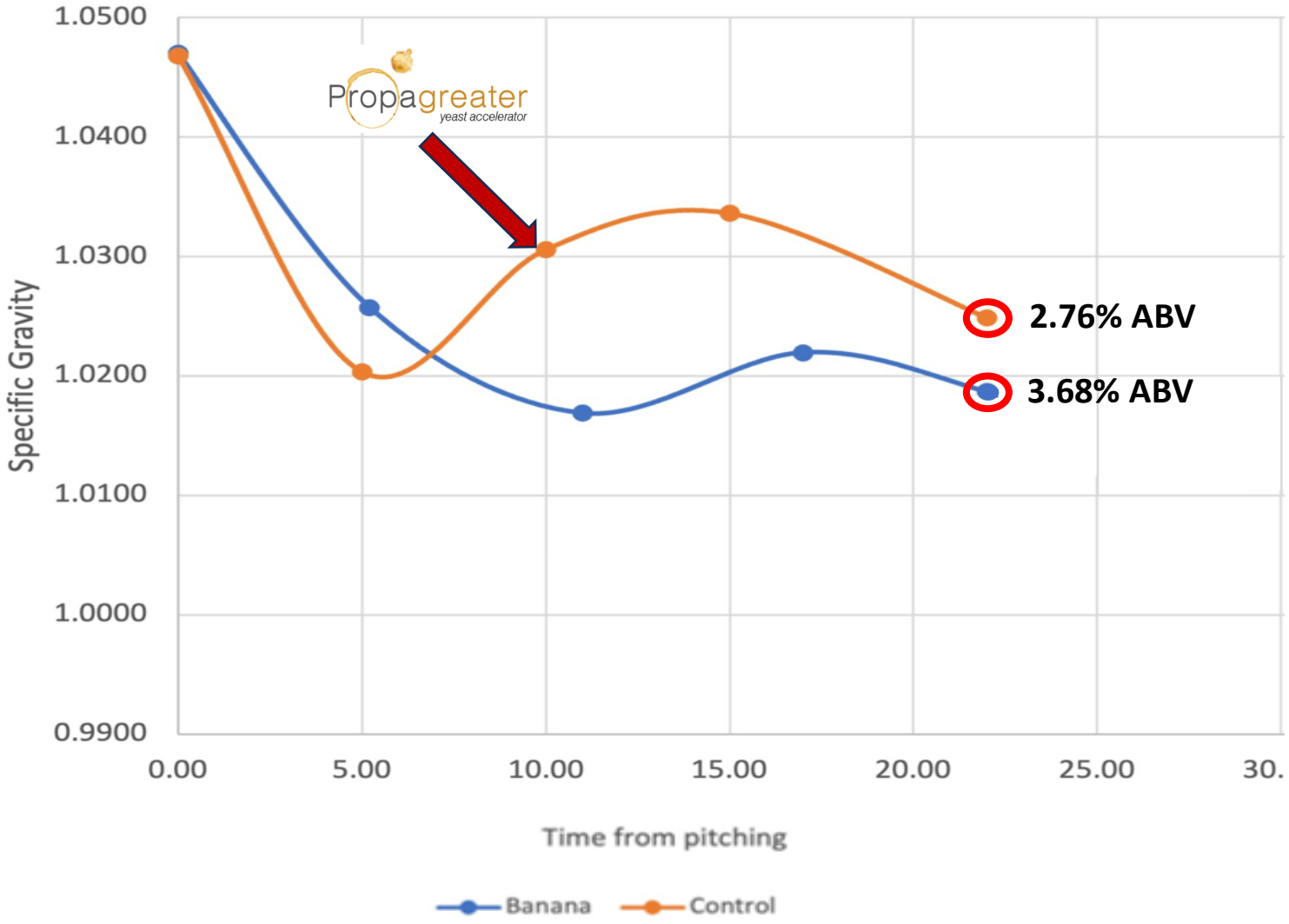
(Molasses fermentation - rum)




**Massive acceleration of the initial fermentation rates seen with Propagreater and both concentrations of a LyteGro's simpler banana extract plus YPD. Huge increase in yield of around 2.6% ABV (50% increase) above control seen with Propagreater over a short 48hr fermentation**

# Arbikie trial data

(Pea fermentation - vodka)




**Kirsty Black – Head Distiller@ Arbikie** performed a fermentation trial using garden peas as substrate in a 20,000L fermenter.

The control fermentation used 10kg of dried turbo yeast and **the test labelled "Banana" used Propagreater as a 12hr pre-treatment of just half of the usual amount of turbo yeast (i.e. 5kg)**.

The fermentations were not run to completion due to COVID striking down some of the team monitoring the fermentations.

**The conclusion was that Propagreater had a profound effect on the yeast – allowing just half the normal amount to be used to give an increased alcohol yield (33% increase over 22hrs) although with the caveat that the both runs would have needed to be completed to properly quantify any improvements**

*We used Propagreater as a pre-treatment for the yeast used in a molasses fermentation to make our small batch base spirit rum. The product not only increased our overall alcohol yield but cut our fermentation time down by over 50% from its usual 7 days to just 3. We also were able to use just half of our usual amount of yeast too! I cannot wait to start using this product regularly in our production fermentations once it is on the market."*

*Signed*

Sam Owen
Unconventional distillery

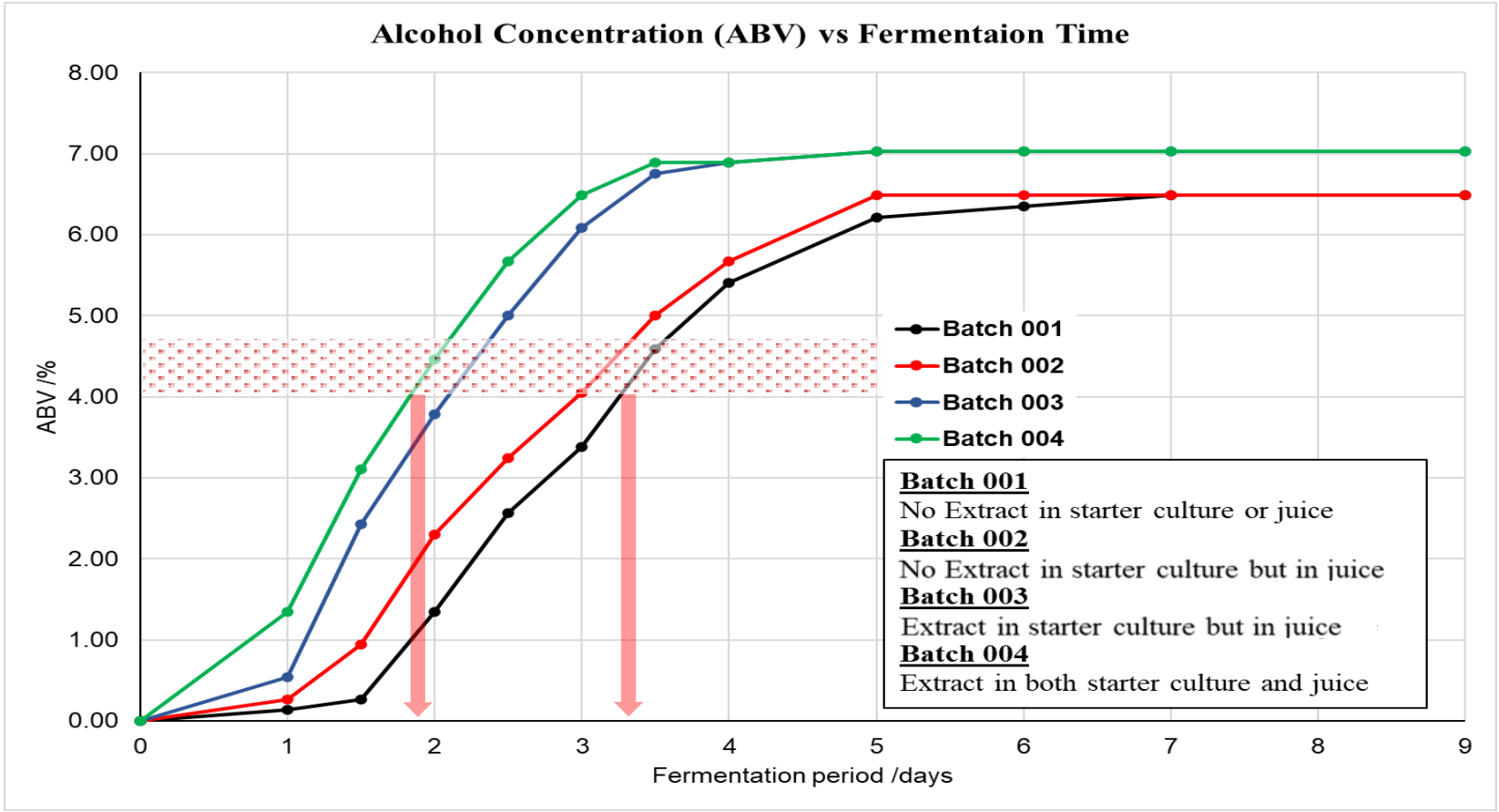
# Brewing & yeast production

Lyte Gro

# Brewing *Halves fermentation time*

Pre-treatment of yeast at the propagation stage prior to its addition into the beer fermentation can halve production time

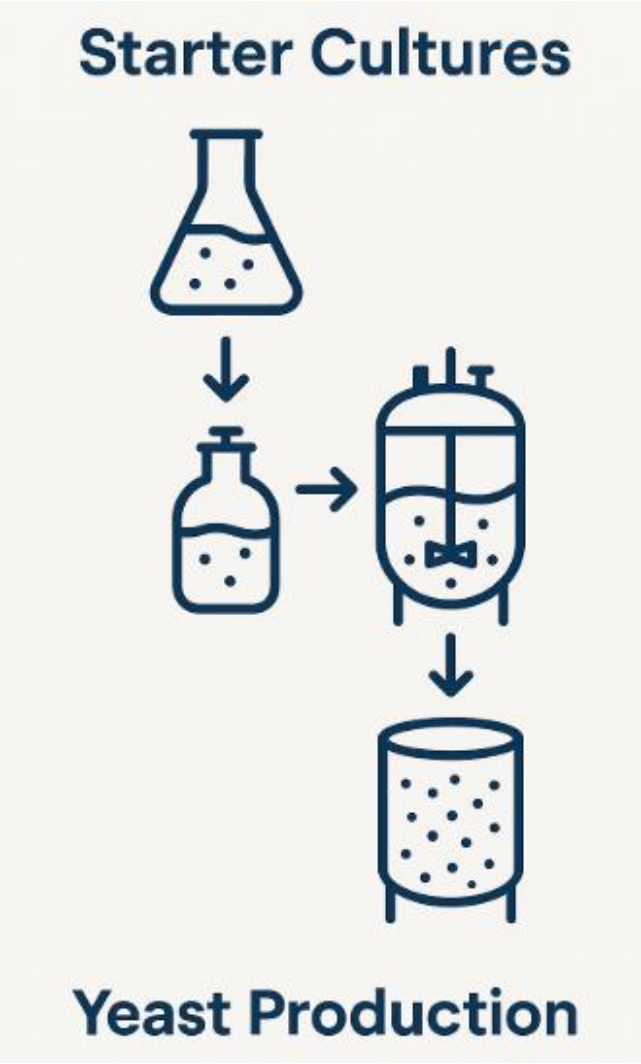
ADNAMS SOUTHWOLD




**Fermentation up to 4 - 4.8% ABV now takes 1.8 days rather than 3.5**

# Yeast production

*Doubles yield & halves media usage*

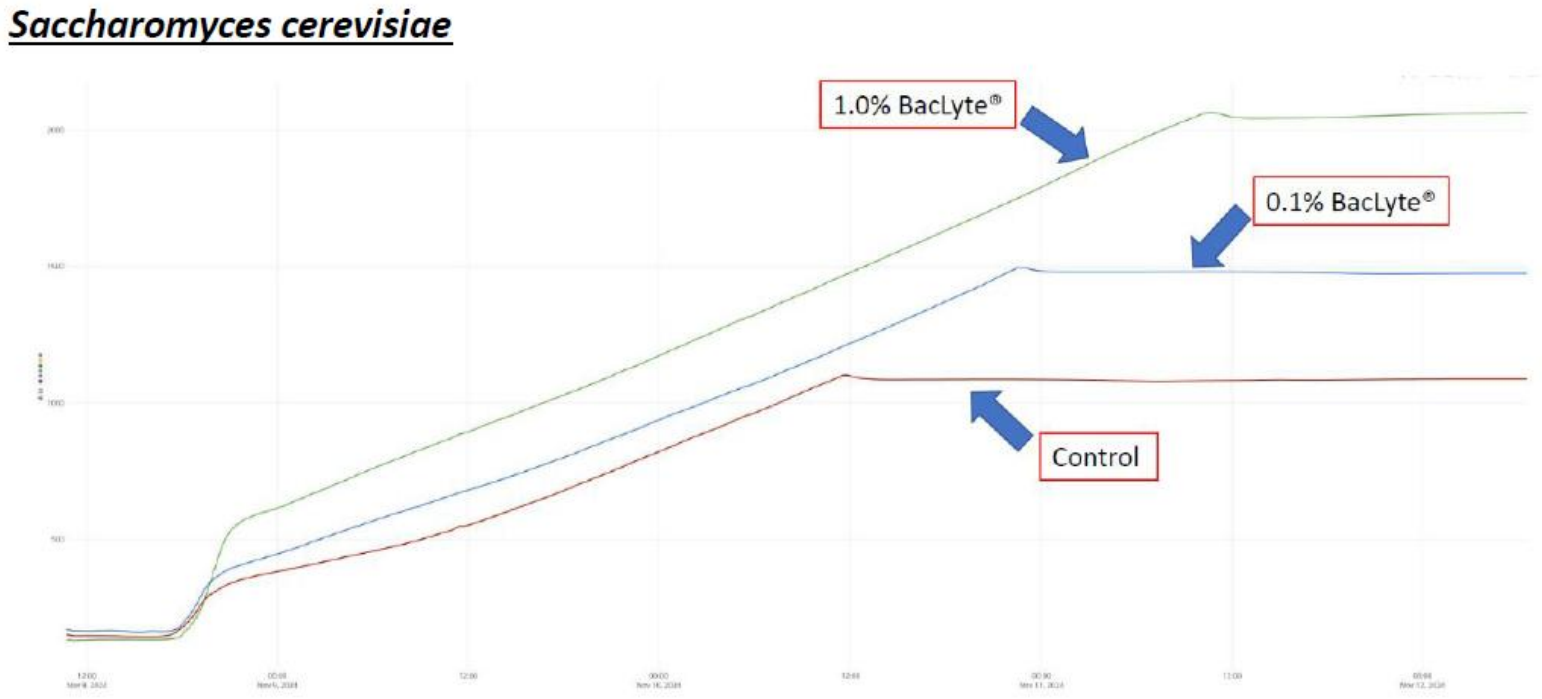



- You start with a small culture then sequentially scale up the size of the vessel
- Each culture is grown to the point where maximum cell density has been reached before its added to the next (larger) vessel
- This sequence is repeated until full commercial scale is reached and can take days

Treatment of starter cultures with BacLyte doubles yield in the same media which means that the number of scale up steps can be reduced – saving time

# Yeast production

Not only can we shorten the scale up process, but we can double the yield simply by adding BacLyte to the starter culture




The metabolic turbocharging by BacLyte is passed on from the parent cells to their progeny – meaning the effects persist into the production culture so double the cell concentration is tolerated

Want to trial our products?

Free materials are available so

**PLEASE GET IN TOUCH**

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