DOTS
a platform by sbi

sbi SCIENTIFIC BIOPROCESSING

DOTS Platform

BUILD A SMARTER SHAKE FLASK, ONE PARAMETER AT A TIME

DOTS brings advanced sensing and control options, simple handling, and lower costs than similar fermentation platforms.

The DOTS Platform: The New Status Quo for Shake Flask Fermentations

The DOTS Platform turns standard shake flasks into smart mini bioreactors.

The DOTS Platform: The New Status Quo for Shake Flask Fermentations

Liquid Injection System (LIS)
Automated feeding of liquids into shake flask cultures. LIS enables bioreactor-like options in shake flasks: Fed-batch, DO-based feeding, biomass-based feeding, automated promotor induction, and more.

Multiparameter Sensor (MPS)
Optical and non-invasive monitoring of various process parameters like biomass, fluorescence, dissolved oxygen, and many more.

DOTS Software
Powerful DOTS Software for easy sensor handling and real-time data visualization.

Dissolved Oxygen (DO) Sensor Pill
Each pill contains a DO-sensitive chemosensor that is read out by the Multiparameter Sensor (MPS).

Choose from an array of parameter-specific sensor-and-software modules to build the smart shake flask that meets your needs.

The DOTS Platform: The New Status Quo for Shake Flask Fermentations

Biomass

Dissolved Oxygen (DO)

Fluorescence

Parameter-based Feeding

Environmental Parameters

With the DOTS Platform, you can continue to expand your shake flask sensing capabilities as new sensors are added in the future.

Sensing & Controlling

DOTS combines sensors and actuators with a powerful software to create bioreactor-like shake flasks with actionable insights into your bioprocess.

DOTS Platform Hardware & Software Components

Multiparameter Sensor (MPS), Adapter & USB Hub

The MPS is an optical sensor, capable of reading out various signals from one shake flask culture. It is positioned in the adapter, underneath the shake flask, allowing for increased stability. The USB Hub bundles data from multiple MPS and forwards it to the DOTS Software.

Parameter Specific Sensors & Actuators

Combine with Dissolved Oxygen (DO) Sensor Pills for online dissolved oxygen (DO) monitoring in shake flasks.

The Liquid Injection System (LIS) enables the automated feeding of liquids into shake flask cultures.

DOTS Software

DOTS Software enables a simplified control of sensors and visualizes the received data from all monitored shake flasks in real-time.

DOTS current sensors and actuators are designed to simplify bioprocessing for a variety of applications.

The Current DOTS Portfolio

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Multiparameter Sensor (MPS)

Dissolved Oxygen (DO) Sensor Pills

Liquid Injection System (LIS)

The MPS is an optical sensor technology for the monitoring of multiple parameters in shake flasks.

Multiparameter Sensor (MPS)

Check Out Individual Product Presentation

DOTS

Key Facts

Most versatile shake flask sensor on the market
Turn you shake flask into a low-cost, high-throughput mini bioreactor

Monitor a broad range of Critical Process Parameters (CPPs)
Biomass, Dissolved Oxygen (DO), Fluorescence, and more!

Save time with automated, online monitoring
Installed underneath the shake flask and measures through the vessel wall

Works on a wide range of shake flasks
Compatible with shake flasks from 100 mL - 2000 mL, clamps and Sticky Mats

For a broad range of organisms
Bacteria, (filamentous) fungi, algae, archaea, and plant cells

Powerful DOTS Software
Simplified sensor control and data visualization for improved comparability

First pill-based optical sensor for online dissolved oxygen (DO) monitoring in shake flasks.

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Dissolved Oxygen (DO) Sensor Pills

Key Facts

Novel, patented pill technology
Enables automated, online DO monitoring in shake flasks

Single-use pill design
Factory-calibrated and pre-sterilized for immediate use

Unique pill identification algorithm
Removes the need for sensor alignment

Easy to use
Drop & Go: Easy handling and fast experiment setup

Enhanced control options
Combine with LIS for DO-based feeding in shake flasks

Powerful DOTS Software
Simplified sensor control and data visualization for improved comparability

The LIS is the first technology allowing for automated liquid feeding in shake flasks.

Liquid Injection System (LIS)

Check Out Individual Product Presentation

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Key Facts

Wireless control and monitoring
Control and monitor your feeding experiments wirelessly with the DOTS Software

New application: parameter-based feeding
Combine with MPS and enable biomass-based or DO-based feeding in shake flasks

Compatible with various substances
Sugars (e.g., 40% glucose), alcohols (e.g., 50% methanol), glycerol, acids, bases,…

Create any feeding profile you want
Single or multi shot, exponential, or constant feeding

Easy to install and use
Fill the sterile cartridge, program the LIS drive and start feeding your culture

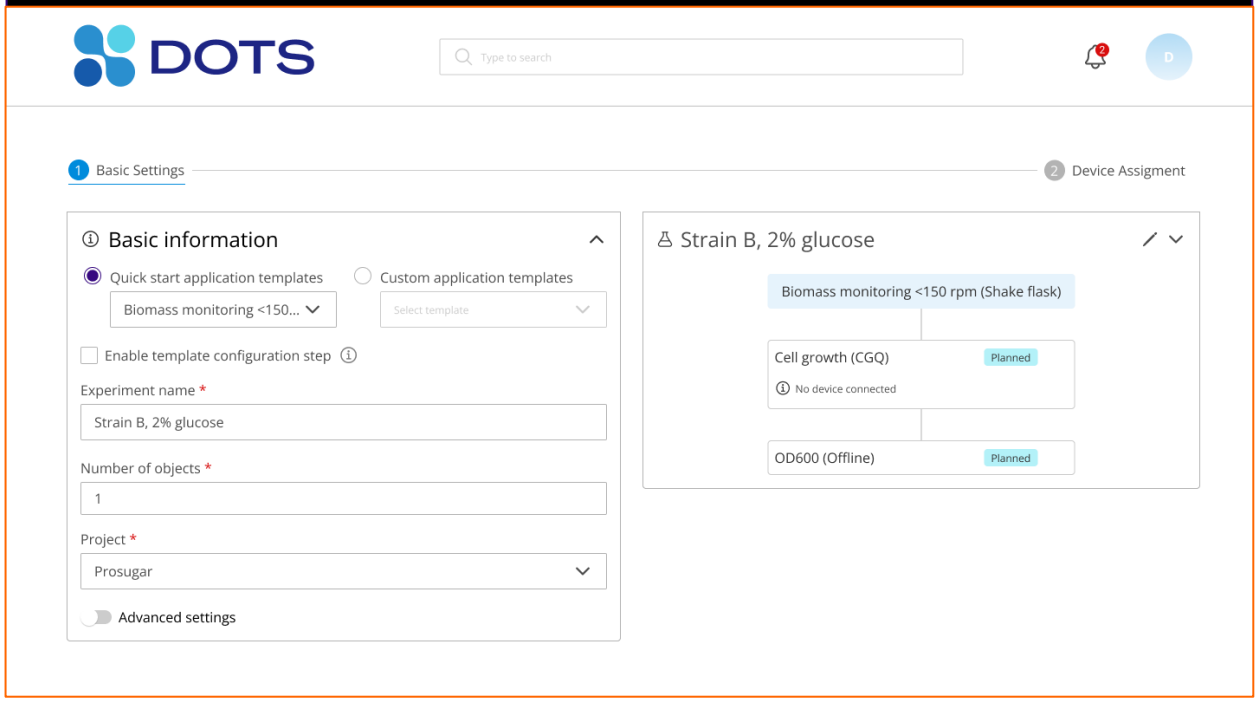
Powerful DOTS Software
Simplified sensor control and data visualization for improved comparability

Sensor Handling & Data Visualization

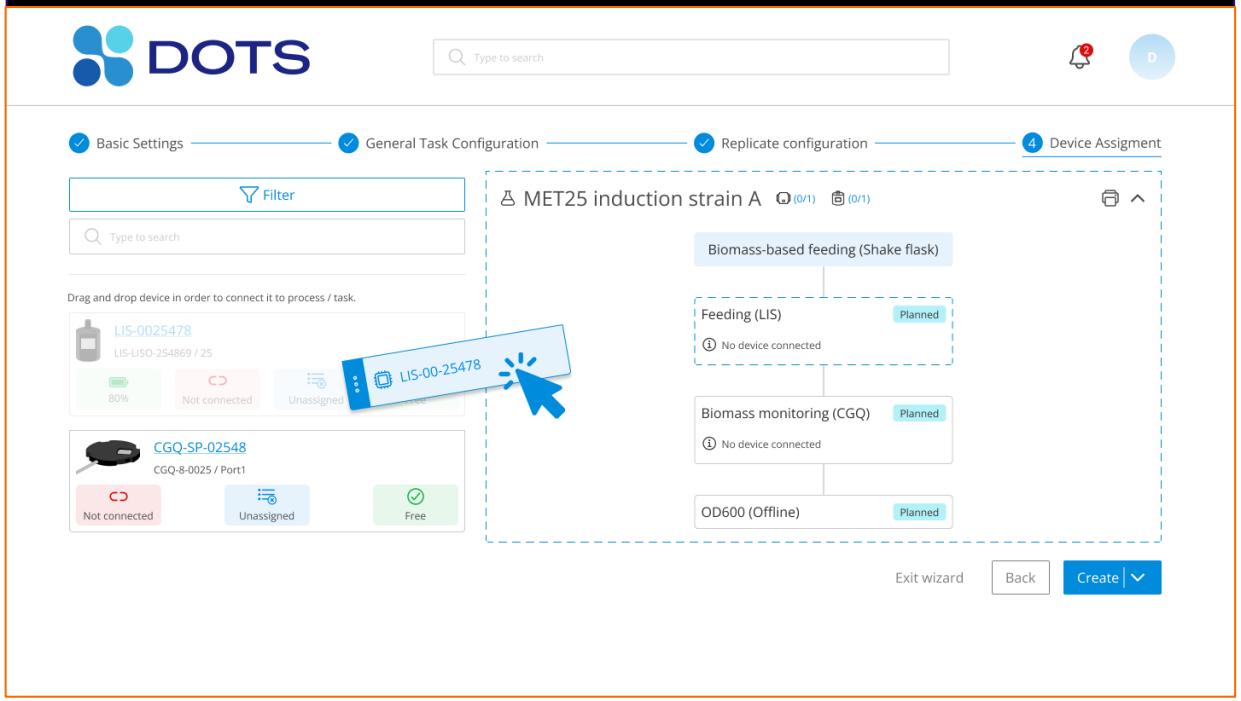
The DOTS Software enables easy sensor handling and experiment set up.

Exemplary Screenshots

Create an experiment with pre-defined application templates



Assign sensors to planned experiments via drag and drop

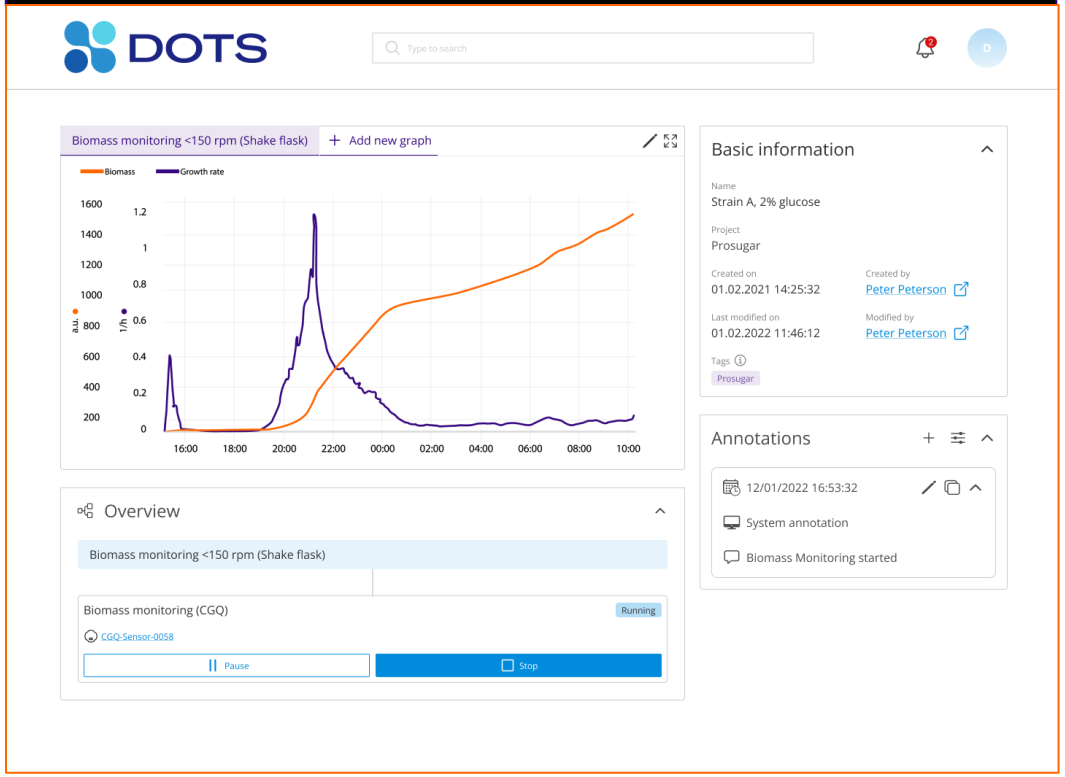


The DOTS Software provides a comprehensive overview of your experiments and visualizes your data in real-time.

DOTS Software Modules for Data Visualization

The dashboard schema provides an overview over all running, planned, or finished experiments

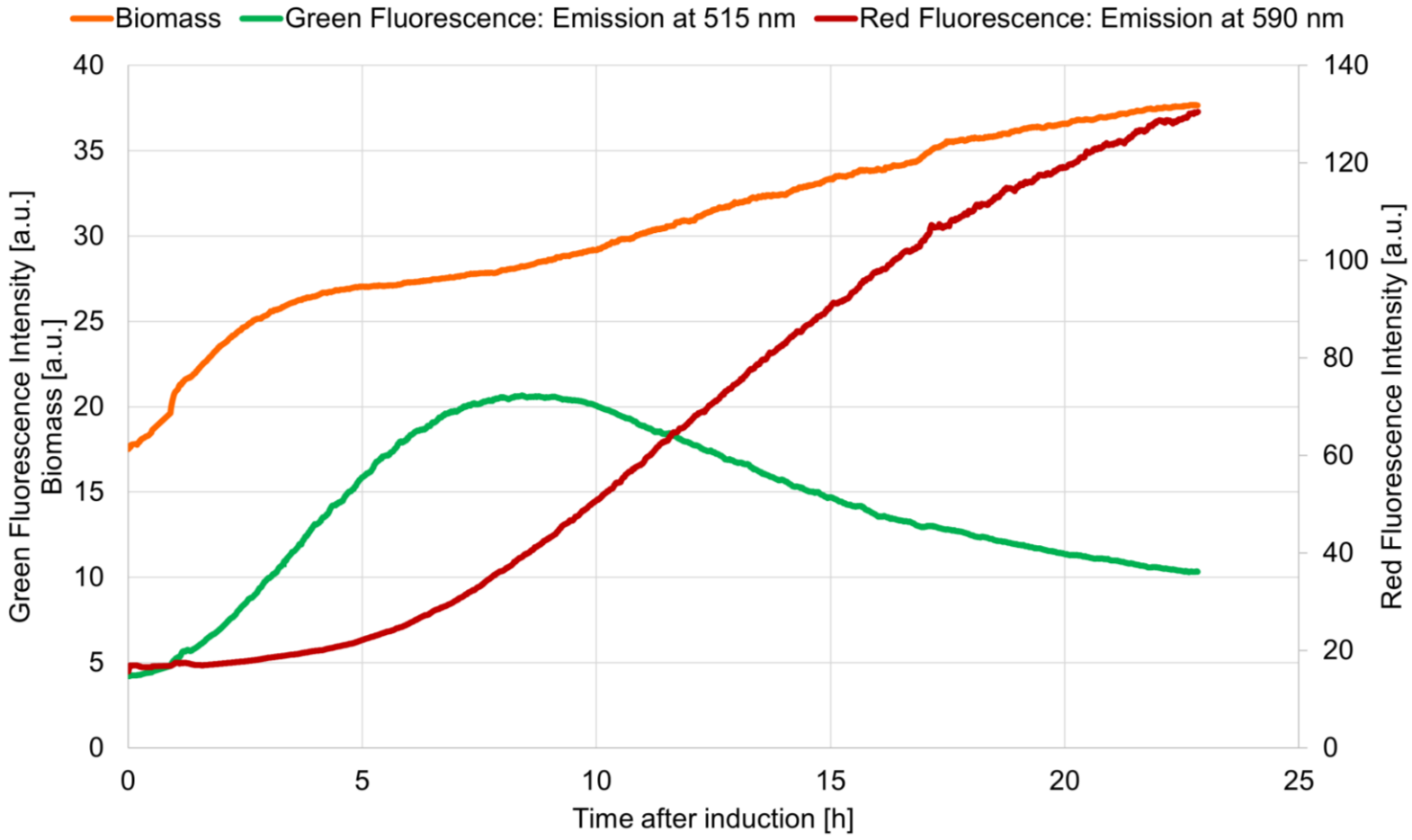
Data visualization tools enable a customized display of data in real-time



Applications

Exemplary data: By measuring fluorescence emission of different wavelengths, photoswitch processes can be tightly monitored.

Fluorescence Monitoring: *E.coli* Expression of a Photoswitch Protein



With the DOTS Platform, parameter-based feeding in shake flasks is now a reality.

Parameter-based Feeding With The DOTS Platform

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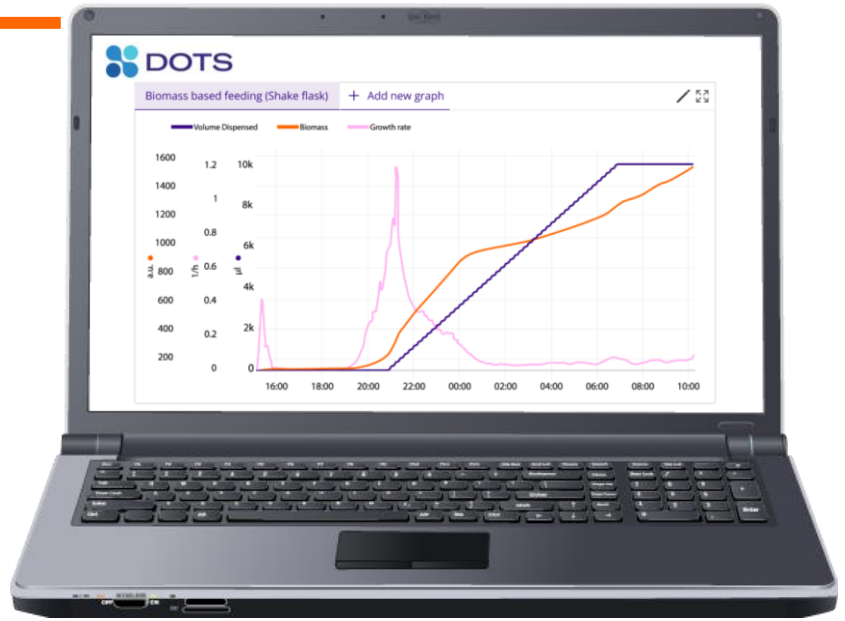
DOTS Software Detects
Preset Threshold

Feeding of
Liquid

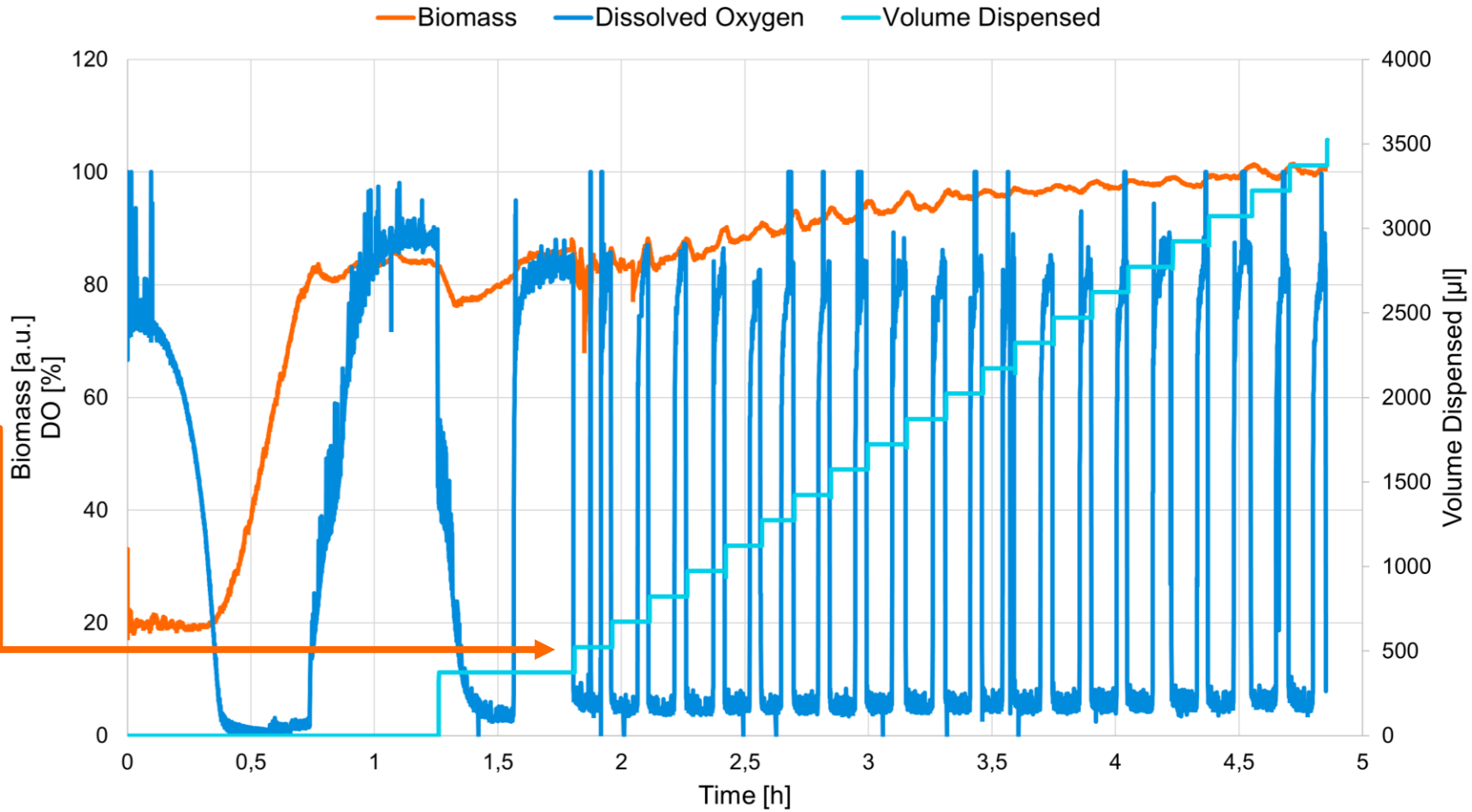


Real-time Monitoring of
Parameters (e.g., Biomass or DO)

Exemplary data: Feeding with the Liquid Injection System starts when a preset DO-threshold, measured with DO Sensor Pills, is reached.

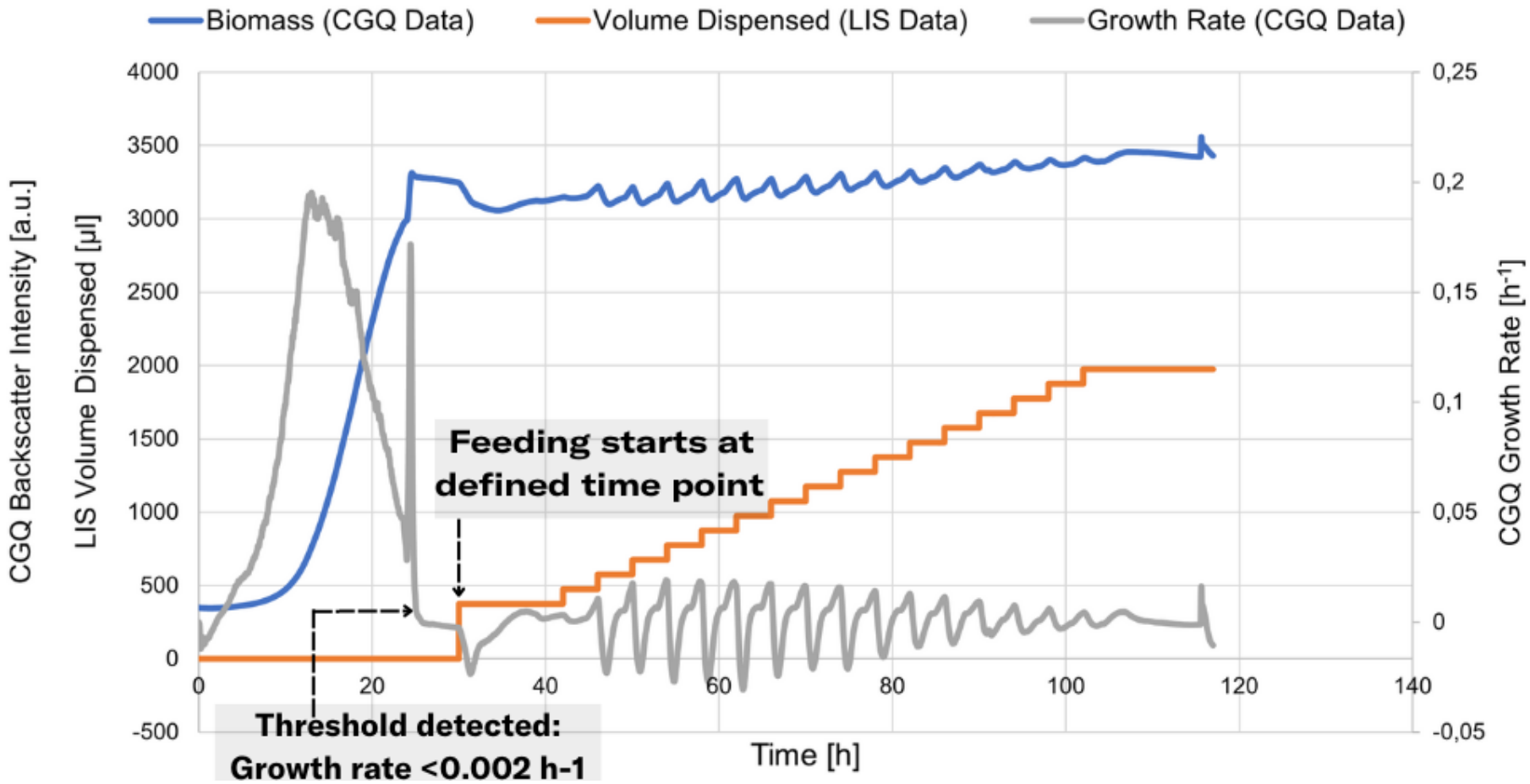
DO-based Methanol Feed to *Pichia pastoris* Cultures to Keep Promotor Activity Constant

- With a DOTS-integrated controller, methanol feed is adjusted
- As soon as the DO of the culture has recovered (>80% DO) the Liquid Injection System (LIS) starts feeding
- This enables ideal cell viability while keeping promotor activity constant



Exemplary data: With biomass-based feeding, the Liquid Injection System starts at a preset biomass or growth rate threshold.

Biomass-based Feeding: Methanol Induction With *Pichia pastoris*



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