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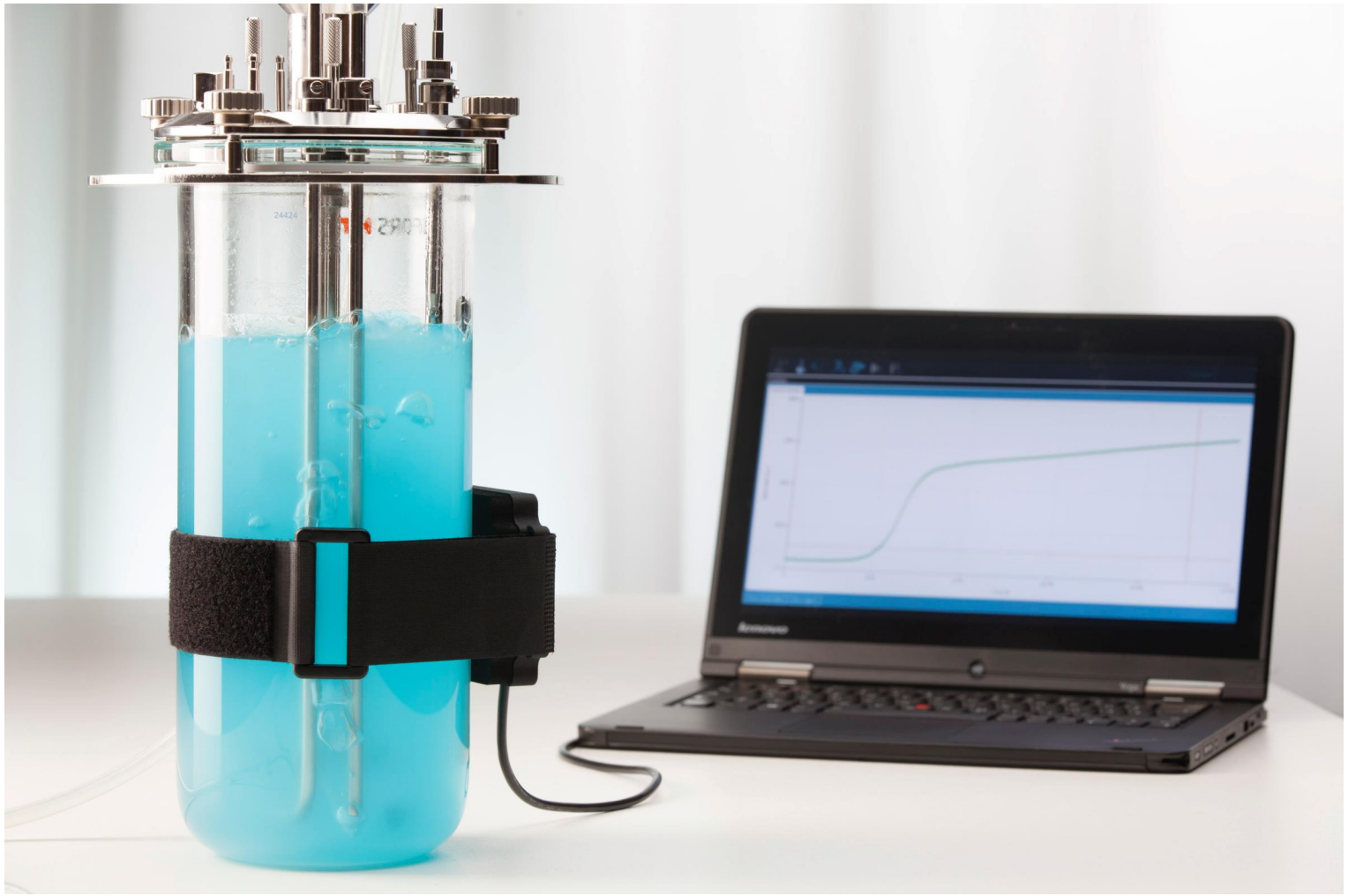
CGQ BioR

Online Biomass Monitoring for Bioreactors

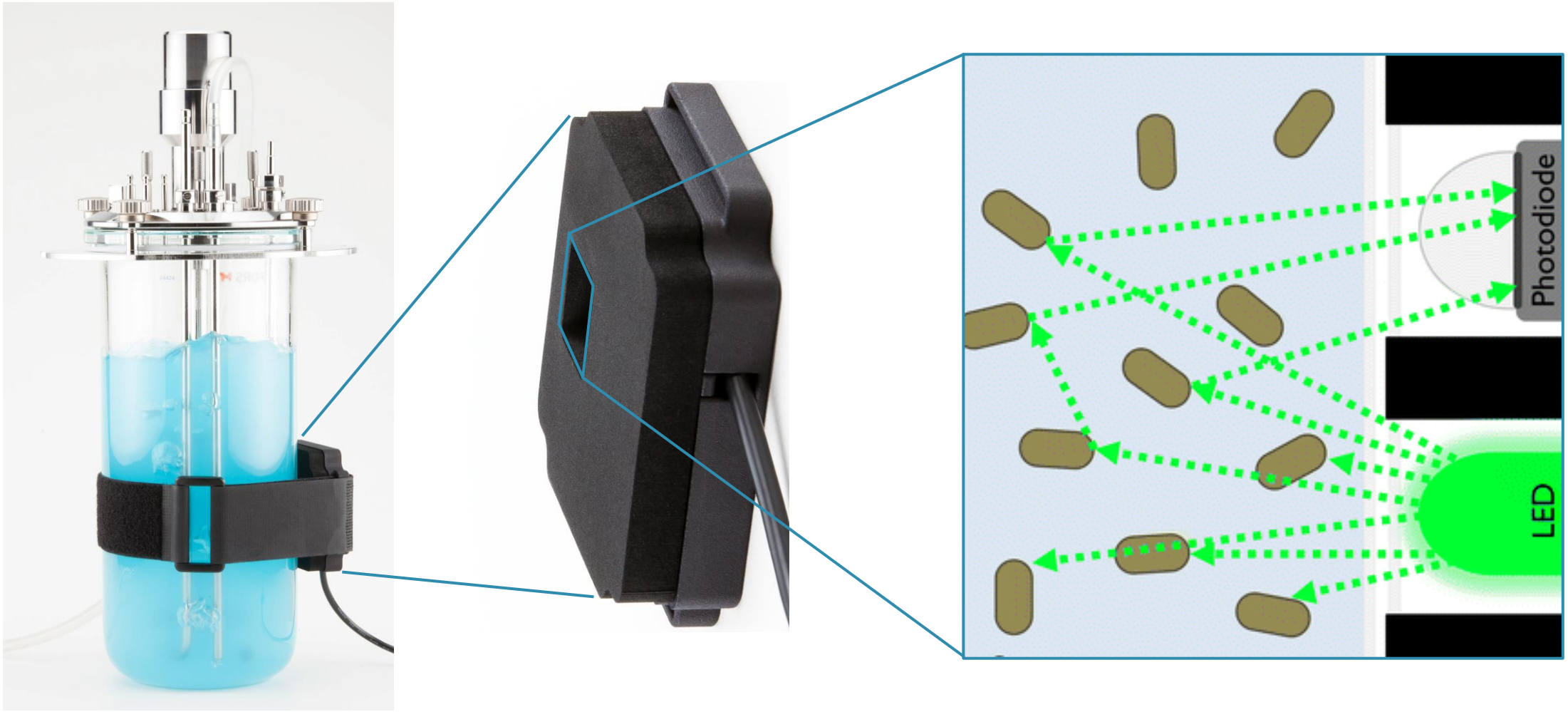
The CGQ BioR is a sensor for online biomass monitoring in various types and scales of bioreactors.

The CGQ BioR



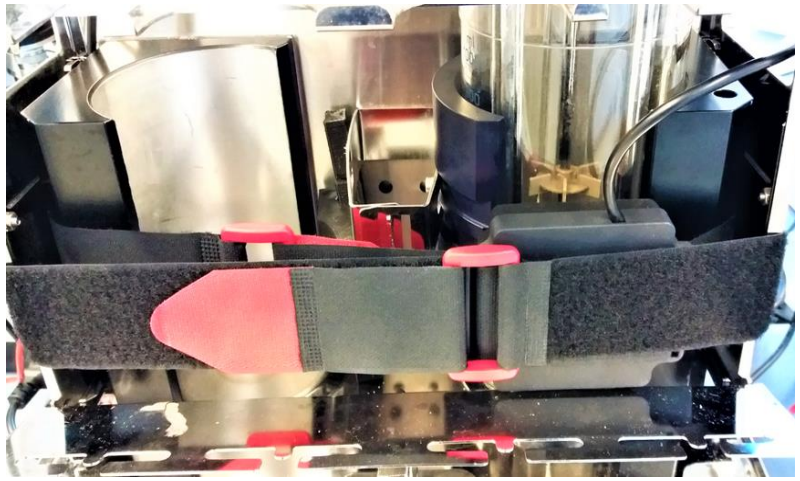
Backscatter measurements are used to monitor the biomass non-invasively through the wall of the bioreactor.

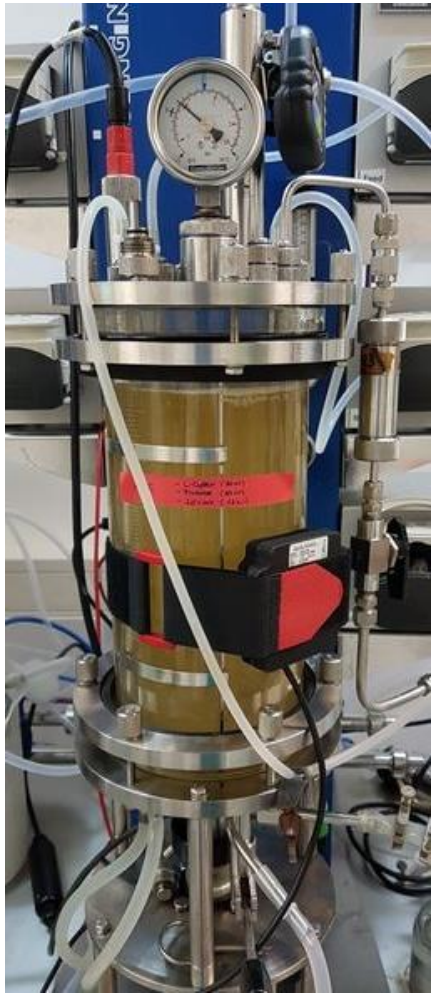
The CGQ BioR Sensor & Its Principle of Measurement



The CGQ BioR is mounted to the outside of the reactor vessel and is compatible with the majority of bioreactors (single wall and double wall).

Exemplary Pictures of CGQ BioR Sensors Mounted to Different Types of Bioreactors





The CGQ BioR creates significant value for its users by saving time and costs as well as creating detailed understanding of the bioprocess.

CGQ BioR Features & Benefits

Features & Benefits

Non-Invasive Plug & Play Technology
No cleaning or autoclaving, no ports blocked, quickly install/uninstall at any time

Compatible with Various Bioreactors
Fully compatible with most bioreactors from all common manufacturers

Detailed Microbial Growth Kinetics in Real-Time
Real-time analysis of important process parameters in highest precision

One Sensor for All Needs
Covers the OD range from 0.5 to 300 in two measurement modes

Saves Time & Costs
No manual sampling for biomass quantification needed, increases productivity and reduces personnel costs

Monitoring at All Times
Continuous measurements: during the day, at night and over the weekend

The CGQ BioR has several clear advantages over currently used invasive biomass sensor for bioreactors.

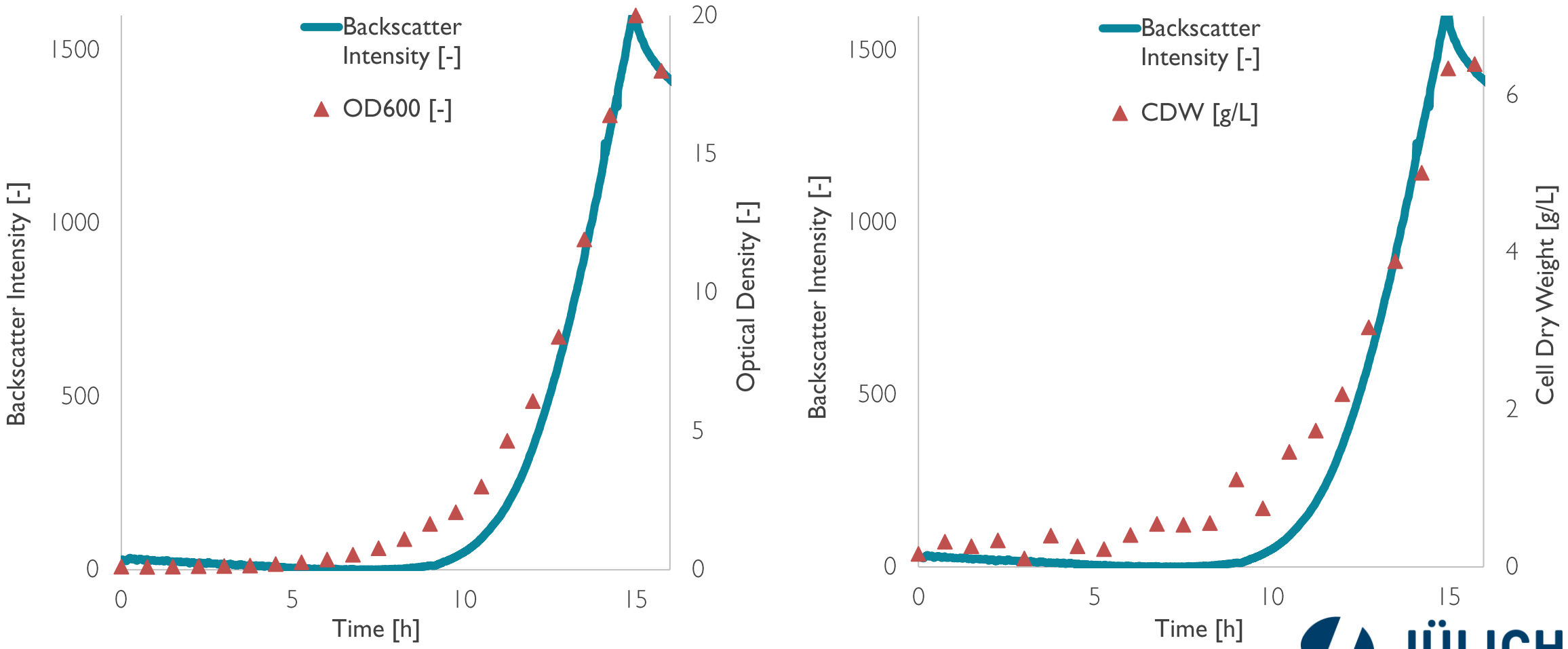
Comparison: CGQ BioR vs. Invasive Biomass Sensor

	CGQ BioR	Invasive Biomass Sensor
Cleaning & Autoclaving	– Non-invasive sensor that does not need to be autoclaved or cleaned	– Needs to be cleaned and autoclaved with the vessel after every use
Available Ports	– No ports blocked since the BioR is attached to the outside of the glass vessel	– Requires a port
Flexibility	– Can be installed/uninstalled at any given time during the fermentation (plug and play)	– Must be installed before the experiment is started
Vessel Compatibility	– Compatible with most vessel types and sizes – Simply attach to the glass wall or a glass window	– Can often only be used for one vessel size (limited by probe length)
OD Range	– Standard Mode (521 nm): OD 0.5-50* – High Cell Density Mode (940 nm): OD 15-300*	– Depending on manufacturer – Usually limited to a specific OD range

*Depending on vessel type/size, media, organism and other factors

The CGQ BioR shows good correlation with offline biomass data such as OD_{600} and Cell Dry Weight.

CGQ BioR & Offline Biomass Measurements (1/2): *Corynebacterium glutamicum*



Corynebacterium glutamicum, CGXII Medium, DASGIP Bioblock (1,8 l), 30 °C

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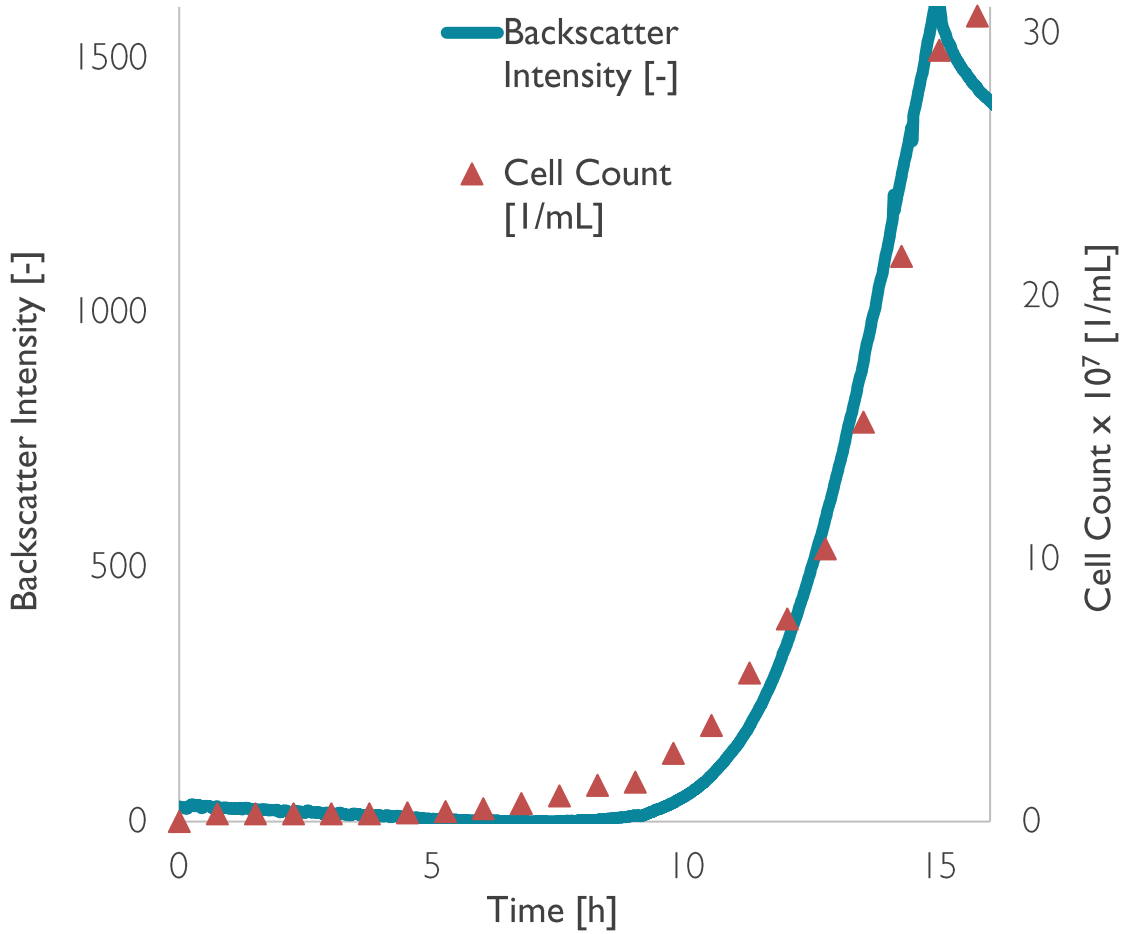
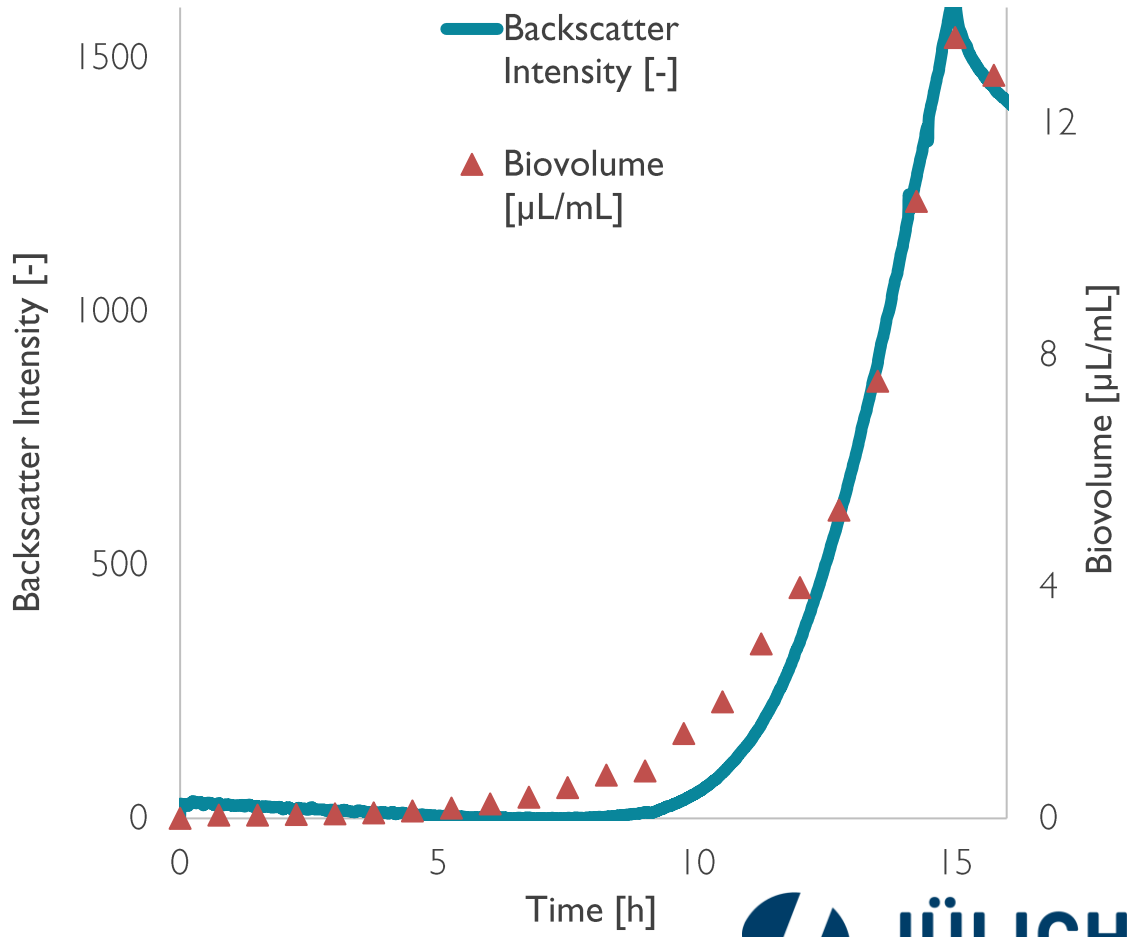
The CGQ BioR shows good correlation with offline biomass data such as Cell Count and Biovolume.

CGQ BioR & Offline Biomass Measurements (2/2): *Corynebacterium glutamicum*





Corynebacterium glutamicum, CGXII Medium, DASGIP Bioblock (1,8 l), 30 °C

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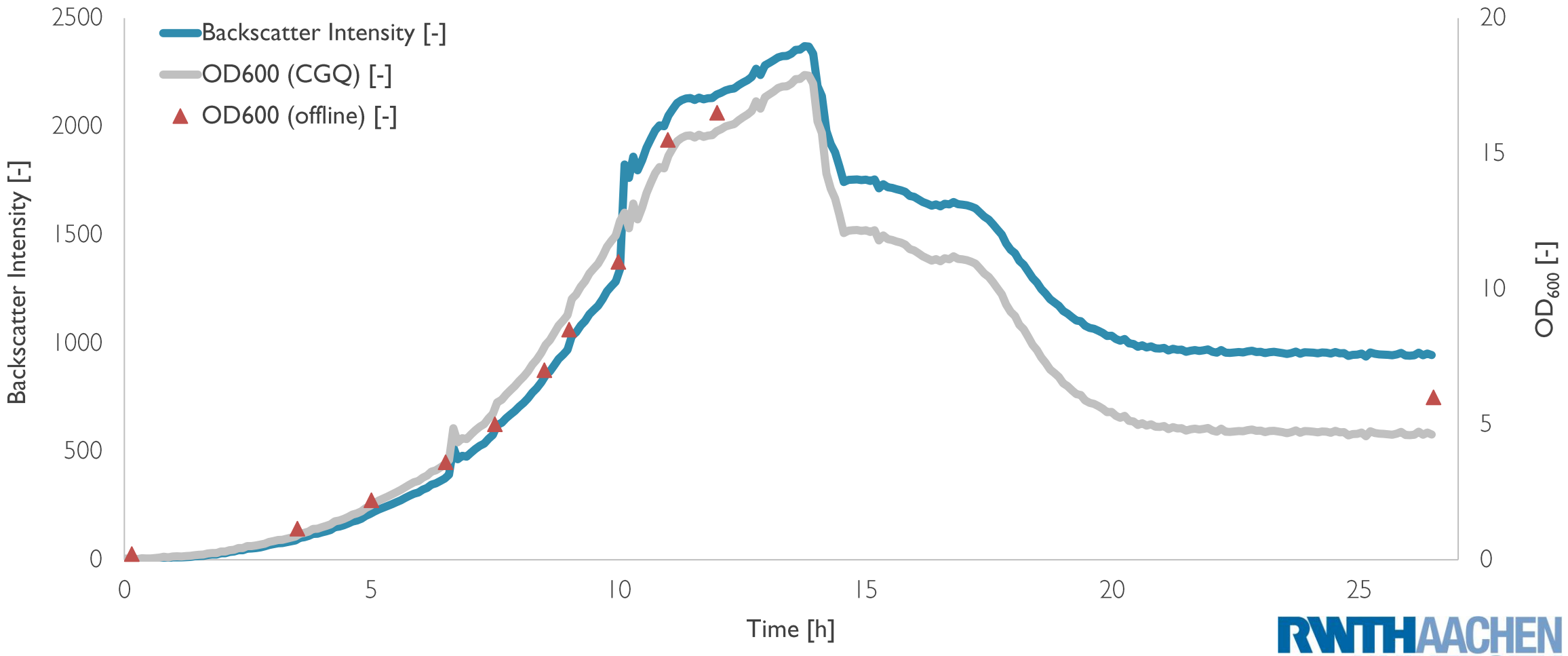
Using a calibration file, the CGQ BioR is able to directly convert backscatter measurements to OD values.

CGQ BioR and Offline OD Measurements: *Bacillus subtillis*



Bacillus subtilis, Minimal Medium, New Brunswick Glass Bioreactor (3 l), 37 °C

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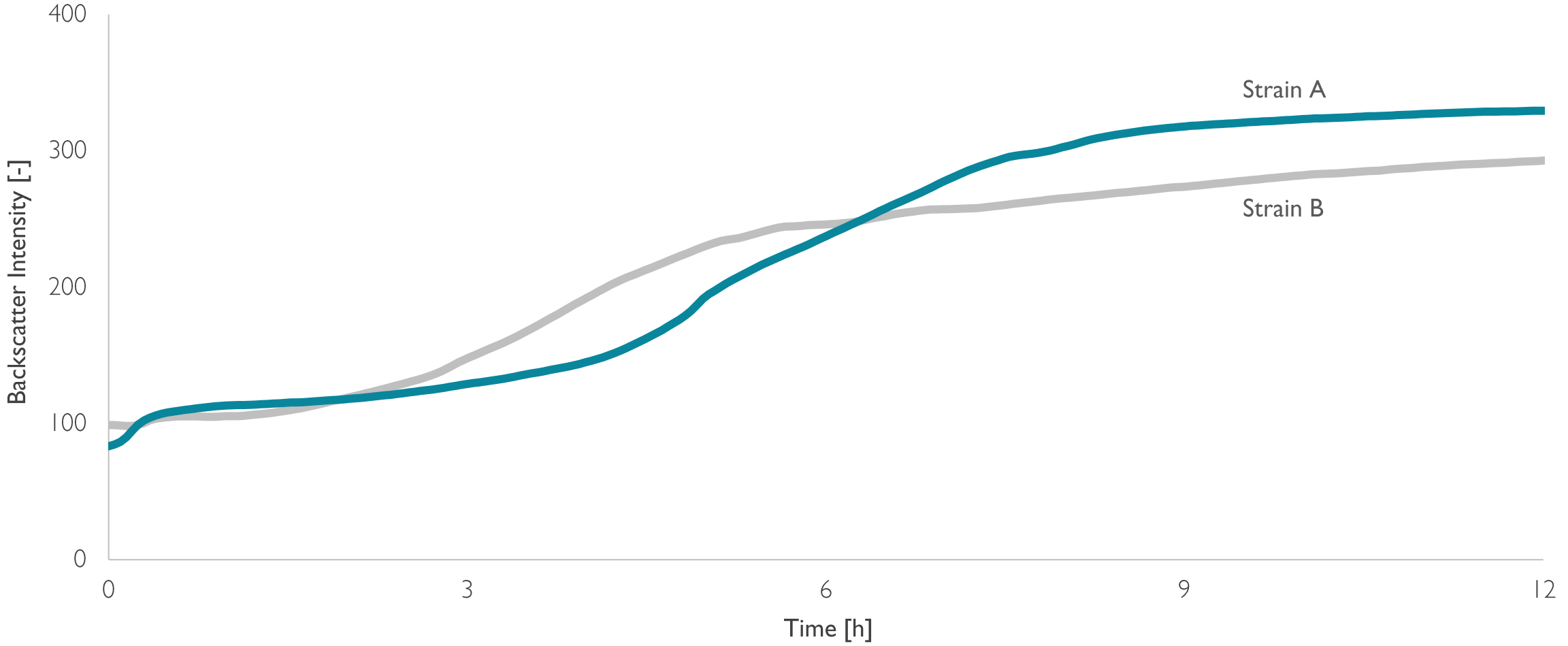
The CGQ BioR is ideal for screening experiments in bioreactors such as strain or media comparisons.

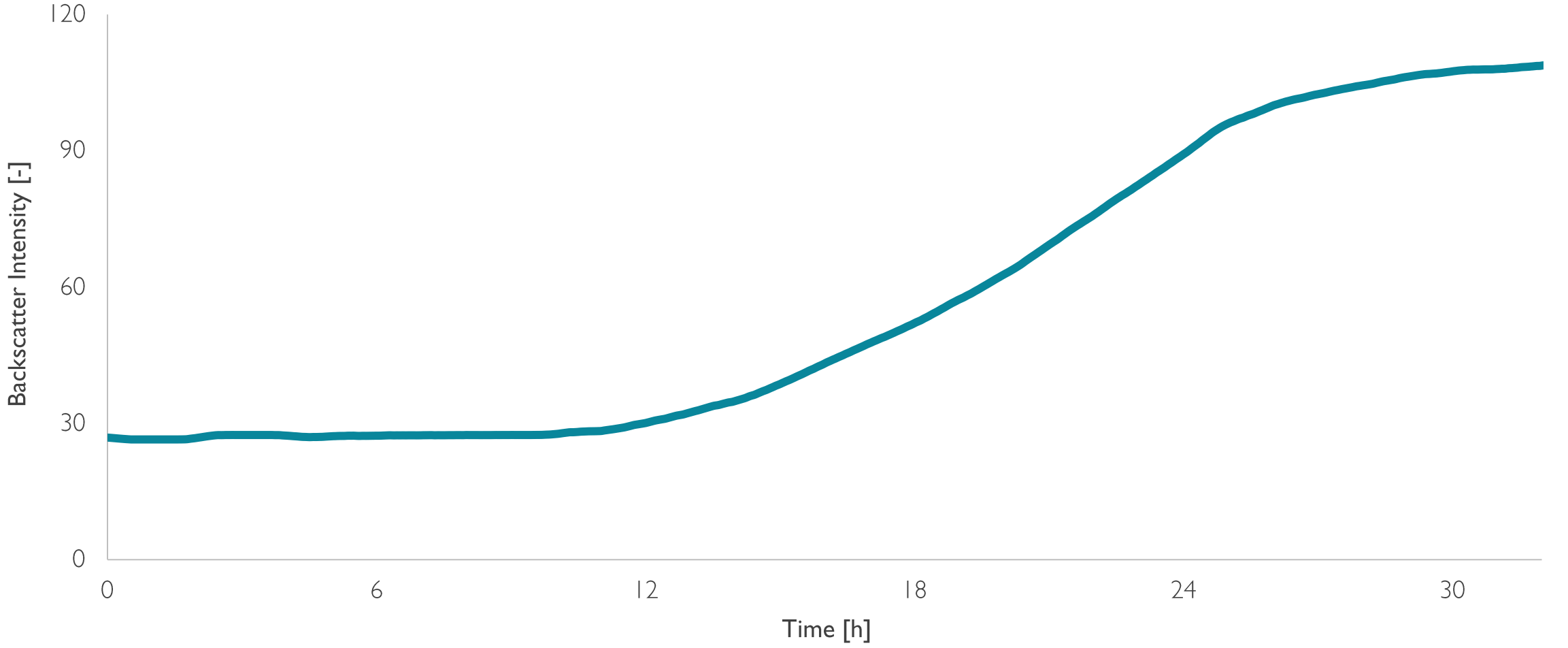
CGQ BioR Measurement: Different *Escherichia coli* Strains



Escherichia coli, HCDC Medium, Infors Labfors (7,5 l), 37 °C

The CGQ BioR allows for non-invasive online biomass monitoring in glass bioreactors with a double wall.

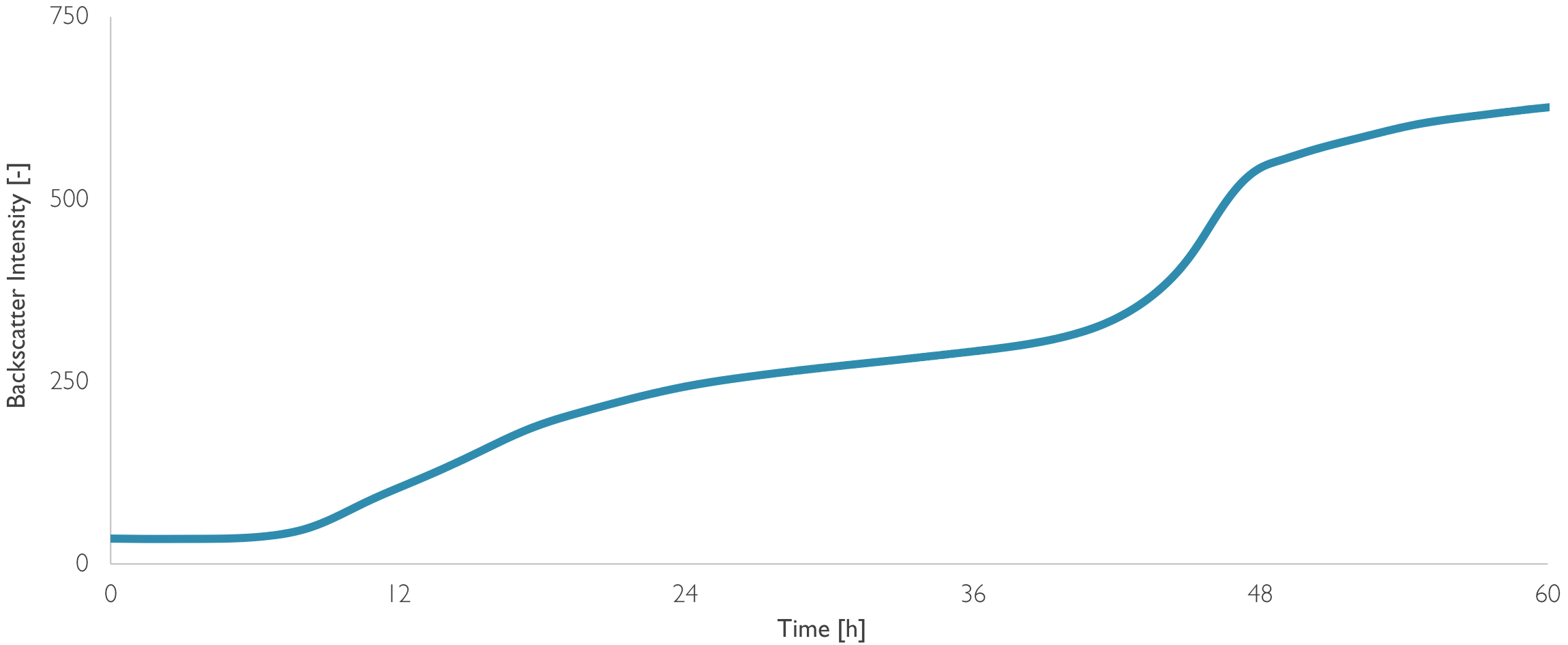
CGQ BioR Measurement: *Escherichia coli*



Escherichia coli BL21, M9 Medium, Applikon Glass Bioreactor (7,5 l), Room Temperature

The high data density of CGQ BioR measurements enables the user to detect and visualize process events like metabolic shifts.

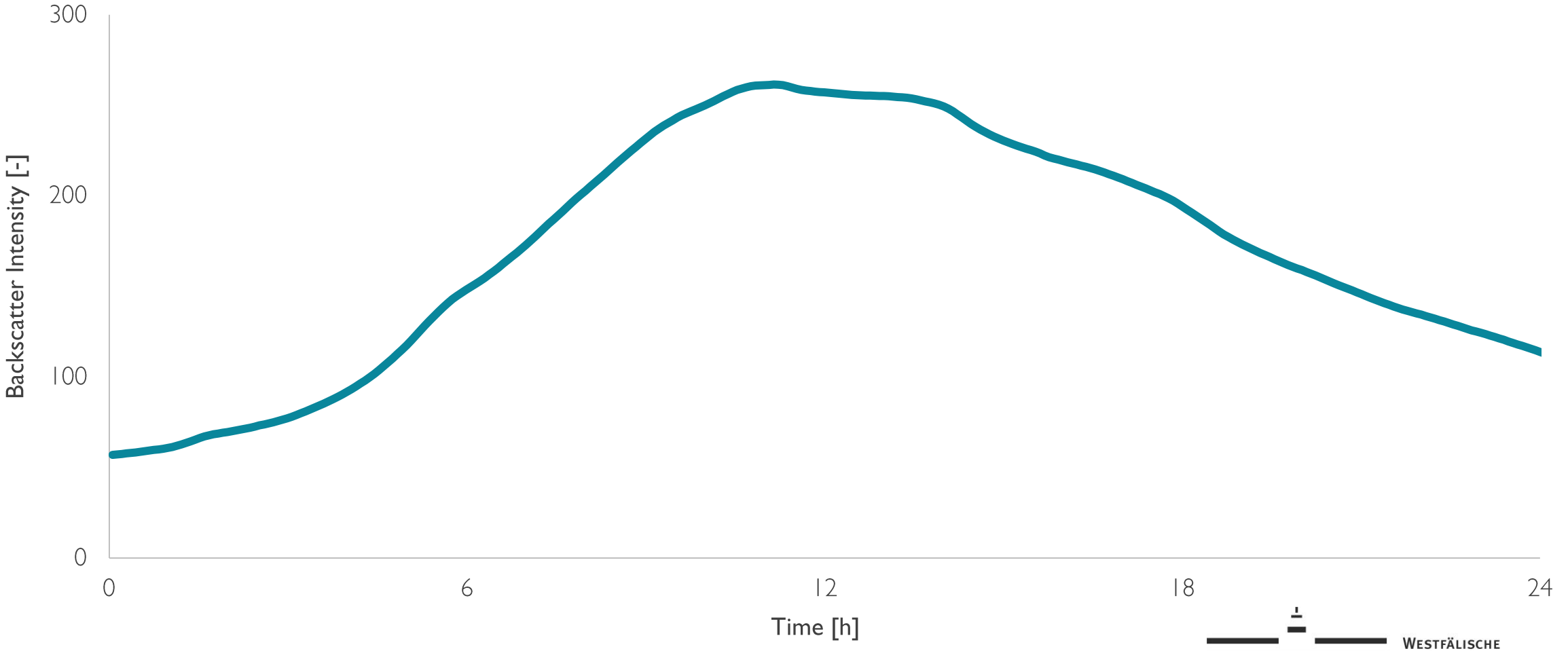
CGQ BioR Measurement: *Saccharomyces cerevisiae* (Diauxic Growth)



Saccharomyces cerevisiae, YPD Medium, Applikon Glass Bioreactor (7,5 l), Room Temperature

The CGQ BioR allows the user to closely follow the growth but also the dying of his/her cultures.

CGQ BioR Measurement: *Amycolatopsis* sp. ATCC 39116



Amycolatopsis sp. ATCC 39116, Glucose Yeast & Malt Medium, Sartorius BIOSTAT b plus (2 l), 45 °C

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