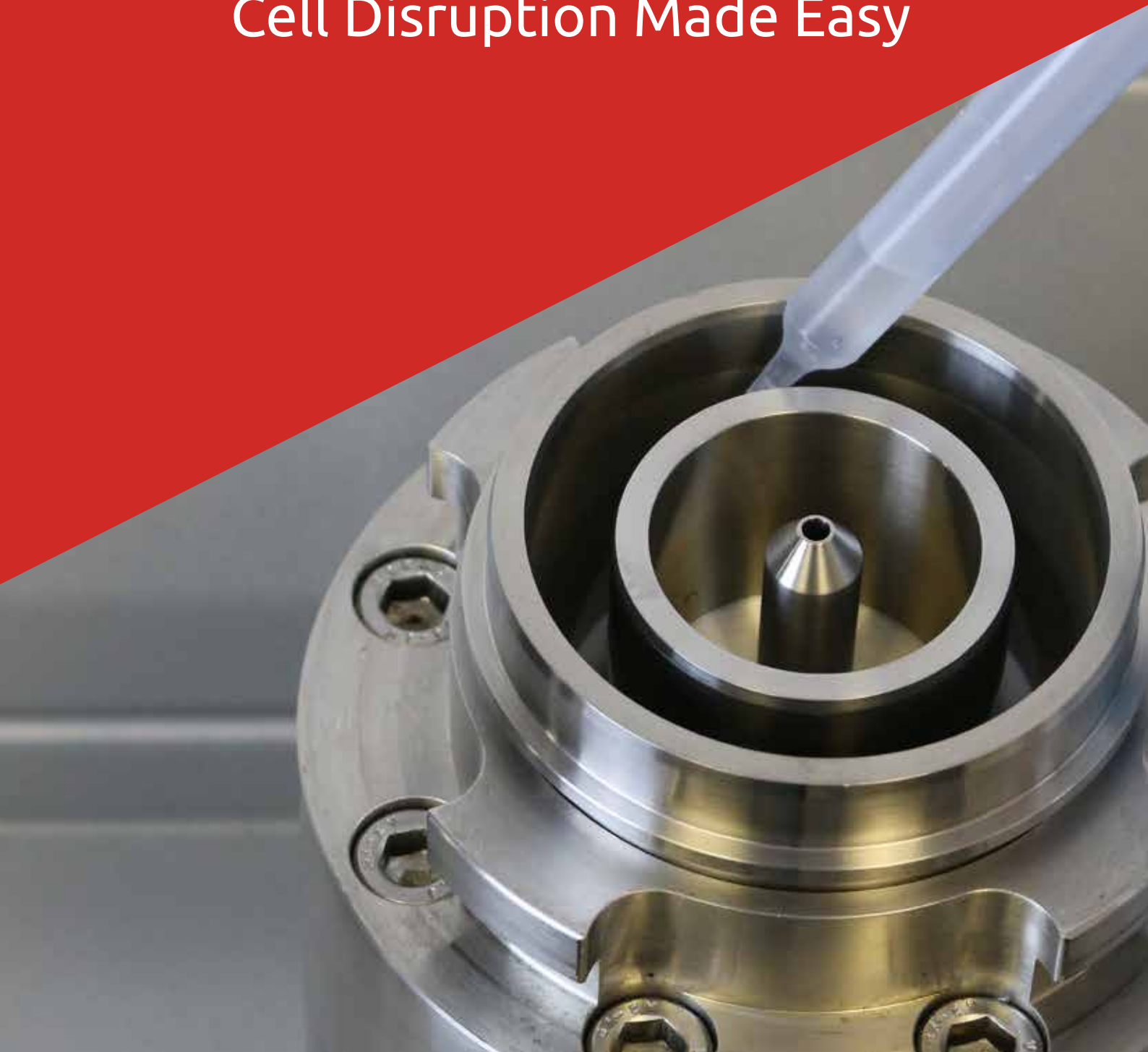
CONSTANT SYSTEMS LTD

Cell Disruption Made Easy



John Innes Centre - "*Our Constant Systems cell disruptor is a heavily used and essential instrument. It has been in use for some years now, and has proved to be durable, reliable and easy to use. It is backed up by good customer support and extremely helpful engineers.*"

Edinburgh University - *"We run our TS Benchtop 1.1 kW multiple times daily with various samples. It is an essential bit of equipment in the EPPF labs and continues to be extremely reliable and robust. The service support is also second to none!"*

University of Sienna - *"After the introduction of Constant Systems Cell Disruption in our laboratory, protocols of bacterial lysis were greatly improved."*

Queens University Belfast - *"We like the Constant System very much to disrupt bacteria for our applications in the isolation of membrane proteins. It is a very effective instrument much more versatile and accurate than the traditional French press system and the more classical disruption systems by sonication"*

Contents

About Constant Systems

Why choose Constant Systems Ltd?

Constant Systems Ltd. was established in 1989 and is based in Daventry, England.

Continual research and development has allowed Constant Systems Ltd. to design and manufacture highly reliable cell disruptors used in laboratory, biomedical and pharmaceutical fields worldwide.

Constant Systems Ltd. works with distributors across the globe, providing them with the skills needed to represent the company and its products in their given territory.

Constant Systems Ltd's products are well known for their reliability, reproducibility, efficacy and consistency, whatever the application they are used for.

The complete range of systems are fully scalable, offering solutions from research through to pilot and production scales.

What's on offer?

Constant Systems Ltd. is committed to its products and customers with the priority of ensuring their customers are satisfied with the purchase. Therefore, to give you peace of mind, they offer a 12 month warranty on their machines from installation.

The trained technicians and excellent Service Department are on hand to assist you with any questions you may have once you have received your new machine.

By having regular service maintenance visits you will be assured that your machine will be working at optimum level. Customers receive fantastic benefits for looking after their machines.

Constant Systems Ltd. has always been driven by constant improvement of the business process and products. The commitment in this area has enabled the company to meet the standard of ISO 9001:2008 transitioning to ISO 9001:2015 by April 2017. This is a guarantee of professional attitude and reliability. All of our machines are designed and assembled at our Northamptonshire site in the UK and built using the highest quality components manufactured by precision engineers.

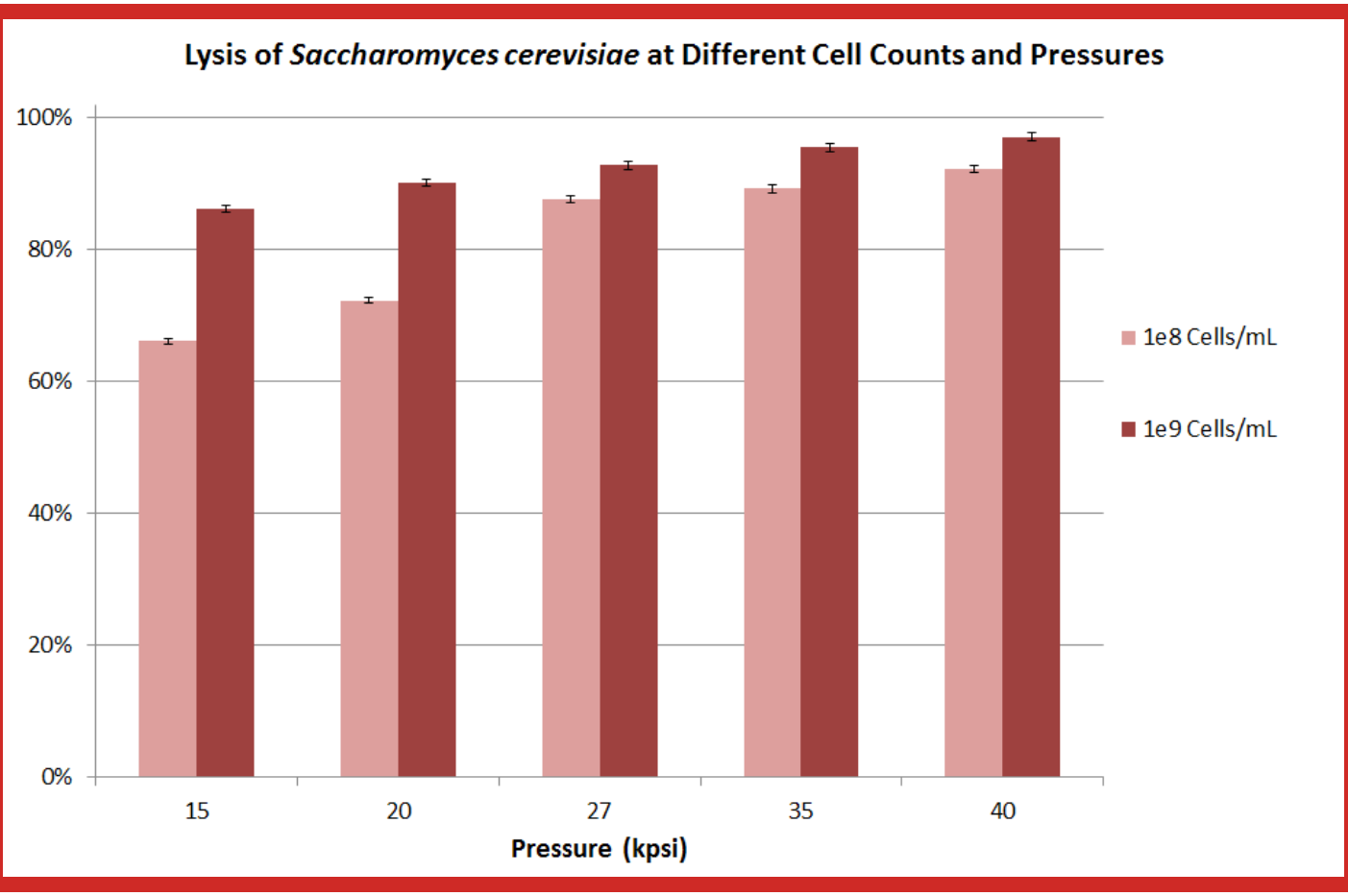
On-site Laboratory

The on-site laboratory at Constant Systems Ltd.'s production facility has been certified to contain biological samples classified as either hazard group 1 or 2 by the Advisory Committee on Dangerous Pathogens. As such, this facility enables Constant Systems Ltd. to provide detailed lysis efficiency data as well as offering services relating to protocol optimisation and personalised cleaning protocols.

The laboratory enables visitors to process their samples under the guidance of an experienced member of laboratory personnel or, if preferable, sample submission via courier may also be arranged.

While Constant Systems Ltd. have always been confident in the ability of their machines to lyse even the toughest cells. Having the laboratory on-site has enabled them to definitively prove that their systems are capable of lysing up to 99% of common expression systems, including *Escherichia coli* and *Saccharomyces cerevisiae*, as well as prove efficiency in lysing tougher samples such as *Pichia pastoris* and *Staphylococcus aureus.*

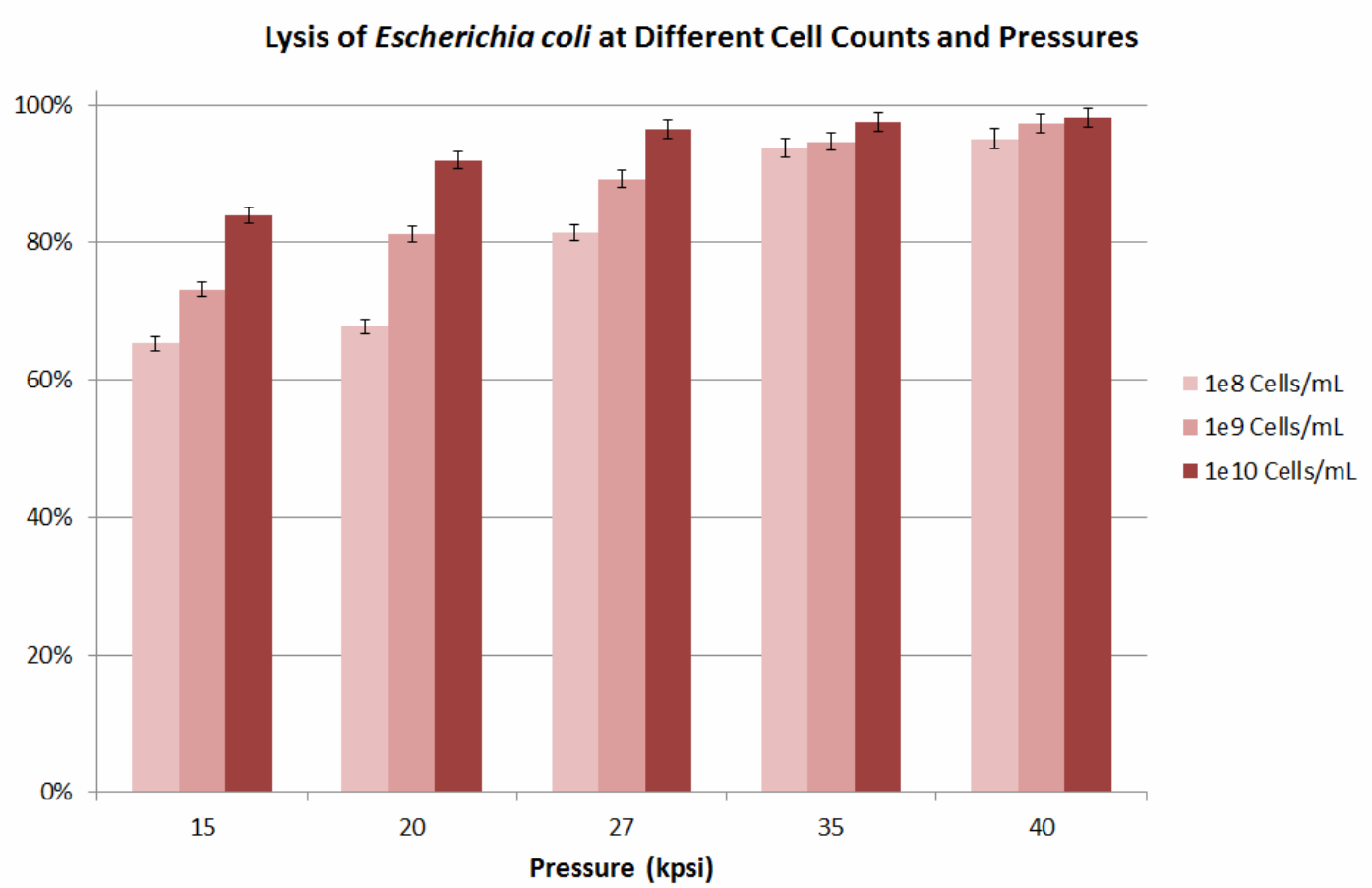
Efficacy of CSL Disruptors



Lyophilised Baker's Yeast (*Saccharomyces cerevisiae*) was used to inoculate 200 mL sterile YMB (Yeast Mold Broth: Peptone 5 g/L, Dextrose 10 g/L, Maltose 3 g/L, Yeast Extract 3g/L) in 1 L flasks which were then incubated at 30°C with shaking at approximately 100 rpm for 24 hours until a cell count of approximately 10^9 cells/mL was reached. A sample of this culture was then diluted by a factor of 10 with sterile YM.

The resulting culture was passed in 30 mL aliquots through a Constant Systems Ltd CF1 Cell Disruptor at pressures indicated. The machine was rinsed with 30 mL deionised water between each use.

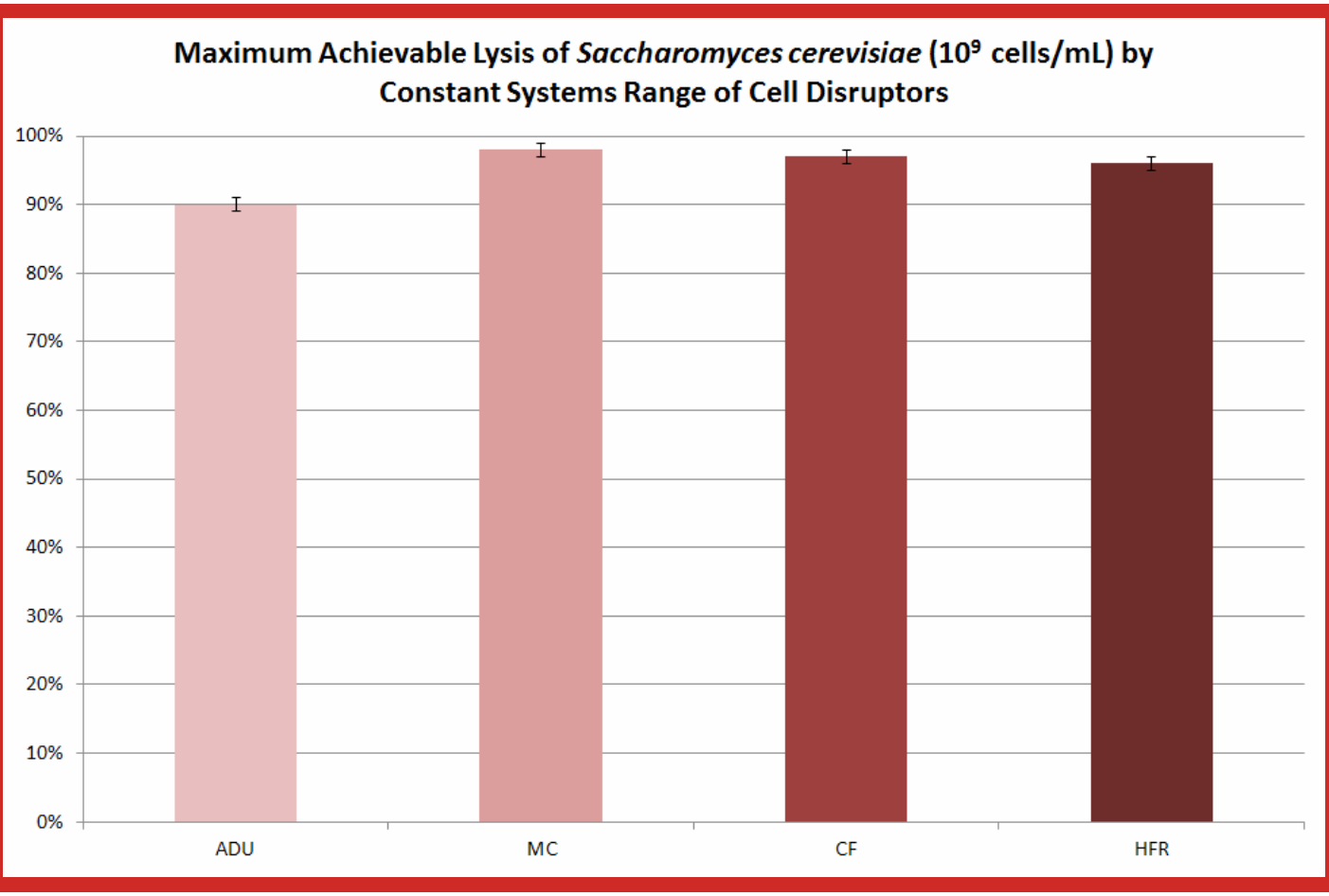
After being passed through the machines, 10 µL of lysate was mixed 1:1 with the viability stain Trypan Blue. White live cells and blue dead cells were counted using a hemocytometer. A sample of unlysed cells from the same culture was used as a control, from which the complete lysis percentage was calculated.



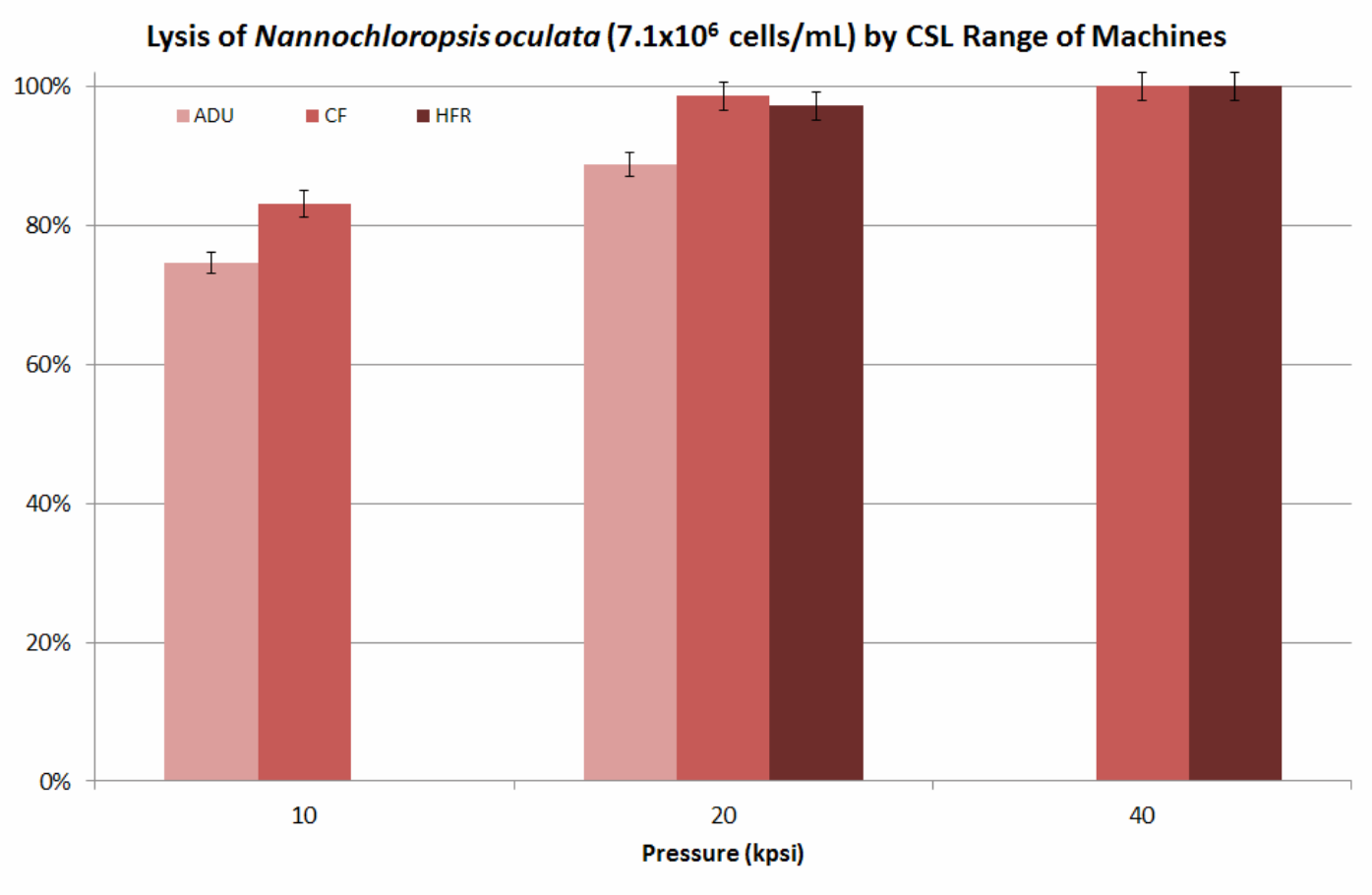
A single colony of *Escherichia coli* ATCC 8739 was used to inoculate 10 mL sterile LB (Lysogeny Broth: Tryptone 10 g/L, Sodium Chloride 10 g/L, Yeast Extract 5 g/L) and was grown overnight at 37°C with shaking at approximately 180 rpm. This starter culture was used in a ratio of 1% to inoculate 200 mL sterile LB in 1 L flasks. These flasks were incubated under the same conditions until cell densities of approximately 10^8, 10^9 and 10^{10} cells/mL were reached, with each flask being stored in a refrigerator once it had reached the assigned cell density.

The resulting culture was passed in 30 mL aliquots through a Constant Systems Ltd CF1 Cell Disruptor at pressures indicated. The machine was rinsed with 30 mL deionised water between each use.

After being passed through the machines, 10 µL of lysate was mixed 1:1 with the viability stain Trypan Blue. Live cells were counted using a hemocytometer. A sample of unlysed cells from the same culture was used as a control, from which the lysis percentage was calculated.



Cultures of *Saccharomyces cerevisiae* were grown in YM as previously described on Page 7 until cell densities of approximately 10^9 cells/mL were reached. These cultures were then processed individually by the four available machine models, all of which were operated at their maximum functional pressure. Samples of lysate were taken and cells were counted using a hemocytometer as previously described in order to provide comparative figures for maximum achievable lysis using the standard machine configurations.



A 500 mL starter culture of *Nannochloropsis oculata* was added to 5 L of dH_2O along with Reefphyto modified Guillard F/2 medium according to manufacturer's instructions. The culture was aerated and incubated in direct sunlight. Cell density was measured daily via hemocytometer readings and the culture was left until the cell density plateaued at approximately 10^7 cells/mL. The culture was then diluted to a total volume of 10 L and more Reefphyto medium was added accordingly. The culture was then again left in direct sunlight with aeration until the cell density plateaued once more at approximately 10^7 cells/mL.

A sample of the resulting culture was processed individually by Constant Systems Ltd. 'ADU', 'CF1' and 'HFR' systems at the pressures indicated.

Immediately after completing the run on each machine, 10 µL of each effluent sample was analysed and cells counted using a haemocytometer. A sample of unlysed cells from the same culture was used as a control, from which the complete lysis percentage was calculated.

MC

The MC will process 1-40 mL over 5 shots and is ideal for customers working with up to 80 mL of sample.

This system also has the ability to process 0.5-8 mL of liquid, solid and frozen samples such as plant/mammalian tissue in 1 shot. This means you do not always need to add a buffer/ solution to your sample!

- 99% cell lysis efficiency with *Saccharomyces cerevisiae*
- Minimal dead loss of 0.5 mL
- Quick & easy to use, simply plug in and switch on
- No need to prime
- Collection cups provided can be transferred to and from ice/freezer for temperature control
- Consistent pressure giving you repeatable results
- Full containment
- Pipette or pour your sample from the collection cup after processing
- Can be dismantled for autoclaving

CF Range

The CF1 will process up to 100 mL per minute (at maximum pressure) and is ideal for customers working with up to 5 L of sample.

The CF2 will process up to 200 mL per minute (at maximum pressure) and is ideal for customers working with 5 L plus of sample.

There is also the option to also process solid and frozen samples on this system along with smaller volumes from 0.5 - 10 mL with with the One Shot Head Adaptor.

- 99% cell lysis efficiency with *Saccharomyces cerevisiae*
- Minimal dead loss of up to 2 mL
- Quick & easy to use, simply plug in and switch on
- No need to prime
- Touch screen control
- Cooling jacket surrounds the disruption head, simply fit your chiller to the disruption head to keep your sample cool whilst it is being processed
- Consistent pressure giving you repeatable results
- Automatic shutdown allowing you to continue with other tasks once sample has been processed
- Disruption head can easily be dismantled for autoclaving
- CIP and SIP options available upon request
- Peristaltic pump fitted as standard on CF2 machine to automate larger volume processing. Pump can be fitted to CF1 if requested

ADU

The ADU is ideal for customers on a budget, with flow rates of up to 20 L/hr (dependent on pressure and air supply) it is suitable for research and production work.

- 85% lysis efficiency with *Saccharomyces cerevisiae*
- Lysis efficiency comparable with the MC , CF1 and CF2 models with equivalent parameter configuration
- This portable system is a self contained air-driven unit
- Configuration optimisable to maximise lysis efficiency of different cell types
- Various flow rates are available depending on pressure and flow of compressed air
- No electricity required

HFR

Constant Systems Ltd's production system can process up to 150 L/hr which is perfect for customers who produce high volumes of cell derived product.

This machine can be tailored to your needs as there are various configurations available.

- Over 95% lysis efficiency with *Saccharomyces cerevisiae*
- Incorporates Constant Systems Ltd.'s unique disruption mechanism and precise hydraulic operating control system
- Flow rate up to 150 L/hr at maximum pressure
- Various flow rates are available depending on desired maximum pressure
- Pressure consistent and stable during the disruption cycle
- Various configurations available for inlet and outlet, allowing direct connections to upstream and downstream equipment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