

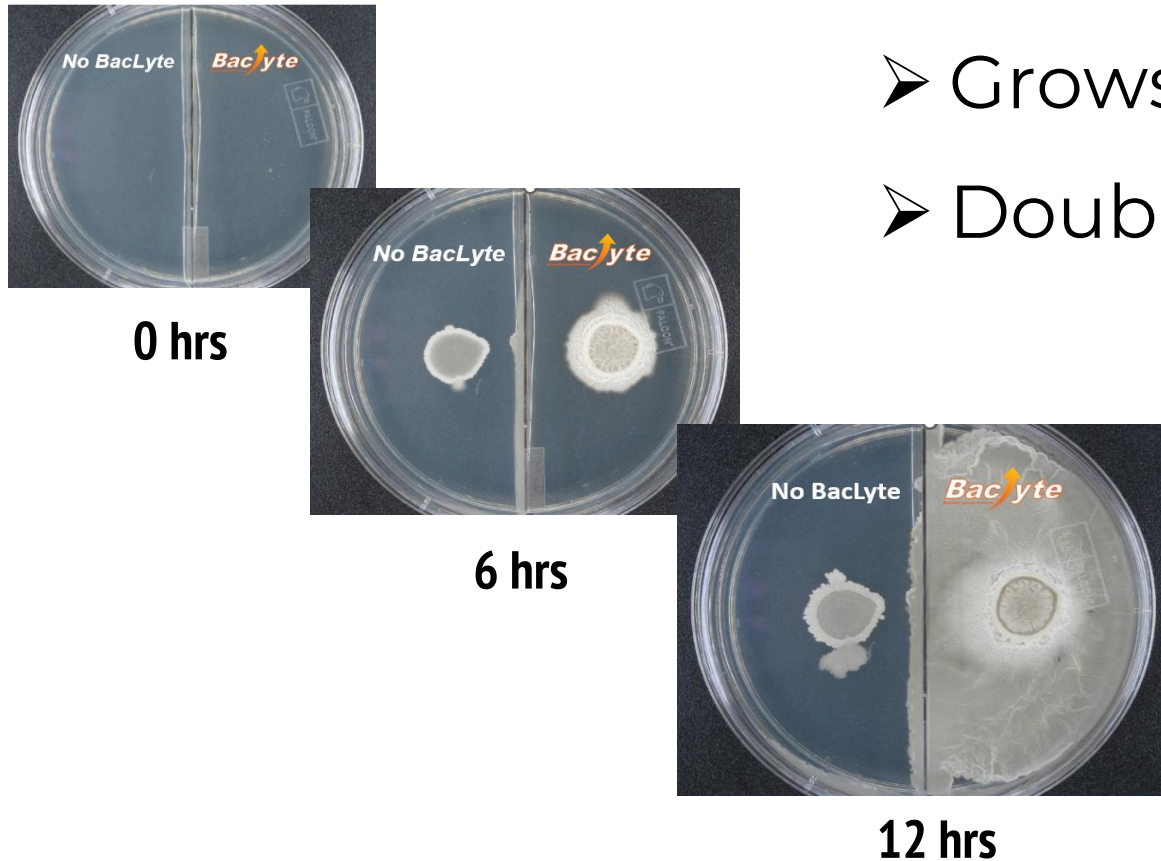
APPLICATION DATA

Turbocharging bio-based industries with waste bananas



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

INITIAL TARGET INDUSTRIES

R&D and diagnostics

Brewing & Distilling

Enzyme & Vaccine Production

Yeast Production

Biofuels – Biogas, Bioethanol and SAF

Surfactant Production

Fermented Foods

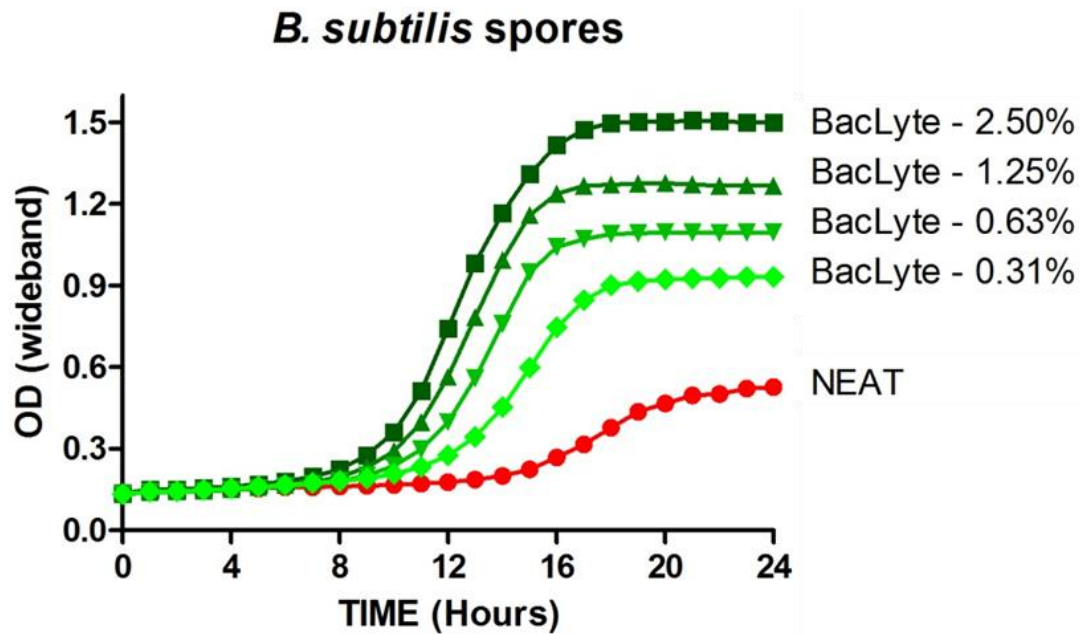
Biofertilisers

Biopolymers

Mining (Bioleaching)

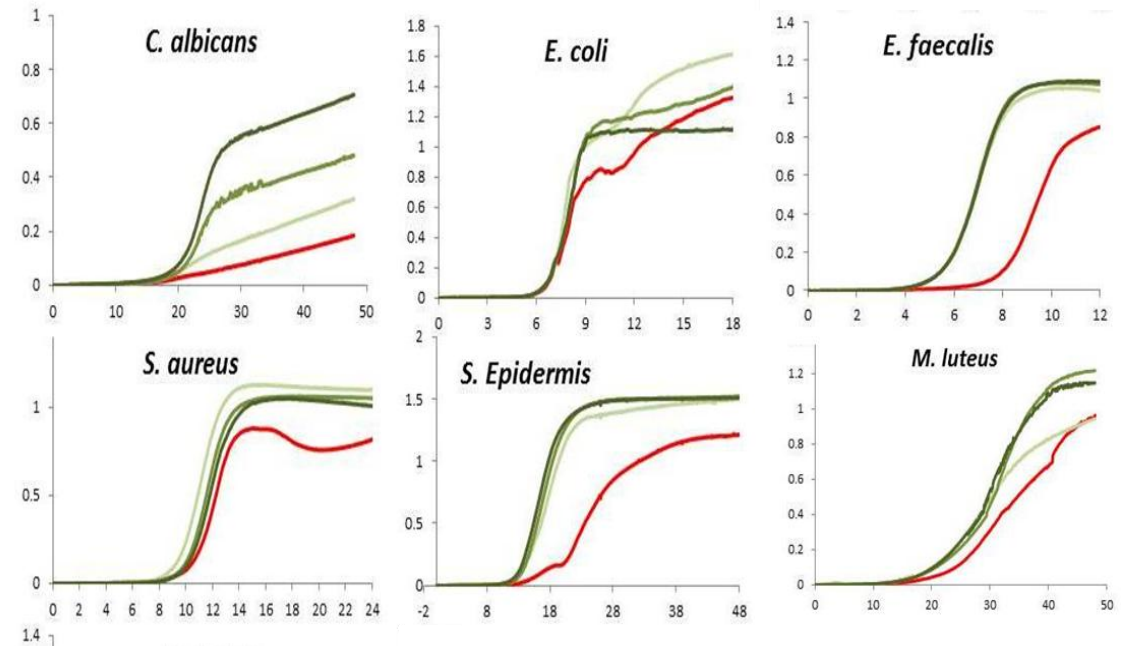
R&D and Diagnostics

Faster Cultures & Increased Biomass



- Reduced lag phase
- Faster replication
- Huge increase in biomass

Hospital Diagnostics



Three different concentrations of BacLyte:

- 0.5% v/v (pale green),
- 1% v/v (mid green),
- 2% v/v (dark green)

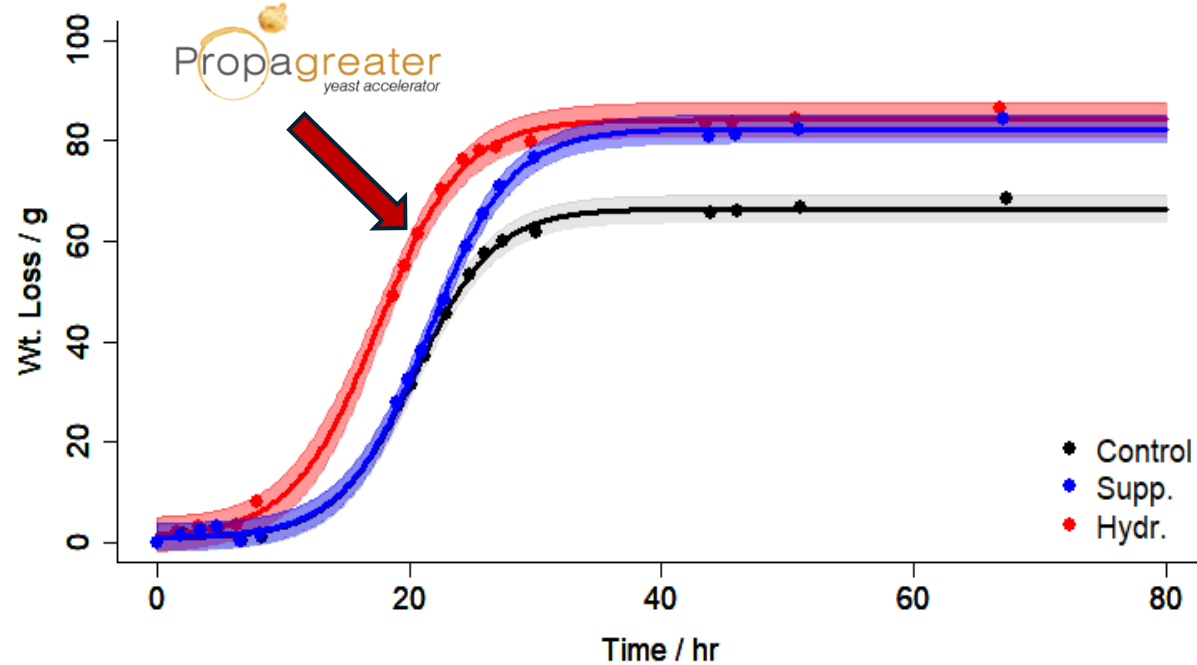
Controls without any BacLyte (red).

Distilling

Halves fermentation time & Increases yield



Fitted models of weight loss vs. fermentation time



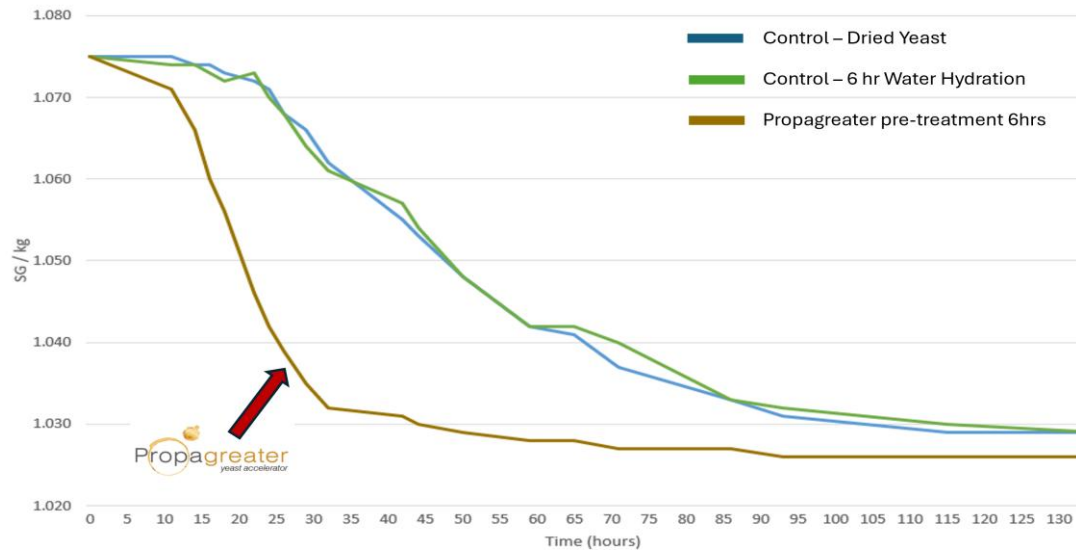
- Supplementation of the fermentation at 5 % produces a significantly ($p < 0.05$) greater weight loss during fermentation.
- Pre-treatment increases yield by of 25%
- Similar results were seen with the pre-treatment of yeast prior to addition to the production fermentation



The Oxford Artisan Distillery

(Mixed grain - whisky)

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

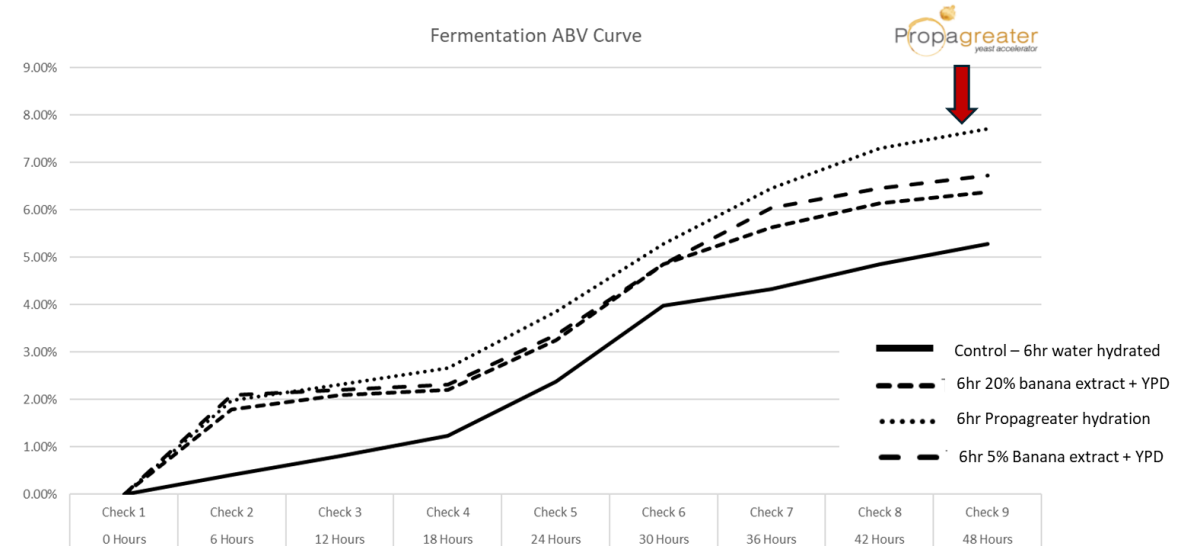


- Pre-treatment of yeast shortened lag phase and quickly increased fermentation rate.
- Shortened run time - 100% of the control yield produced in 30hrs rather than in 100hrs it took the control.



Chase Distillery trial data

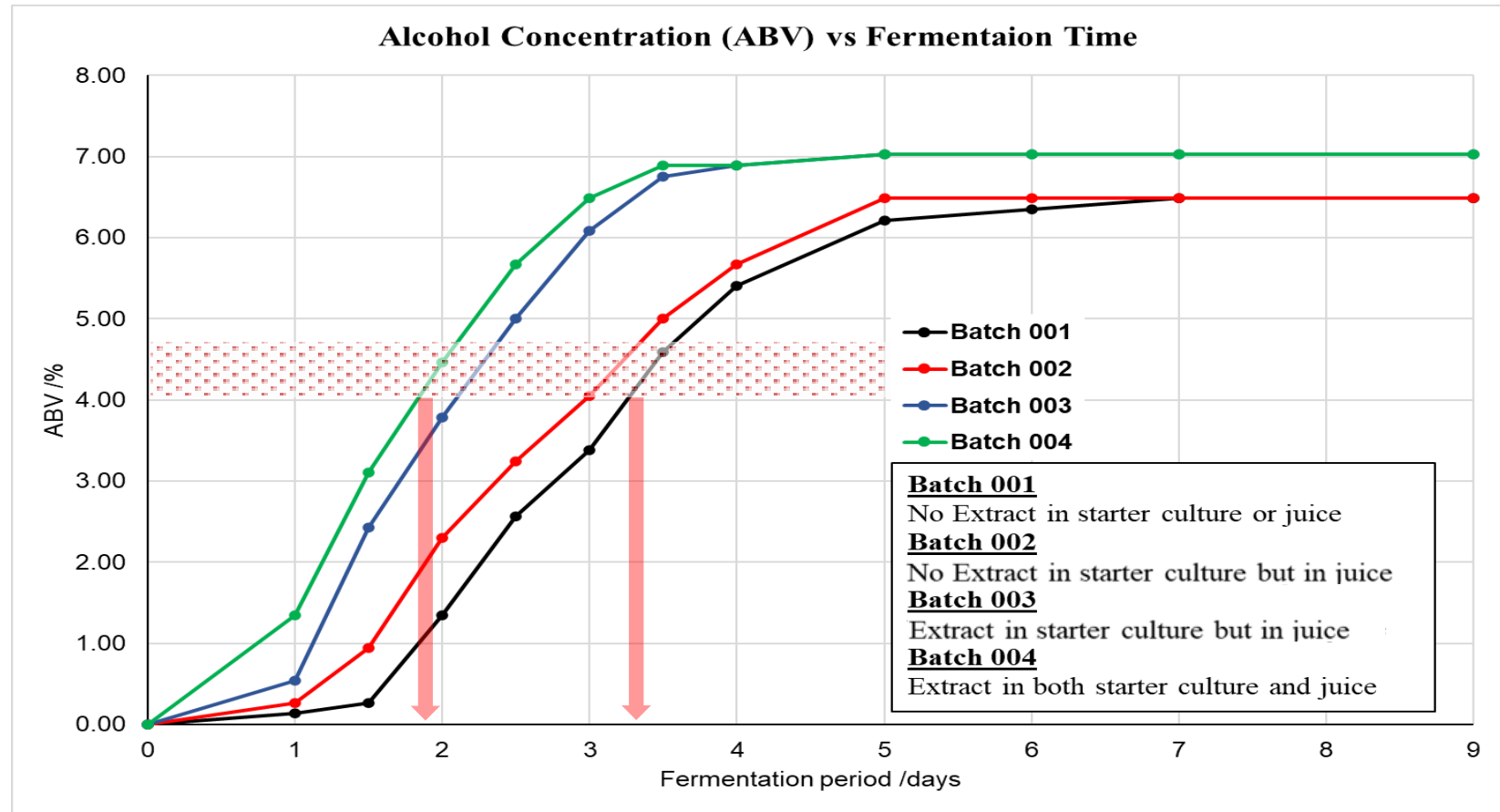
(Molasses fermentation - rum)



- Massive acceleration of the initial fermentation rate
- Very significant uplift in yield of around by 2.6% ABV (50% increase) above control levels

Brewing *Halves fermentation time*

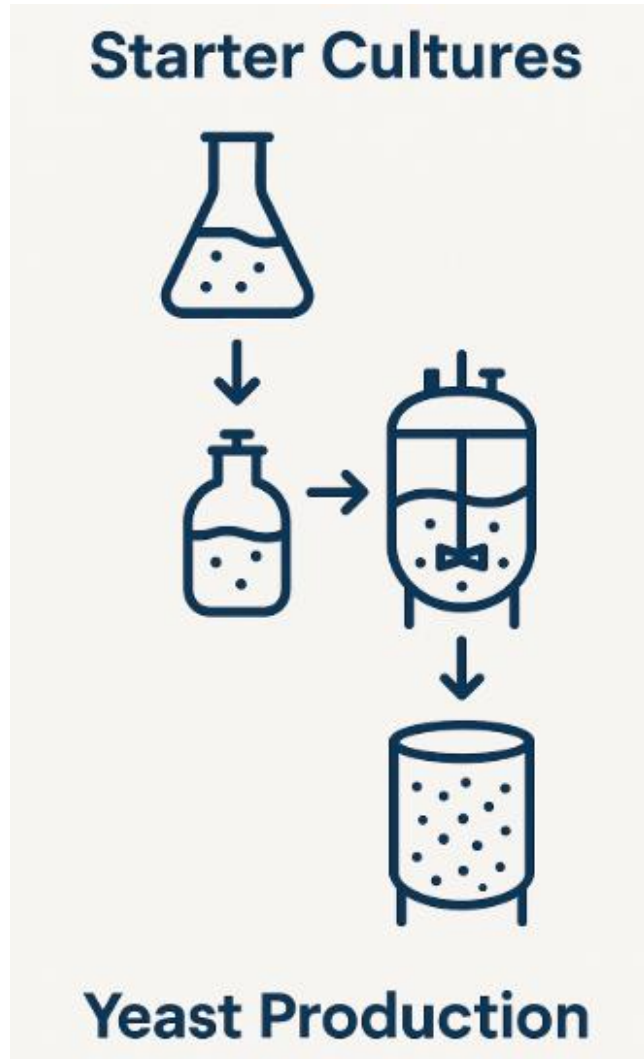
Pre-treatment of yeast prior to its addition into the beer fermentation can halve production time



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

Yeast production

Doubles yield & halves media usage



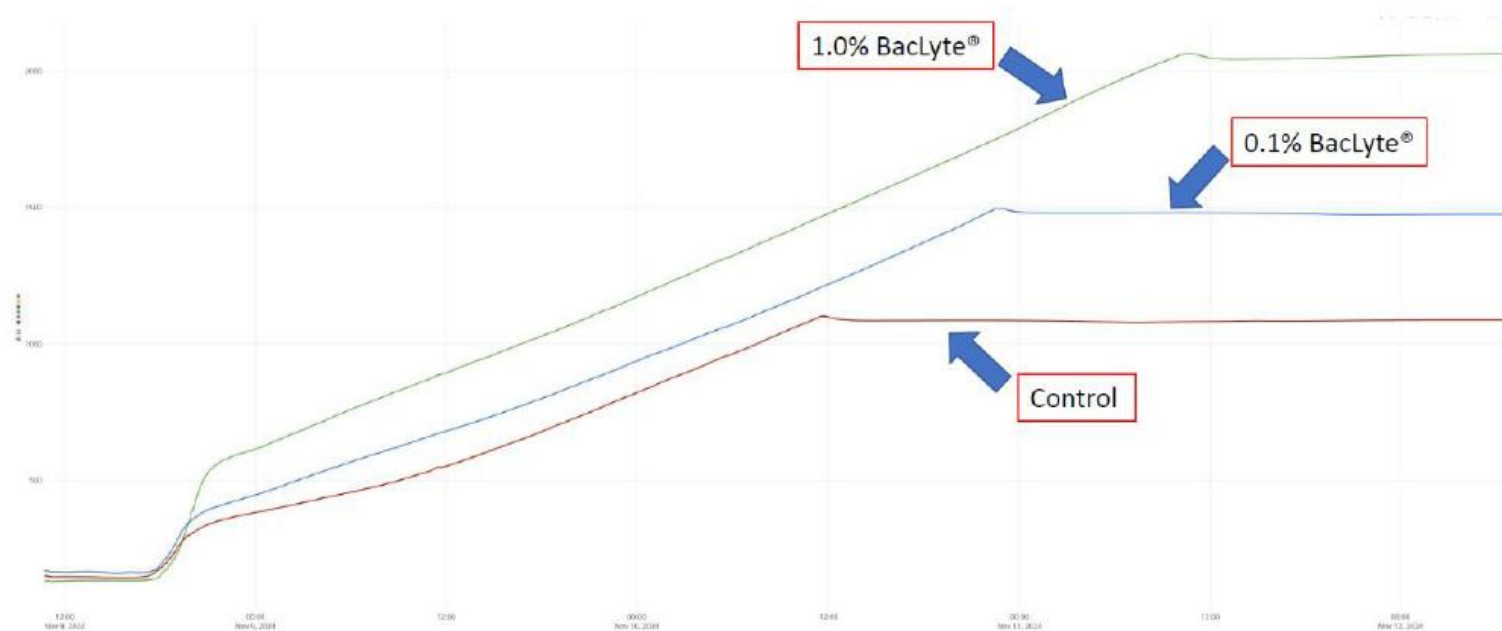
- You start with a small culture then sequentially scale up the size of the vessel
- Each culture is grown to the point where maximum cell density has been reached before its added to the next (larger) vessel
- This sequence is repeated until full commercial scale is reached and can take days

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

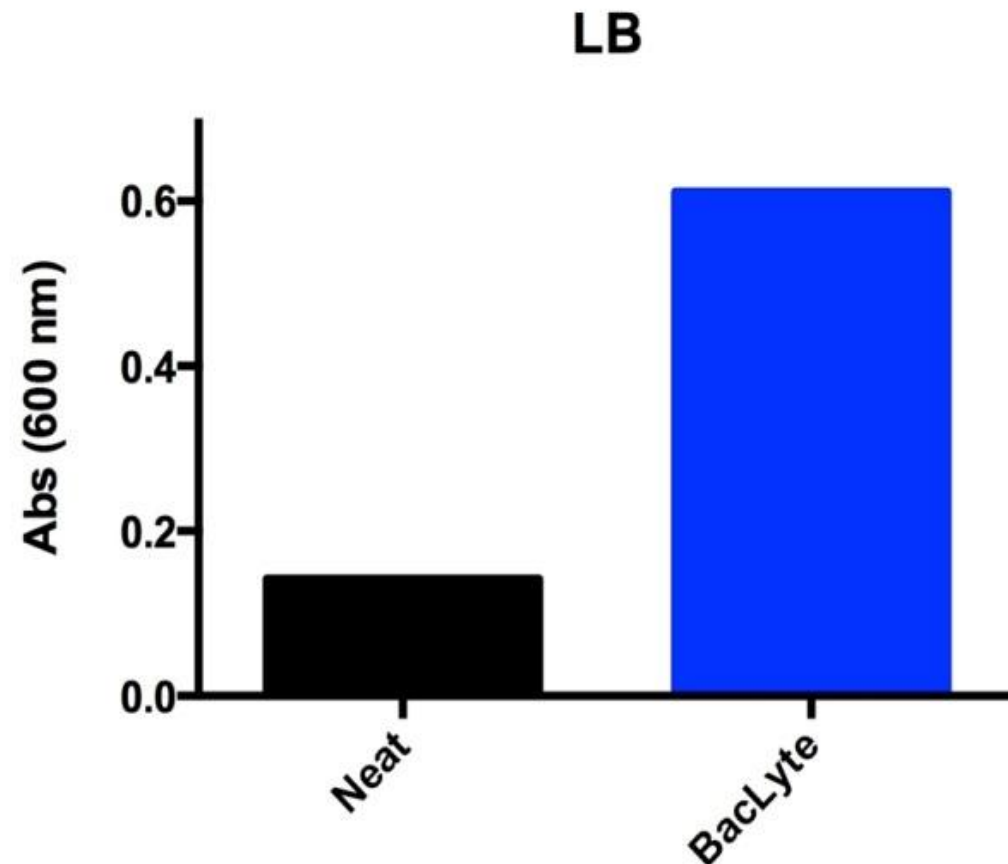
Saccharomyces cerevisiae



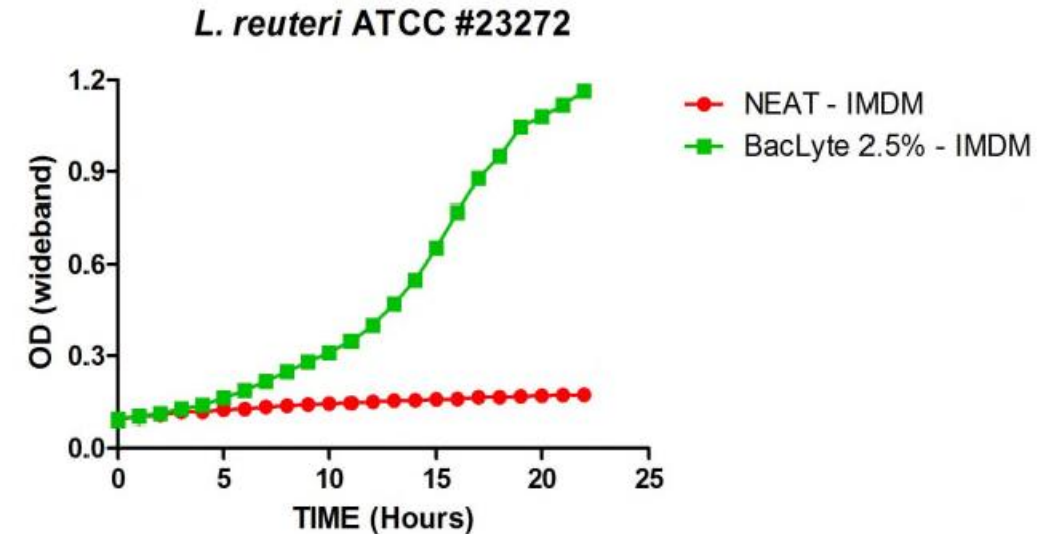
The metabolic turbocharging by BacLyte is passed on from the parent cells to their progeny – meaning the effects persist into the production culture so double the cell concentration is tolerated

Lactic acid bacteria

This graph demonstrates how growth of *Lactobacillus rhamnosus* is enhanced by addition of 0.5% v/v Baclyte to rich Luria Bertoni media.

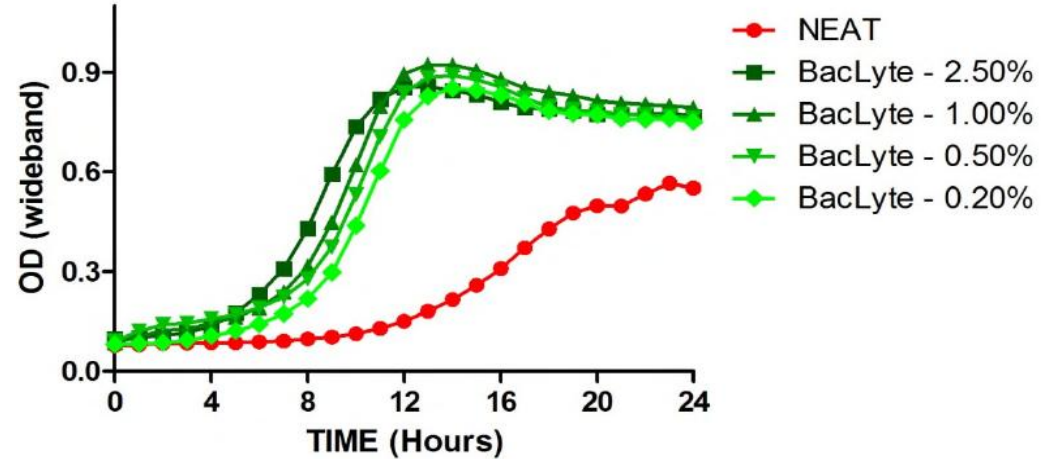


Similarly, supplementation of the media with Baclyte (2.5% w/v) enables the otherwise fastidious *Lactobacillus reuteri* to grow in IMDM media which normally is unsupportive of growth.



This is a mammalian cell culture medium that is not designed for bacterial growth. The culture was also grown aerobically which is not normally tolerated

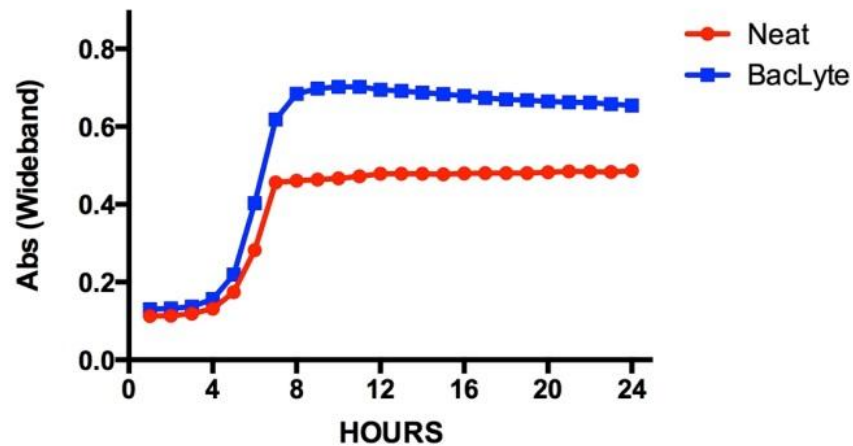
L. lactis B-2356



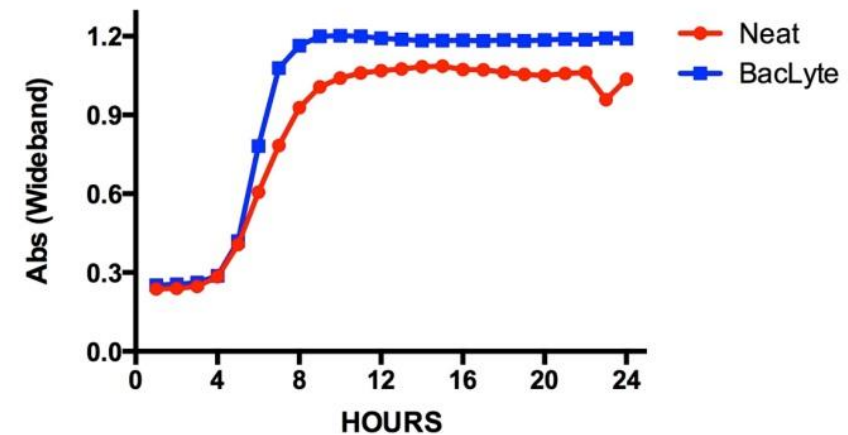
This graph demonstrates the improvements in growth rate and final cell density of a *Lactobacillus lactis* culture achievable with the addition of Baclyte at a range of concentrations in rich MRS (de Man Rogosa Sharpe) media

Similarly addition of 0.5% BacLyte into rich M17 and Luria Bertoni medias increased growth rate and final OD of *L. lactis*.

LB

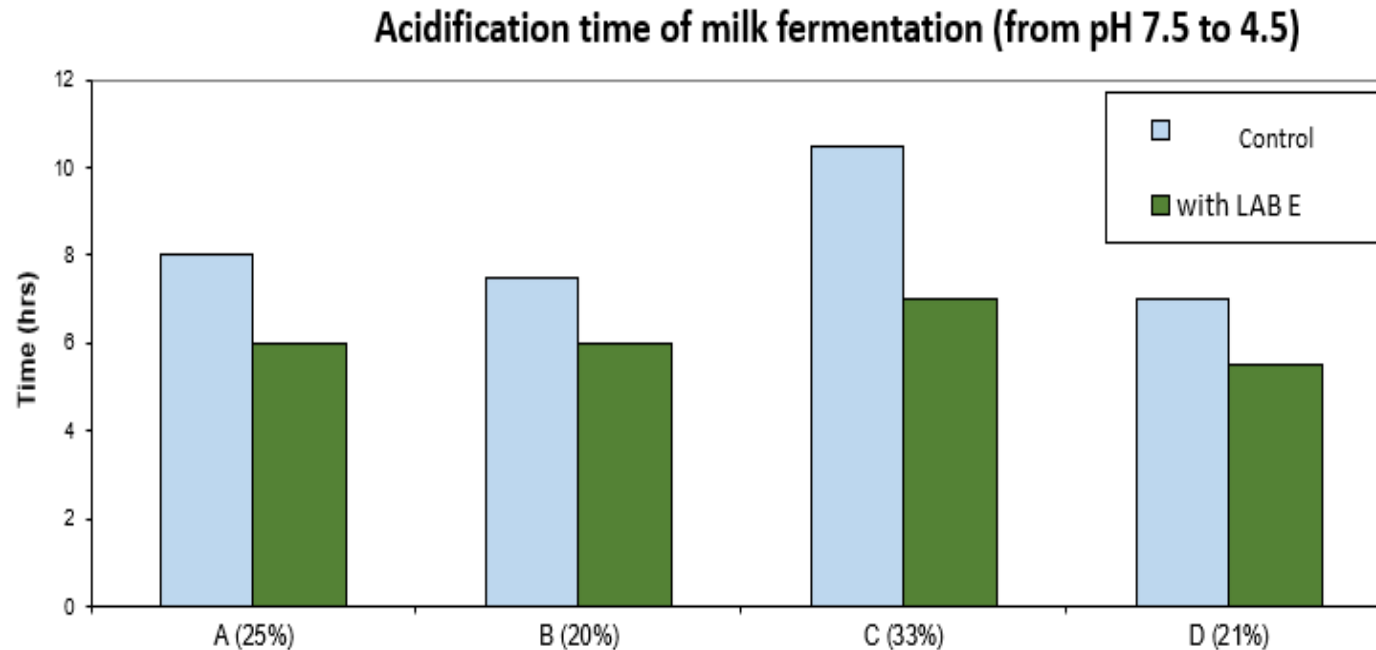


M17



Yoghurt production

A number of evaluations were carried out by leading European probiotic manufacturers seeking to evaluate LAB Enhancer (an earlier and much less potent version of BacLyte) use in bulk milk fermentations. In the first evaluation four (4) *Streptomyces thermophilus* strains were tested

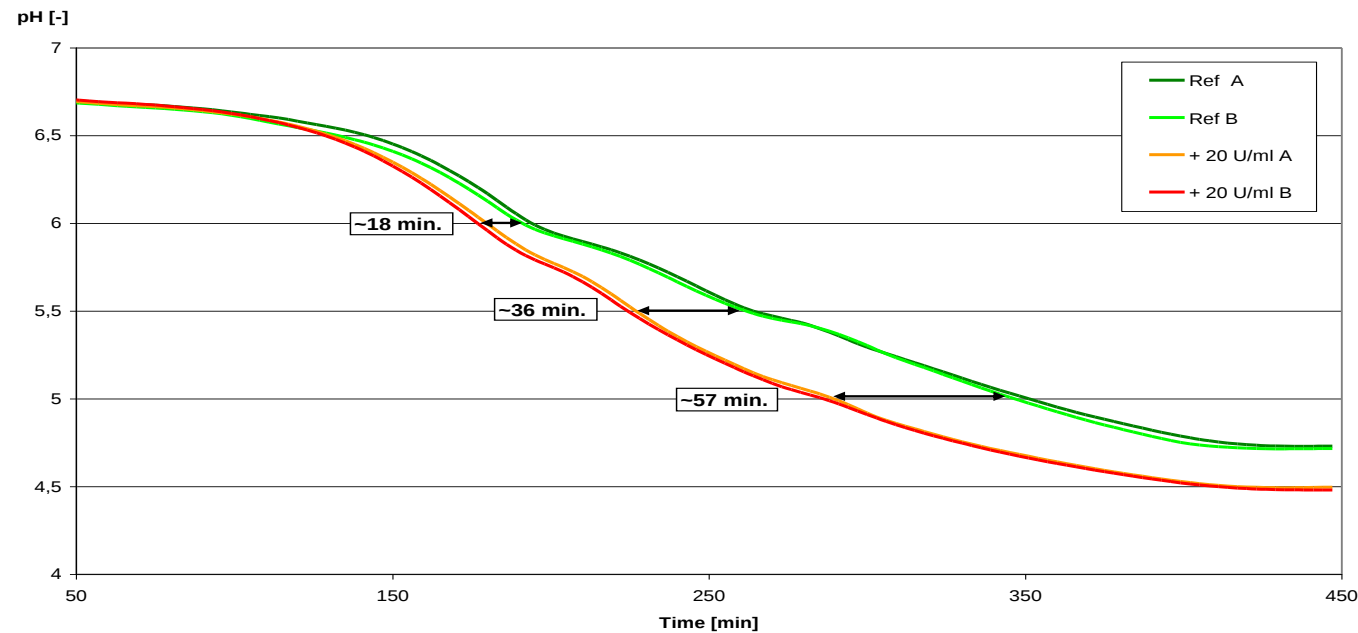


Acidification time was reduced by an average of 24.6% across all four strains tested
Similar results were also obtained *Lb. acidophilus*

In a second industrial evaluation of LAB Enhancer testing the ability to accelerate milk acidification the results were conclusive

“Overall nine different strains were tested with LAB Enhancer generating an enhancement of the activity in 7 of those 9 strains.”

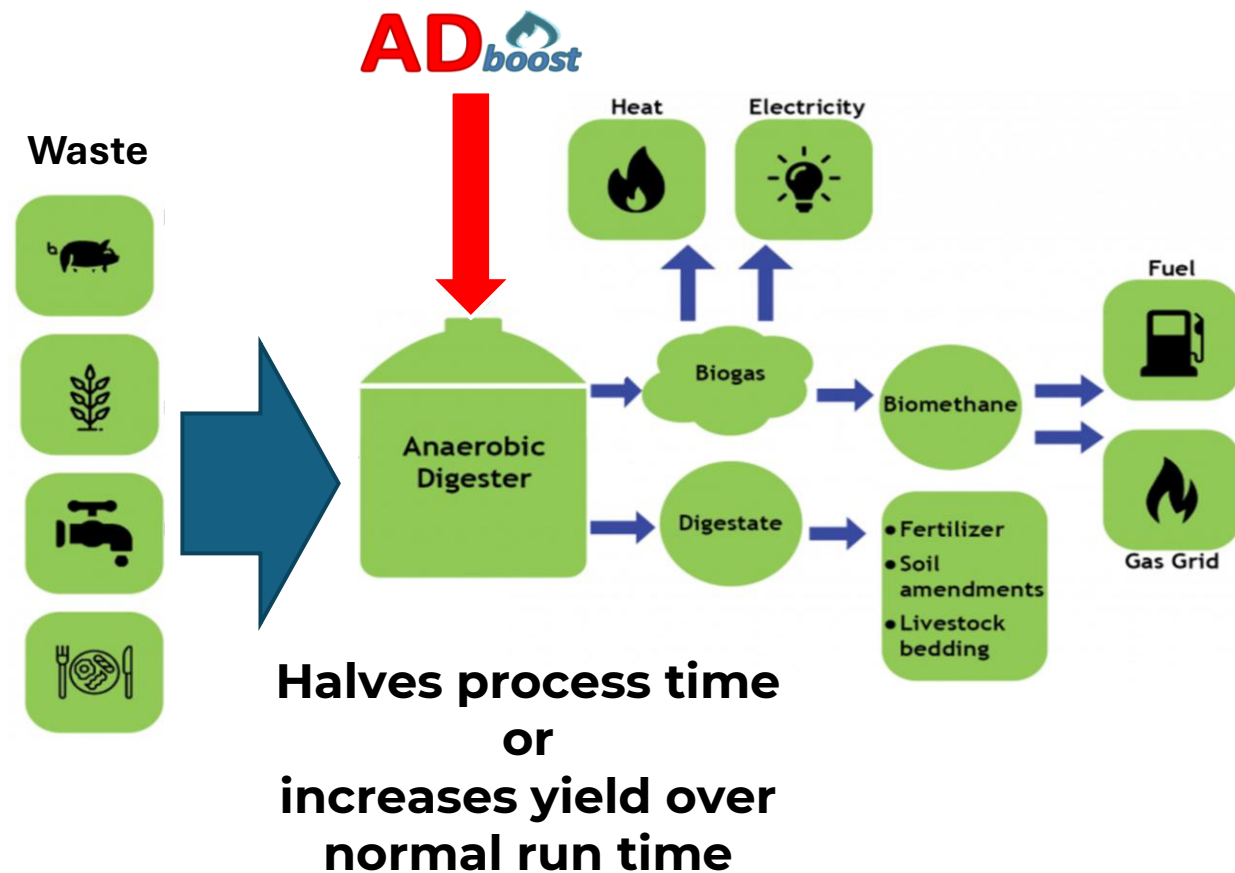
“The extract showed promising results for Streptococcus, Lactobacillus & complex cultures.”



“Only two Lactococci strains showed no response – the other seven experiments provide benefits between 10 and 120 minutes depending on the strain and the chosen pH-feature point. There was a clear correlation between the amount of extract used and the measured benefit.”

Anaerobic digestion *Halves digestion time & Increases yield*

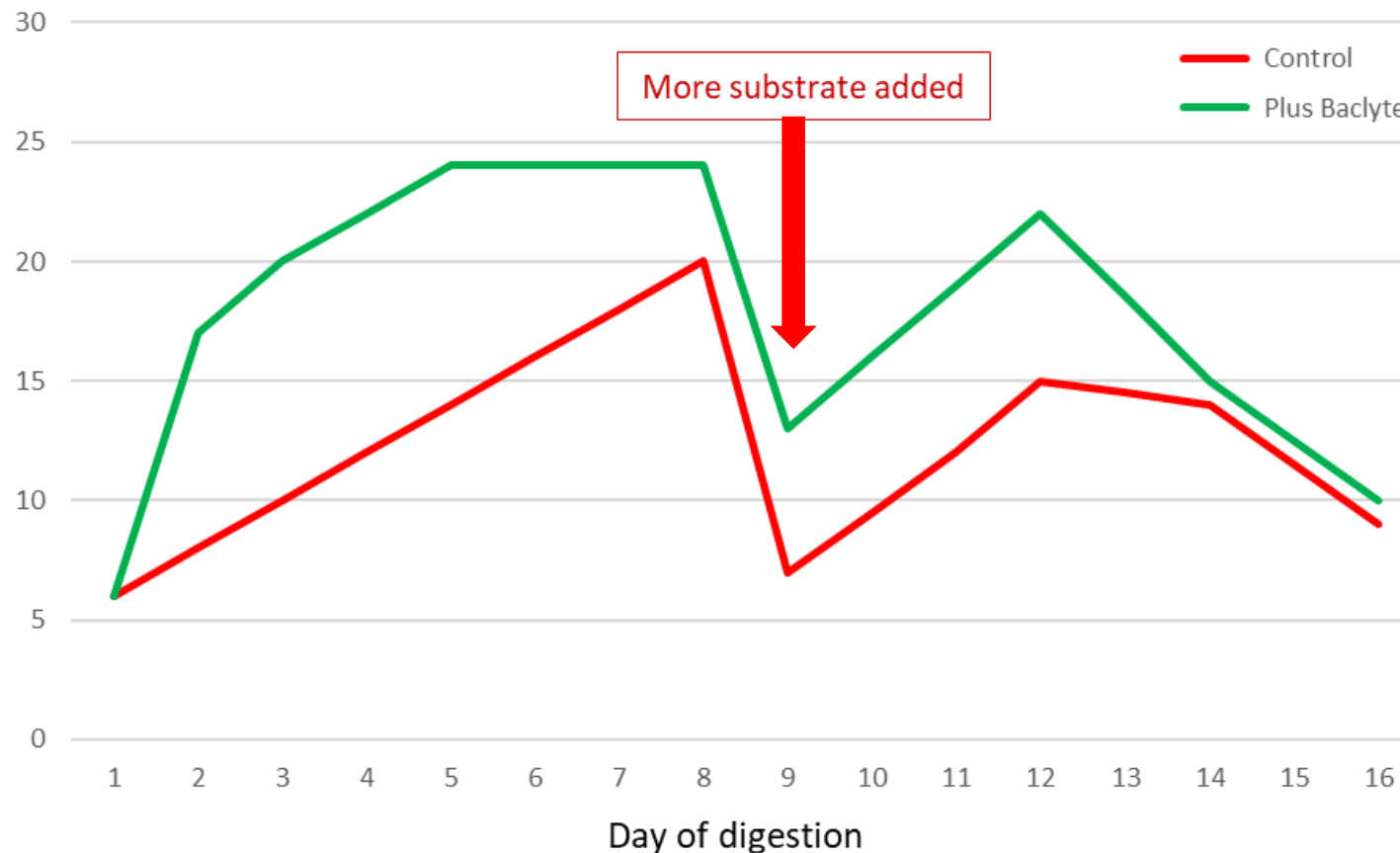
ADboost is a cruder (and cheaper) version of BacLyte and is simple supplement which is added to the digester at the start of the process – with the potential to add booster doses for longer digestion runs



Initial trial

Our initial trial was at small scale and used liquidized mixed food waste as feedstock. It was run over a 16-day time course with redosing of feedstock taking place on day 9

Methane levels during AD fermentation (ml)

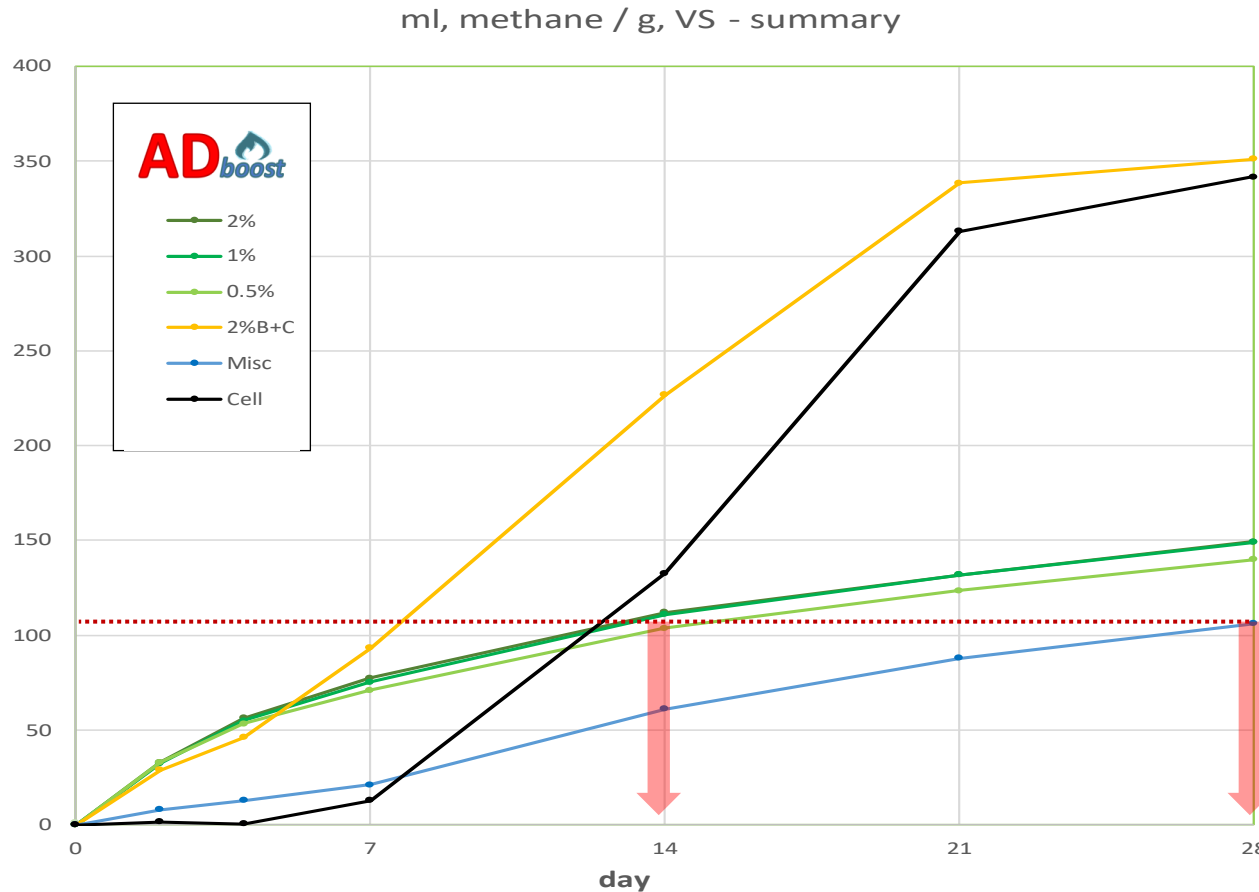


Data shows the use of Baclyte (ADboost) at a 5% supplementation level has a huge impact on the efficiency of digestion:

- BacLyte greatly increased the initial rate of digestion
- BacLyte supplemented run reached peak production levels in 2/3rd of the time taken by control
- **Overall methane yield over the 16-day course of digestion was increased by 46%**

Miscanthus trial

A second trial was performed using different dosages of BacLyte and miscanthus as the digestion feedstock. Miscanthus is high yield but known to be a very difficult feedstock to use because of its high fibre content which slows (and can even stall) digestion. Cellulose data was also included as a secondary marker of activity.



- Immediate start to digestion – no lag phase
- 60% increase in methane over a 28-day digestion
- Same methane yield in 14 days (halves process time)

Want to trial our products?

Interested in a production partnership?

PLEASE GET IN TOUCH

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