Evaluating a Portable Yeast Pitching Skid for Reliable and Accurate Pitching for Craft Breweries

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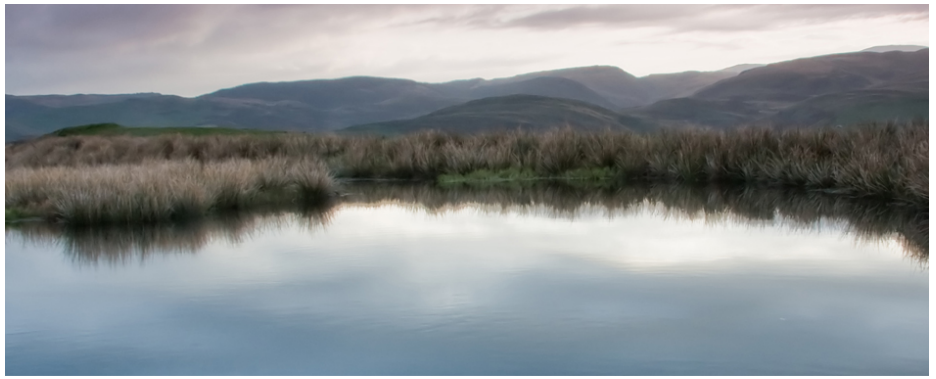
The Science of Beer

Aber Instruments – located in University town called **ABERYSTWYTH** and surrounded by the hills and coast of West Wales

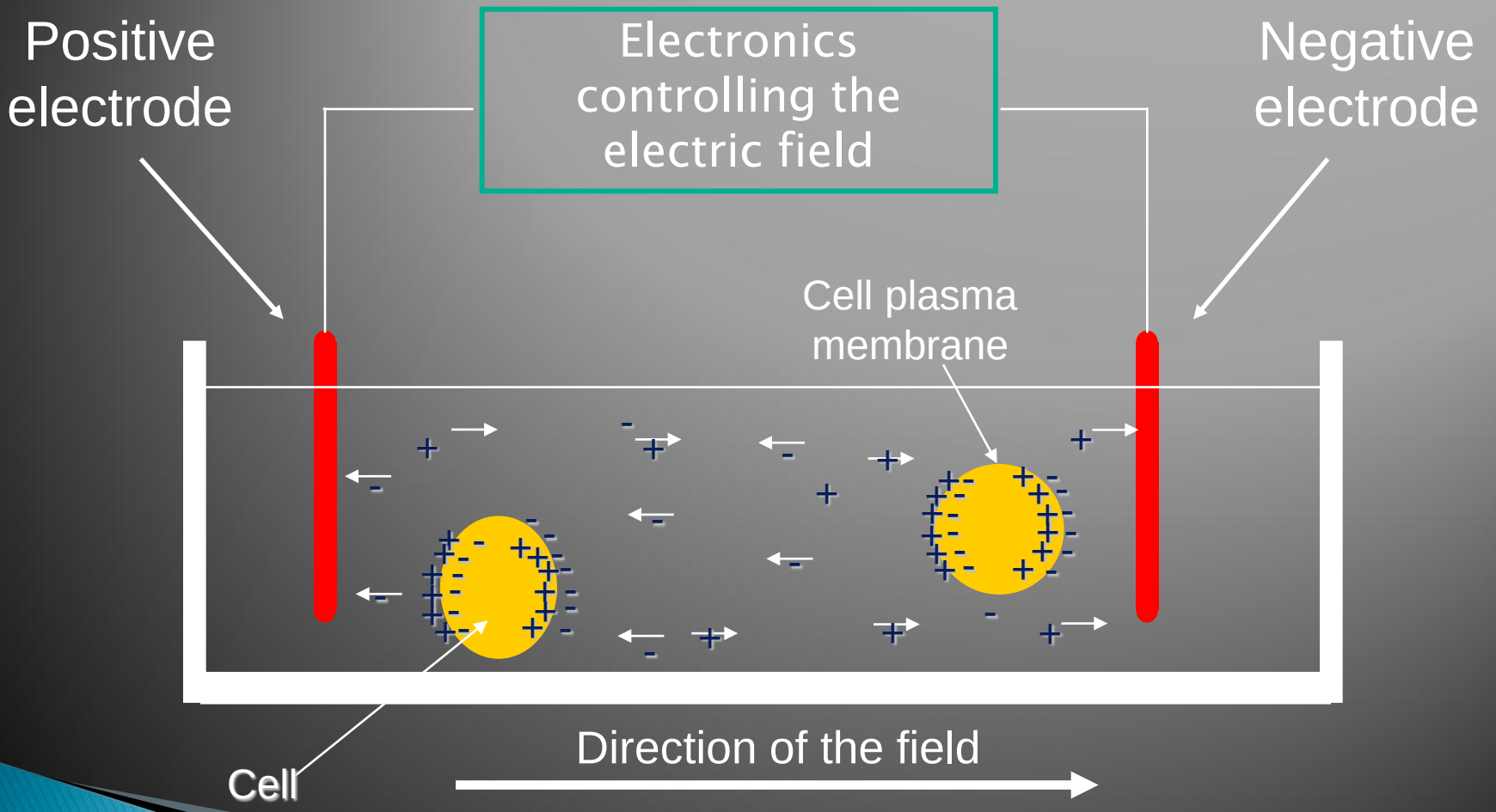


BACKGROUND

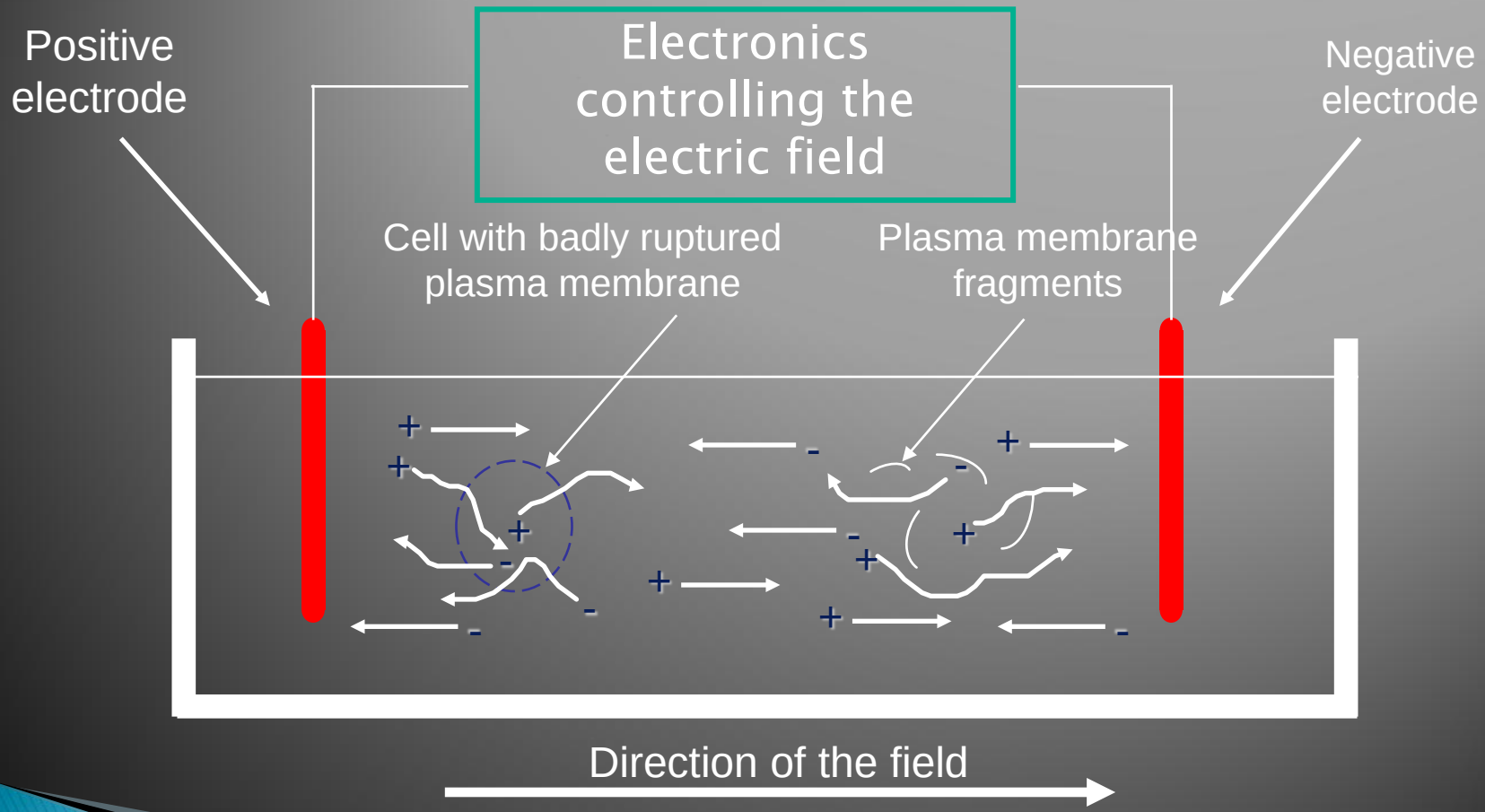
- Technology invented and patented by Aber Instruments in 1988
- First brewing instruments (model 316) made in 1991
- Now over 500 systems in brewing with some companies using over 50 systems.
- Now a standard with many of the large brewing groups

HOW DOES IT WORK?

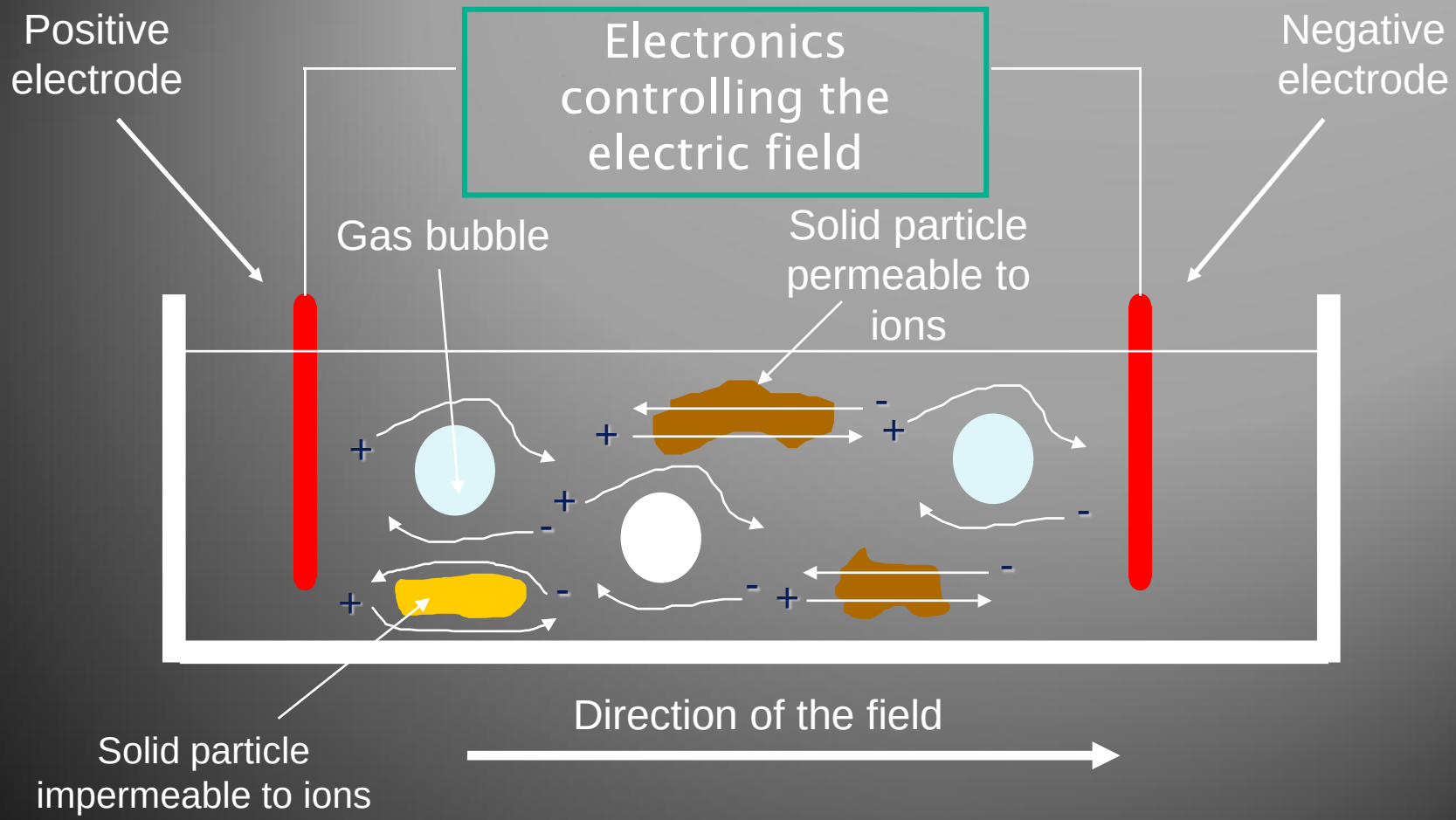
Influence of electric field to 'polarise' viable yeast cells



Failure of electric field to 'polarise' dead and ruptured cells



Influence of gas bubbles and trub on capacitance measurements.



WHAT IS BEING MEASURED?

CAPACITANCE

- Build up of electrical charge on live cell membranes
- Linear to amount of yeast cells present
- Measured in pico Farads/centimetre (pF/cm)
- Converted to recognized lab units: %VSS or cells/ml

WHAT IS BEING MEASURED?

CONDUCTIVITY

- Ability of a current to flow through a substance
- Measured in milliSiemens/centimetre (mS/cm)
- Indicates process taking place
  - CIP
  - Rinsing
  - Dosing

IMPORTANCE IN A BREWERY

Accurate Yeast Pitching Crucial

UNDERPITCHING

- Excess level of diacetyl
- Increase in higher/fusel alcohol formation
- Increase in ester formation
- High terminal gravities
- Stuck fermentation
- Increased risk of infection

OVERPITCHING

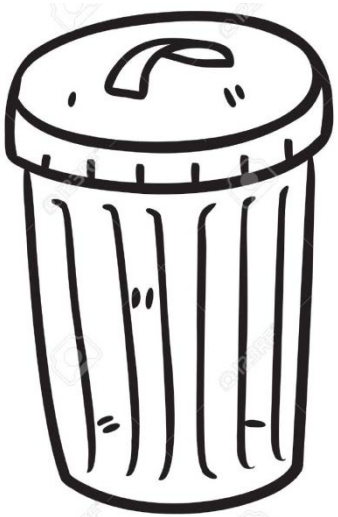
- Very low ester production
- Very fast fermenations
- Thin or lacking body/mouthfeel
- Autolysis
(Yeasty flavour due to lysis of yeast)
- Haze

Batch-Batch variation | High Wastage | Poor yeast management

PUTTING THINGS INTO PERSPECTIVE

US BASED CRAFT BREWER IN 2013-2014

1700 bbl of beer/year



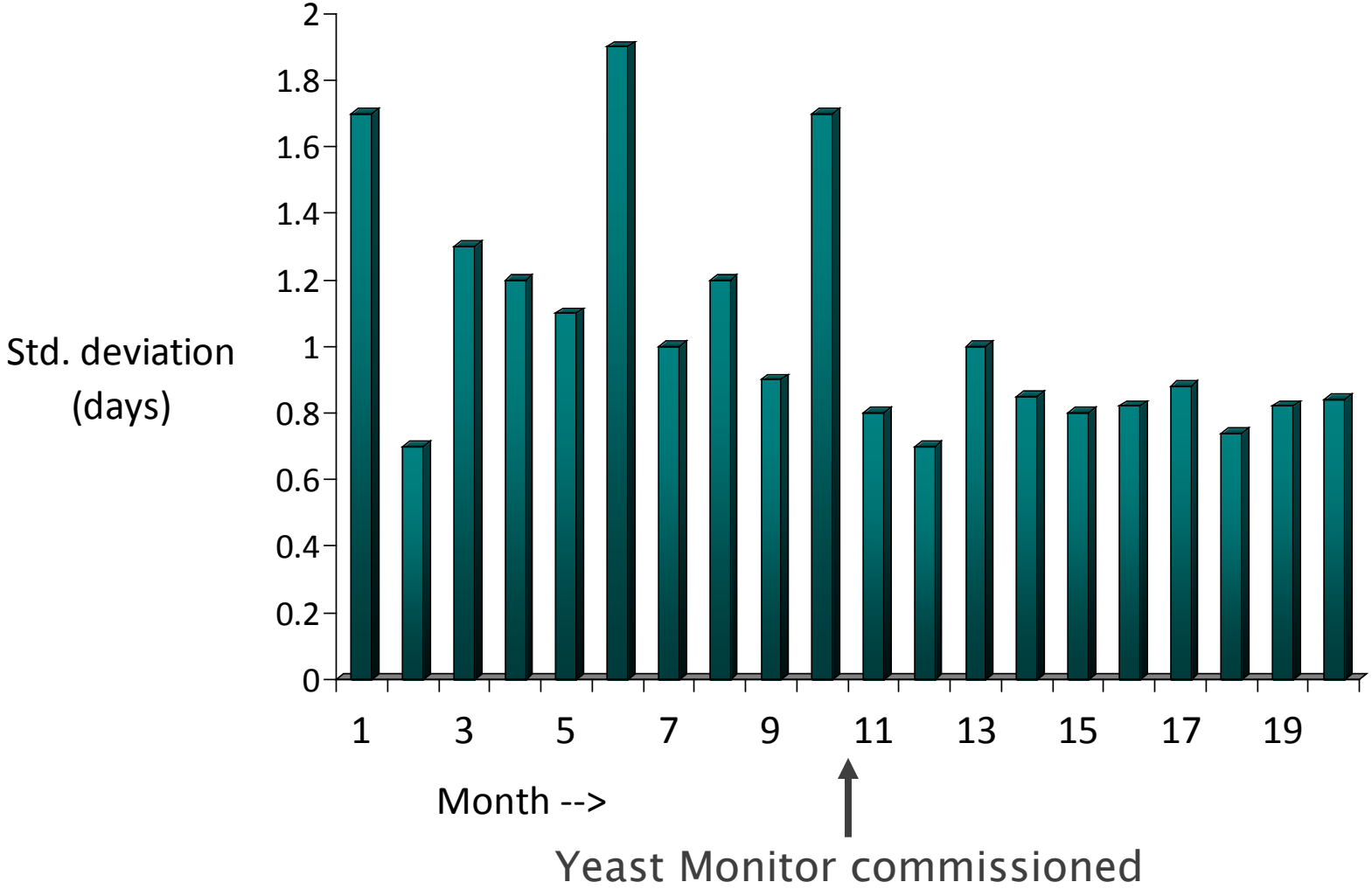
$30,000/year

HOW DO YOU PREVENT THIS?

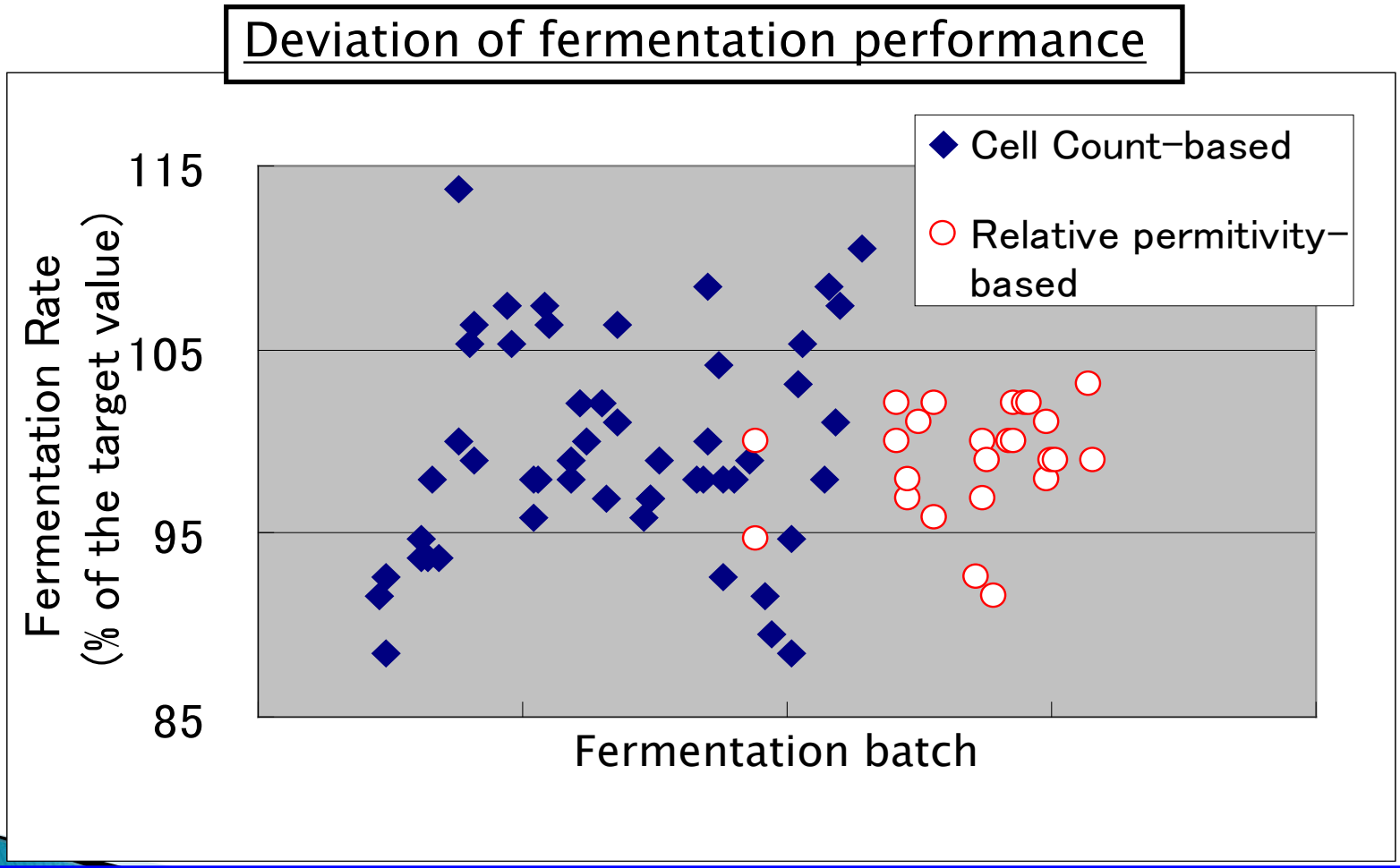
- Bigger breweries – Strict tolerances on yeast pitching rates
- Need to be within ±10% of the target rate
- Impossible to achieve this manually
- Aber Yeast Monitor has been used successfully
- Immediate impact on process and product parameters

Reducing variation in fermentation times

(Data courtesy of Bass Brewers)



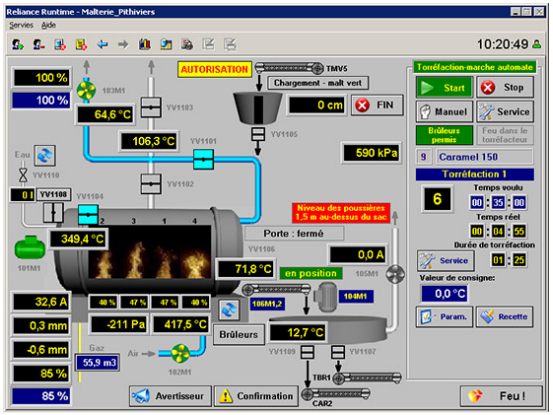
Reduction in deviation of fermentation performance after installing the "Yeast Monitor" (Suntory, Japan)



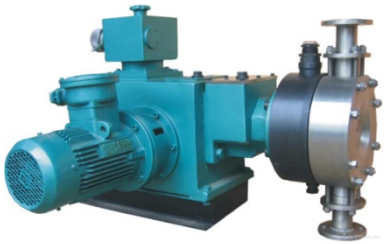
COMMON STRATEGY

Yeast Monitor

Flow meter



Brewery Controller



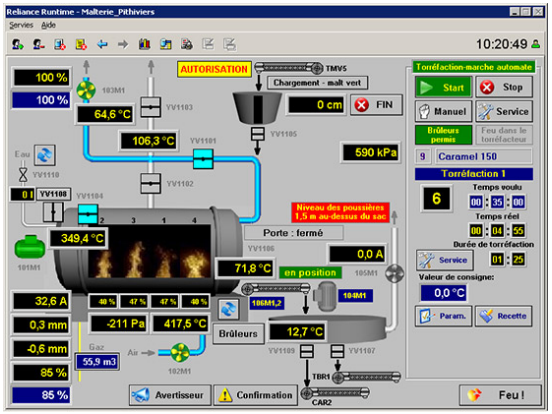
Dosing pump

http://www.reliance-scada.com/en/success-stories/food-processing-industry/control-system-of-brewing-malt-production-in-malteries-franco-belges-france
http://www.diytrade.com/china/pd/7152662/Metering_dosing_Pump.html
http://www.uk.endress.com/en/Tailor-made-field-instrumentation/Flow-measurement-product-overview/Product-Electromagnetic-flowmeter-Proline-Promag-50P

CRAFT BREWERS

Aber PerfectPitch

Flow meter



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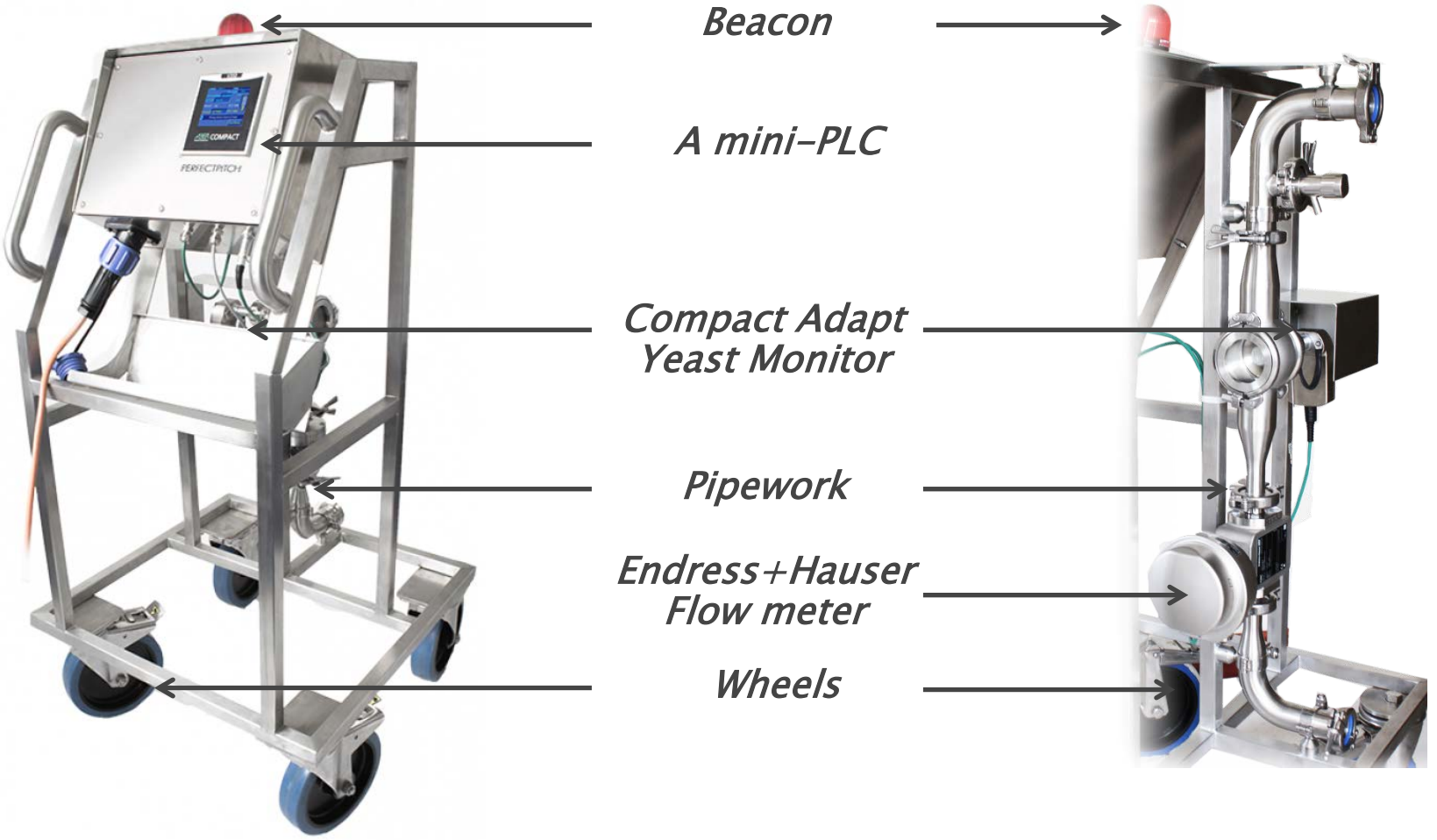
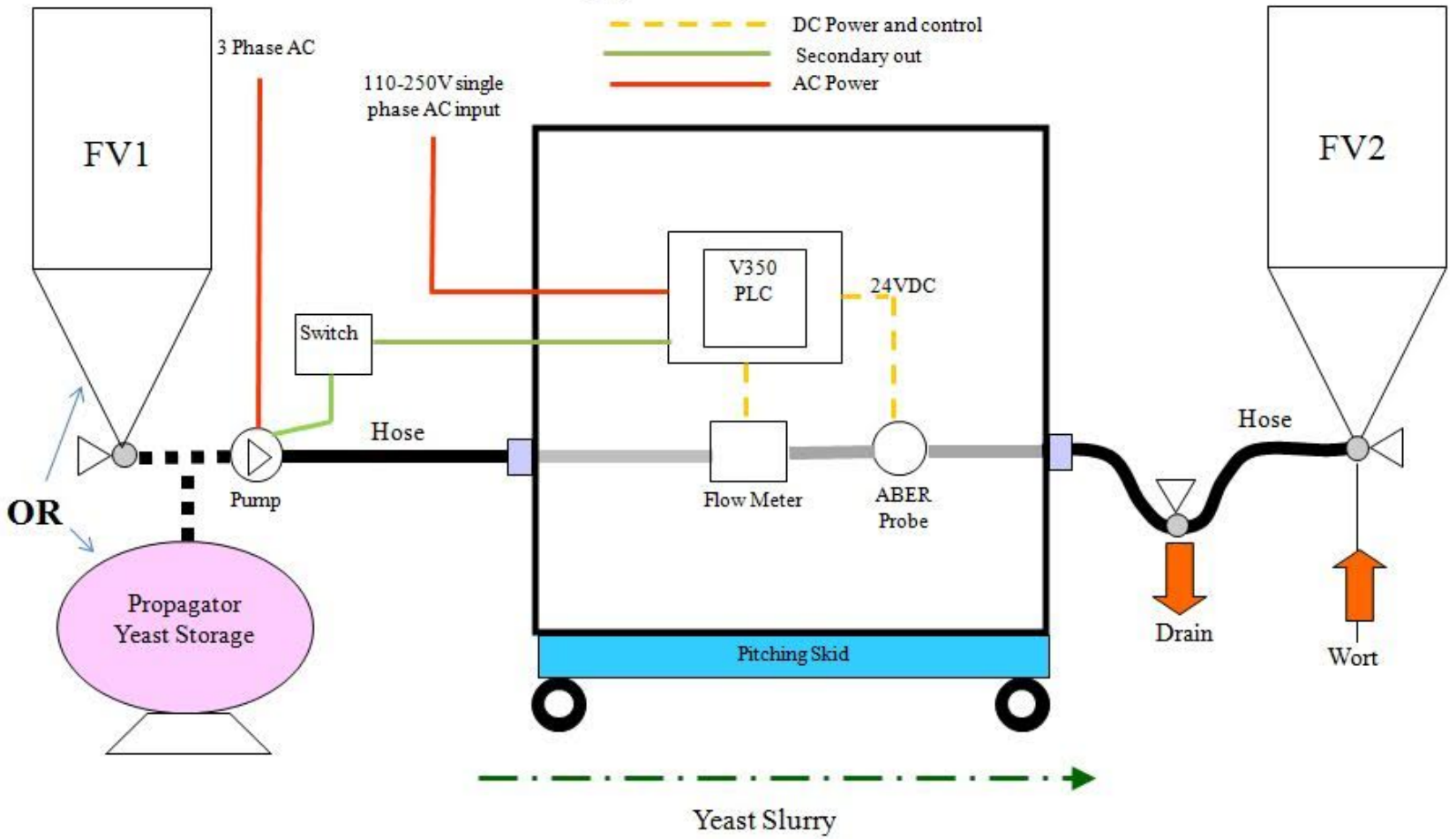
http://www.someecards.com/usercards/viewcard/MjAxMi02NDRhZDExZDRmZDdjODll

What is the PERFECTPITCH?



Application

From Yeast Propagation Tank **OR** FV1 to FV2 **Cone to Cone**



PERFECTPITCH CASE STUDY

- Performed at Meantime Brewing Company, London

- Ideal candidate:
  - Reputation
  - Focus on quality
  - Imminent expansion plans

http://www.aboutmygeneration.com/?p=19286
http://en.wikipedia.org/wiki/Meantime_Brewery
https://www.meantimebrewing.com/news-events/news/the-beer-tank-hits-the-road-/

PERFECTPITCH CASE STUDY

Objectives:

1. Assess functioning of PerfectPitch
2. Evaluate effect of new strategy on product/process parameters
3. Comparison with old strategy

Work done on one brand of beer – Brand A

http://www.aboutmygeneration.com/?p=19286
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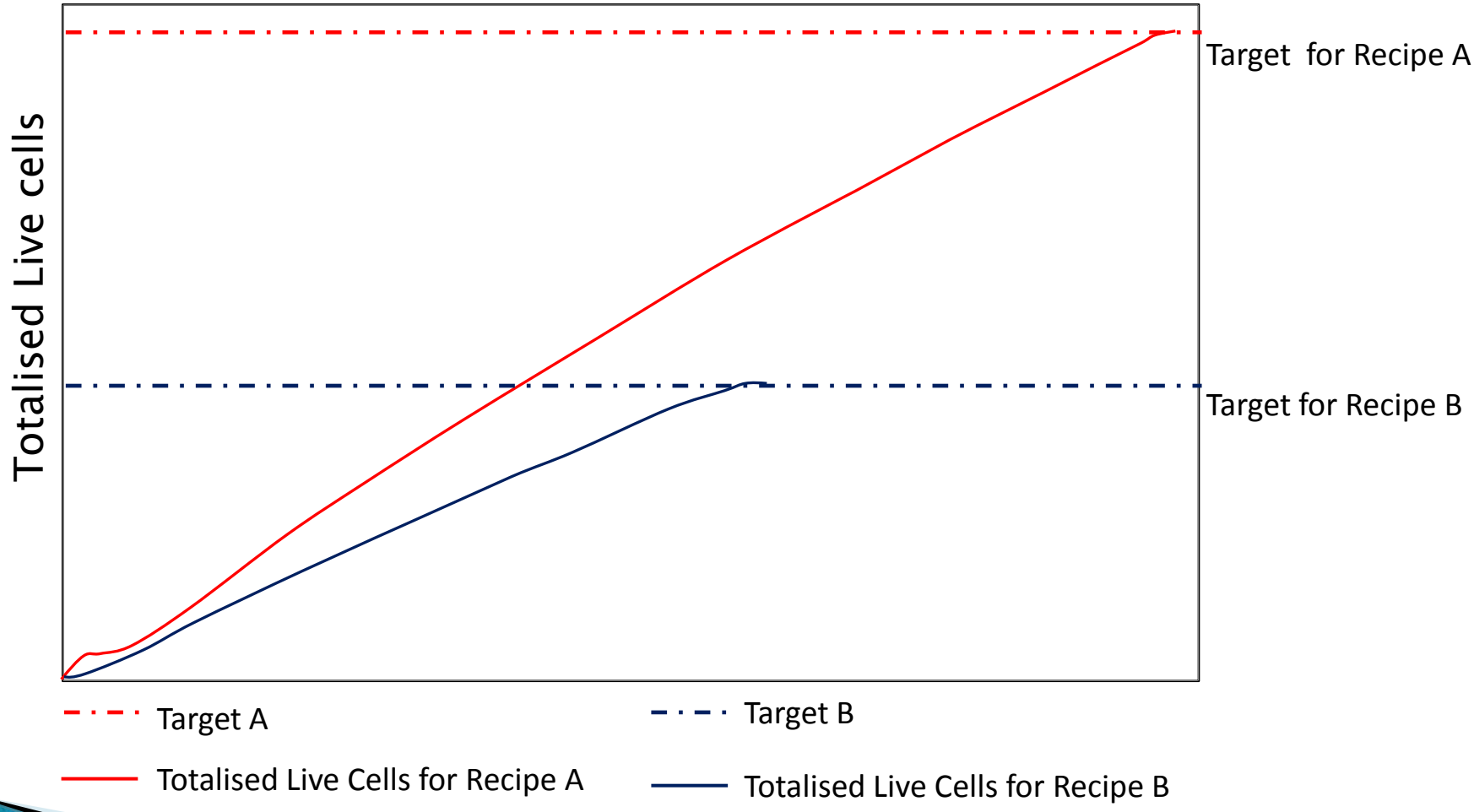
MEANTIME PP INSTALLATION

PERFECTPITCH CASE STUDY

Achieving different target cell concentrations in fermenters using the ABER PerfectPitch

First aim – Does it do its job? Different Recipes, different targets?



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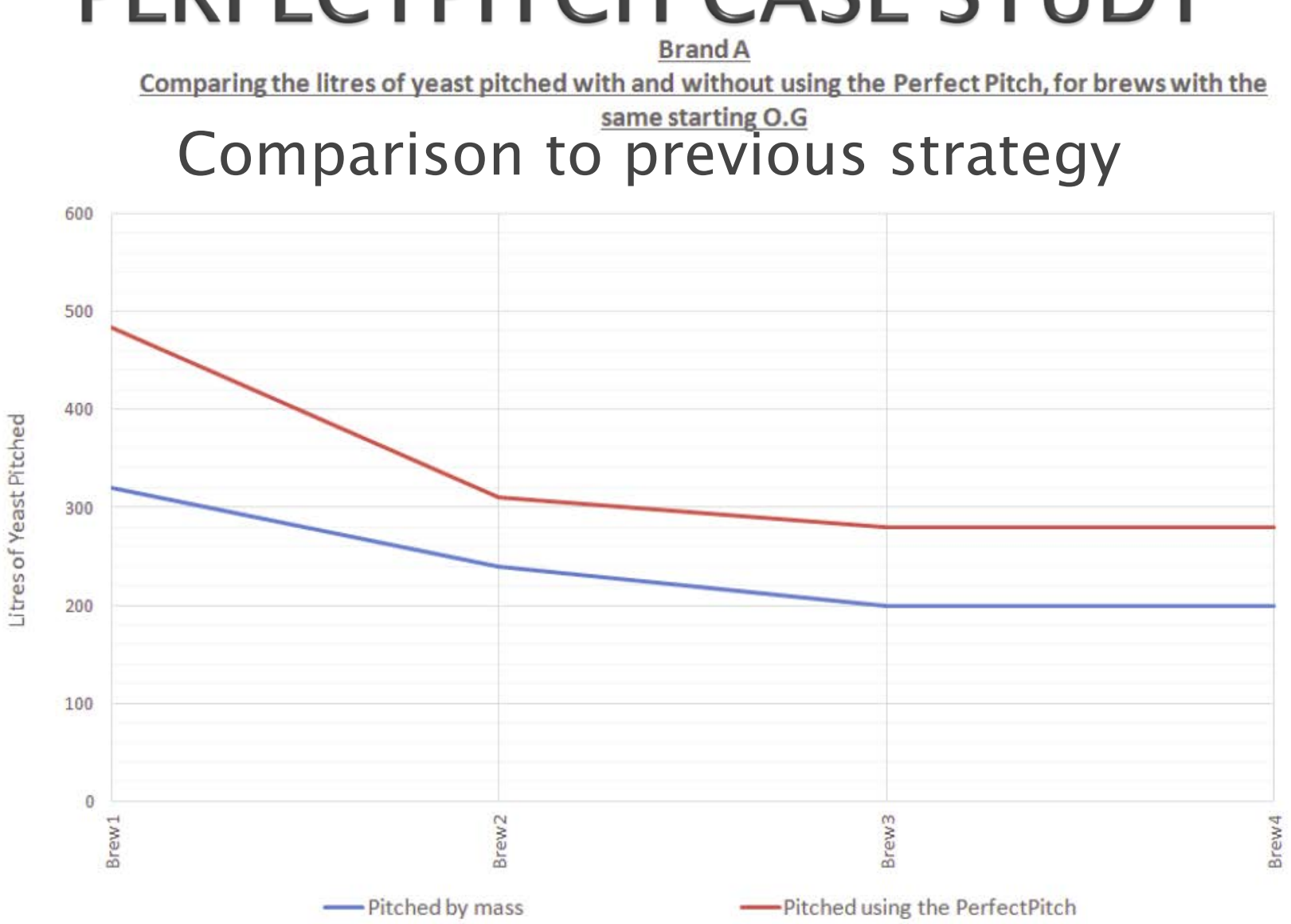
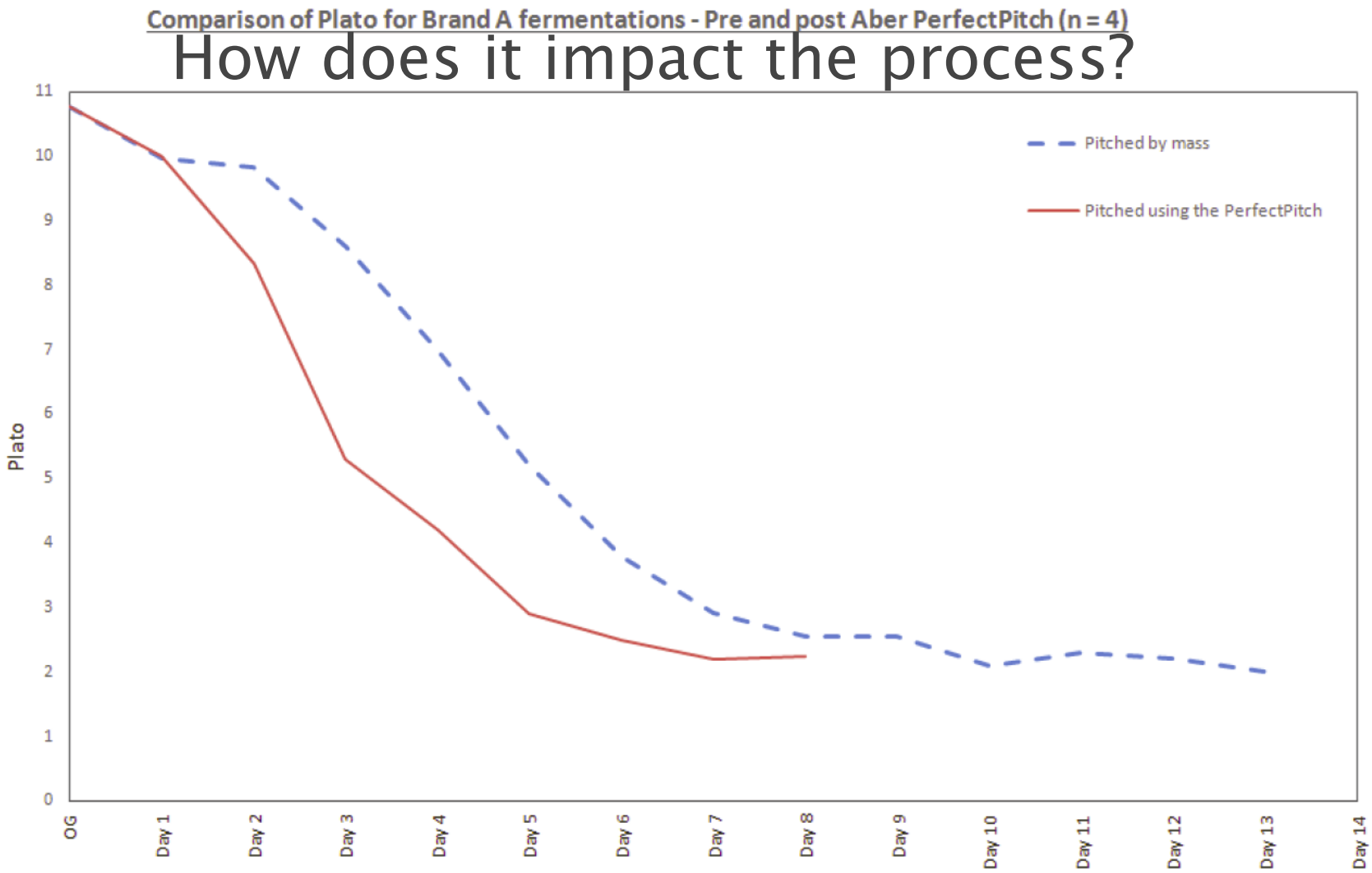


PERFECTPITCH CASE STUDY

How does it impact the process?



Feedback from the Case Study

- Easy to use
- Helped to get a more uniform fermentation profile plan of yeast
- Improved batch to batch consistency
- Could pitch different targets of live yeast cells effectively
- Pitched right amount of yeast litres when compared with different strategy

Feedback from the Case Study

- Improved fermentation efficiency
- Improved ABV on using PP, thus reduction in raw material expenditure
- Recent information –
  - Acquired by SAB Miller
  - Meantime increased production by 58% last year

THANK YOU!