

RoboLector®

Automated Fermentation



High-Throughput
Real-Time Monitoring
Scalability
Automation



The Robotic Solution for your Fermentation

RoboLector®

The RoboLector® consists of a standard liquid handling robot and a BioLector®.

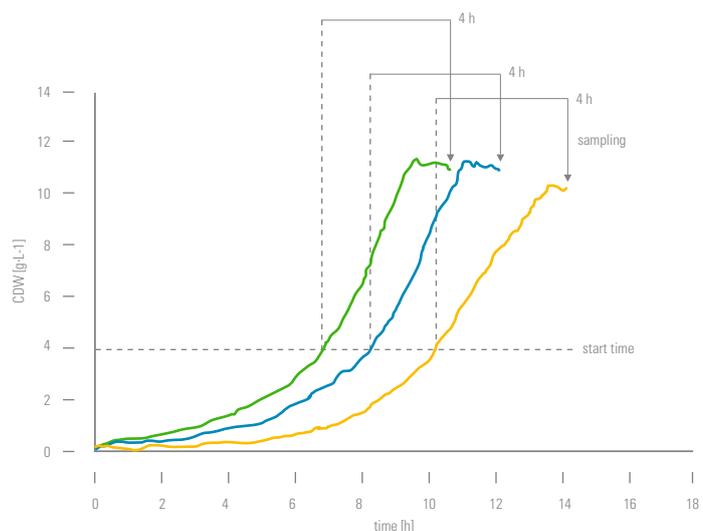
This unique automated fermentation platform combines the high-throughput fermentation and online monitoring capability of the BioLector® with the precise and accurate liquid handling of a robotic system. For the first time, automated fermentations in microbioreactors fulfill the requirements of modern fermentation processes and bioprocess development. The RoboLector® autonomously prepares media compositions, amongst others, from design of experiments (DoE) tests followed by an online-monitored high-throughput fermentation. Furthermore, pH adjustments can be made, inducers as well as feed solutions can be added to each process according to a pre-defined schedule or triggered by online process signals. Automated sampling into various targets including a freezing and a cooling station facilitates optimal process monitoring and control.

Applications

- Automated sampling
- Automated induction
- Induction profiling
- Synchronized process manipulation
- pH profiling
- Feeding profiling
- Media preparation
- Triggered process manipulation
- Process characterization
- High-throughput protein expression
- Automated upstream processing with microbial cultures
- Combination with automated downstream processing

Measurements

Triggered controlled sampling



C. glutamicum ATCC 13032 pXMJ 19: SP-Cutinase T=30 °C, 1200 rpm, 3mm, 1 mL media: CG XII, 0.5 mM IPTG

Source: Rohe et al. Microbial Cell Factories 2012, 11:144

Full Process Understanding



Features

Fermentation Modes

- Biomass dependent sampling or dosing
- Time dependent sampling or dosing
- DO or time controlled feeding
- Fed-batch with bolus feeding
- Repeated fed-batch

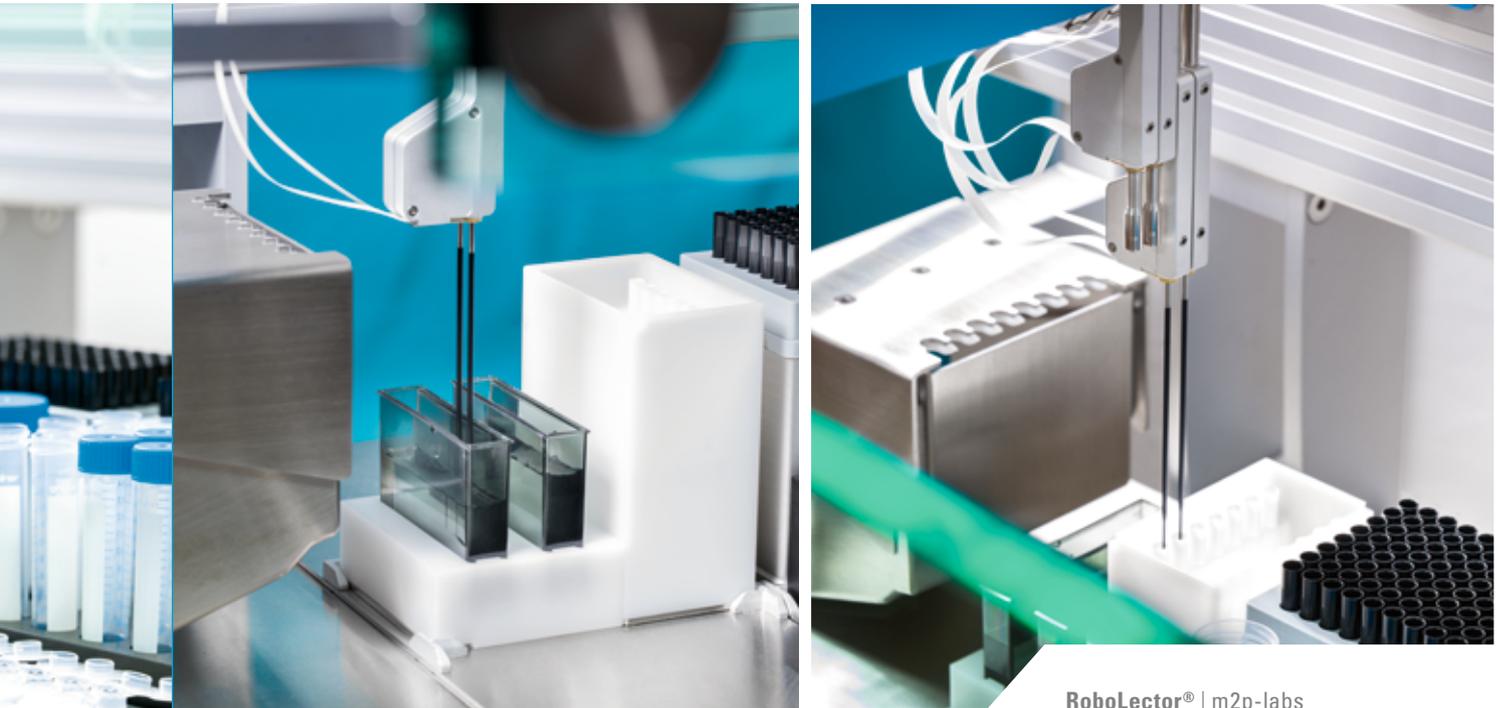
Online Trigger Signals

- Biomass concentration
- pH, DO (using optodes)
- Fluorescent molecules (GFP, YFP, DsRed ...)
- NAD(P)H and riboflavins
- Process or induction time
- Working volume

Operating Principle



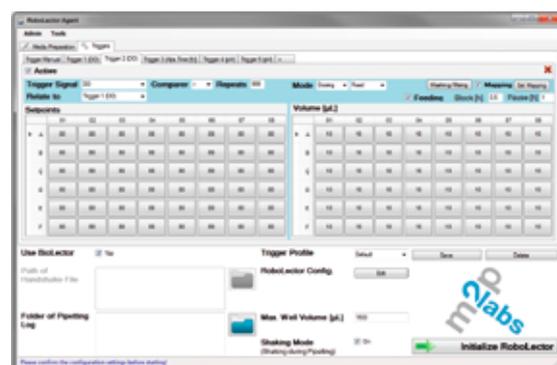
Access of pipetting tips to the shaking microtiter plate in the BioLector®



Advantages

- Automated upstream processing of up to 48 parallel fermentations
- Continuous operation 24 hours/day and 7 days/week
- Plug & Play disposable technology
- Design of experiments (DoE)
- Detailed process understanding in short time
- Excellent pipetting accuracy (< 5 %) and reproducibility (CV < 5 %)
- Flexible tip configuration (1–8 tips)
- Reliable scale up to lab-fermenters
- Fast and easy data analysis
- A valuable tool for PAT and QbD
- Combination with HT-downstream
- Processing units possible (for custom made solutions¹)

Process Design Software



RoboLector® Agent Software for Fermentation Process Design

Technical Specifications

RoboLector®

	Robo S	RoboLector® L	RoboLector® XL
	Art.-No. G-RL-100	Art.-No. G-RL-200	Art.-No. G-RL-800
	BioLector® not integrated	BioLector® integrated	BioLector® integrated
Operation Conditions BioLector®			
Plate format	48	48	48
Working volume	800 – 2400 µL	800 – 2400 µL	800 – 2400 µL
Temperature, minimum	5 °C below RT (room temperature)	5 °C below RT (room temperature)	5 °C below RT (room temperature)
Temperature, maximum	50 °C	50 °C	50 °C
Gas atmosphere	Various, see BioLector®	Various, see BioLector®	Various, see BioLector®
Humidity	> 75 % rH	> 75 % rH	> 75 % rH
Orbital shaker	400 – 1500 rpm at 3 mm (diameter)	400 – 1500 rpm at 3 mm (diameter)	400 – 1500 rpm at 3 mm (diameter)
Liquid Handler			
Robotic arms	1	1	1
Arm type	Liquid handling	Liquid handling	Liquid handling
Pipetting channels	1	2 or 4	8
Pipetting volume			
with disposable tips	10 – 950 µl	10 – 950 µl	10 – 950 µl
with washable tips		10 – 1000 µl	10 – 1000 µl
Liquid level detection	By capacity in conductive liquids	By capacity in conductive liquids	By capacity in conductive liquids
Type of tips	Disposable	Fixed, disposable and mixed	Fixed, disposable and mixed
Max. deck positions (SBS footprint)	5	16	20
Modules			
Dimensions (WxDxH)	566 × 460 × 649 mm	1788 × 825 × 920 mm	2009 × 825 × 920 mm
Weight (excl. BioLector®)	33.5 kg	ca. 84 kg	ca. 102 kg
Power source	100 – 240 V (50/60 Hz)	100 – 240 V (50/60 Hz)	100 – 240 V (50/60 Hz)
Optional modules	Different racks	Different racks, plate cooler 4 – 50 or –15 °C, orbital shaker (2 mm shaking diameter)	Different racks, plate cooler 4 – 50 or –15 °C, orbital shaker (2 mm shaking diameter)
Other	Fits in most standard clean benches		
Software Features			
Media preparation (disposable tips)	✓	✓	✓
DoE import	✓	✓	✓
Signal triggered actions		✓	✓
Dependent trigger		✓	✓
DO-controlled feeding		✓	✓

The RoboLector® is a proprietary combination of a liquid handling robot and the BioLector®.

¹ Optionally, the BioLector® can be integrated into other standard liquid handling systems.

ORDERING

Leasing option available

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The Company

m2p-labs is a worldwide leading supplier of microbioreactors.

The company focuses on microreaction and automated solutions for screening and bioprocess development. The microfermentation technology enables customers to conduct experiments with greater efficiency, better quality and lower cost than in any other cultivation platform. More knowledge from small scale leads to more rational and reliable decisions in the development of bioprocesses.



PRODUCT PORTFOLIO

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Systems

The BioLector® microbioreactor is a unique high-throughput fermentation system. In up to 48 parallel cultures the essential fermentation parameters such as biomass concentration, pH and DO as well as fluorescent proteins or substrates can be all monitored online. The advanced BioLector® Pro technology is using proprietary microtiter plates with an integrated microfluidic chip. By using the microfluidic technology the system continuously controls the pH of each culture individually as well as the feeding for fed-batch cultivations. The BioLector® microbioreactors are established systems for bacterial, yeast, fungi, plant and insect cells. All systems are suitable for aerobic, microaerophilic and strict anaerobic cultivations.

Disposables

m2p-labs provides worldwide unique microtiter plates with improved oxygen transfer and excellent mixing properties. Due to its design, the FlowerPlate® supplies microbial cultures even with high oxygen demands with a sufficient amount of oxygen. In addition, the proprietary microfluidic plate uses 16 donor wells for online feeding and pH control. The round well plate delivers moderate oxygen transfer for organisms with lower demand in oxygen or organisms sensitive to shear stress. All plates are available with different optical sensors for different applications.

Automation

The RoboLector® provides an unique automated cultivation platform combining the high-throughput fermentation and the online monitoring capability of the BioLector® with the very accurate and reproducible pipetting of a liquid handling robot. The system is used for media preparations, automated sampling and dosing steps, inductions and fed-batch processing.

www.m2p-labs.com