BioLector® I
48 Parallel Microbioreactors

High-Throughput
Real-Time Monitoring
Scalability
Automation

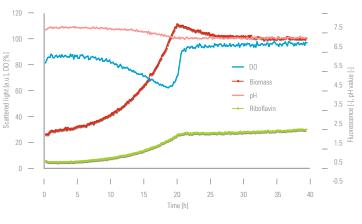# High Information Content for fast Selection
BioLector® I

The BioLector® I is the first bench top microfermentation system to perform high-throughput fermentations together with online monitoring of the most common fermentation parameters (biomass, pH, DO and fluorescent molecules).

The system is based on a standard microtiter plate format and operates with non-invasive, optical sensors. Due to the continuous and rigorous shaking during the optical measurements and over the whole experimental time it is ideally suited for aerobic and anaerobic cultures. For the first time, real time culture monitoring at a massive parallel scale becomes possible!

Applications

- Cell line and strain screening
- Media screening and optimization
- Fermentation parameter optimization
- Anaerobic and microaerophilic fermentations
- Synthetic and systems biology
- Statistical design of experiments (DoE)
- Growth characterization
- Protein building kinetics
- High-throughput protein expression
- Enzyme and cell activity tests
- Functional genomics
- Proteomic studies
- Inhibition and toxicity tests
- Quality control

Measurements

Multiparameter-Monitoring in the FlowerPlate®
48 well FlowerPlate®, 1000 µL, 800 rpm, 37 °C
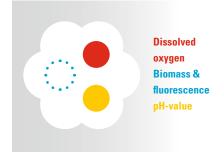
48 Parallel Microbioreactors
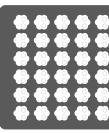

Features

Online Parameters

- Biomass concentration
- pH-value
- Dissolved oxygen (DO)
- NAD(P)H and riboflavins
- Fluorescent molecules (GFP, YFP, DsRed …)

System Performance

- Working volume of 800 – 2400 µL
- 48 parallel microreactions
- No foaming problems
- Broad range of $k_L a$ values (25 – 600 1/h)
- Continuous gas exchange and oxygen supply
- Equal power input to each reactor
- Defined engineering parameters and scalability
- Controlled gas atmosphere (CO_2, O_2 and N_2)
- Humidity control (> 75 % rH)
- Temperature control (5 °C below room temperature) with active cooling

Operating Principle

Dissolved **oxygen**
Biomass & fluorescence
pH-value

Multiparameter FlowerPlate® with Optodes
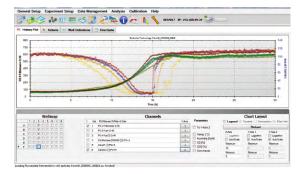
Smaller and Smarter

BioLector® I | m2p-labs

Advantages

- Real time kinetics out of
  48 parallel fermentations
- Microfermentation in standard MTP format
- High-throughput and easy automation
- Broad range for biomass detection
  (up to 100 g/L CDW, 650 OD_{600})
- No edge effects
- Continuous shaking operation (no artifacts)
- Defined mass transfer conditions (no O_2-limitation)
- Easy scale up to lab-fermenters
- Industry leading data analysis software
- Fast and easy data analysis included
- A valuable tool for PAT and QbD

Intelligent Software

Data Analysis with the BioLection Software

Technical Specifications
BioLector® I

SYSTEM

Operation conditions

Plate format	48
Volume	800 – 2400 μL (depending on microtiter plate)
Temperature	5 °C below room temperature, max. 50 °C
Gas atmosphere	Only air (optional modules, see below)
Humidity	> 75 % rH
Orbital shaker	400 – 1500 rpm at 3 mm (diameter)

Modules

Dimensions (W × H × D)	795 mm × 333 mm × 470 mm
Weight	Approx. 40 kg
Power source	100 – 240 V (50/60 HZ)
Interface	Ethernet
Ambient conditions	15 – 40 °C, max. 75 % rH
Automation	Optionally, the BioLector® can be integrated into the RoboLector® liquid handling systems#

Optical measurements

Filter configuration	up to 6 different filters
Wavelengths	365 nm – 800 nm
MTP read time	down to 3 min/parameter/48 wells
Scattered light measurement* for example *E. coli* in FlowerPlate®	> 100 NTU (≙ 0.055 OD_{600} at 25 °C, 1000 μL, 800 rpm) (MTP-48-xx), 0.2 – 650 OD_{600}, 0.1 – 100 g/L CDW, 37 °C, 1000 μL, 800 rpm)

pH / DO Monitoring

Calibration	Precalibrated plates
Measurement range pH	4.5 – 7.5 depending on plate type in buffered systems
Measurement range DO	0 – 100 % oxygen saturation
Application mode	Disposable technology

*scattered light detection depends on shaking frequency, filling volume of cavity, microplate type, particle size and particle shape of microorganism and media components

OPTIONAL MODULES

Art.-No.	Module description	Application	Additional feature	Note
E-AN-200	BL-Module for anaerobic cultivation	Strict anaerobic fermentation + low, controlled gas flow	Gassing with pure N_2 or CO_2 or other defined gases, controlled gas flow through mass flow controller (1 – 10 mL/min)	
E-O2-100	O_2-upregulation module	Fermentation with O_2 enriched air	Control of gas atmosphere: 21 – 35 % O_2	Only one O_2 sensor can be installed in the device
E-O2-25	O_2-downregulation module	Fermentation at O_2 reduced air, microaerophilic conditions	Control of gas atmosphere: 2 – 21 % O_2	Only one O_2 sensor can be installed in the device
E-CO2-10	CO_2-upregulation module	Fermentation with CO_2 controlled gas atmosphere	Control of gas atmosphere: 0 – 10 % CO_2	
E-AN-200	BL-Module for anaerobic cultivation	Strict anaerobic fermentation + low, controlled gas flow	Gassing with pure N_2 or CO_2 or other defined gases	Operates only with standard 48 well plate
E-FRET-100	BL-Option for FRET measurement	FRET measurements in BioLector® (1× excitation / 2× emission fluorescences)	Additional measurement of a second, synchronous emission wavelength	Two photomultipliers installed
E-OP-101-199	LED/Filter Module	Measurement of additional fluorescences in the BioLector®	Measurement at additional wavelengths	Ask your sales manager for available modules
E-OP-900	Notebook for BioLector® System	Notebook for data analysis	Data analysis and visualization on a separate computer	

It is possible to combine all types of modules (AN, O_2, CO_2, FRET) in one device.

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.

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PRODUCT PORTFOLIO

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