BIOPROCESS MONITORING

OPTICAL ENZYMATIC SENSORS

Application

Fast, accurate, and precise measurements are of high demand in the biofuels, biochemical, biopharma, and biotechnology industries. Bioprocessing operations require rapid measurement techniques during fermentations to ensure product quality, improve process efficiency, increases product yield, and prevent expensive shutdowns.

While continuous sensors exist for monitoring process conditions such as pressure, temperature, and pH, key analytes must be measured using cumbersome, slow methods. In batch cultivations, slow response times can mean problems are identified too late. In fed-batch or continuous cultivations, delayed response times inhibit feedback control and lead to non-optimum process conditions.

Product Description

OptiEnz provides a sensor platform for rapid and continuous monitoring of organic chemicals. The platform includes PC-based software, an instrument with an attached sensor probe, and replaceable sensor caps with multiple sensor tips. The sensor tips are unique to each chemical to be measured.

Technology Platform

The OptiEnz sensing technology is based on a two-layer sensing element. One layer contains an enzyme that causes a continuous chemical reaction involving the analytes of interest, such as glucose and ethanol. The second layer contains a fluorophore that changes its properties based on the altered chemical environment resulting from the enzymatic reaction. The fluorescence changes are directly related to the concentration of the chemical being measured. A signal is transmitted via a fiber optic cable to the instrument. The signal is converted to a continuous, real-time concentration measurement that can be read and recorded by the operator or transmitted to an automated process control unit.

OptiEnz has created two chemical measurement platforms based on this optical-enzymatic sensing technology:

- An at-line assay system, capable of quickly measuring the analyte concentration in samples.
- A probe for continuous, in-line measurements in a bioreactor.

The sensors are accurate, specific, quantitative, and easy to use. OptiEnz has identified over 50 organic chemicals that can be measured using this technology and has tested sensors for 20 of these. Of particular interest to bioprocessing are sensors for glucose, ethanol, lactate, glutamate, glutamine, xylose, lactose, glycerol, and methanol.

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At-line System

- Simple, easy to use
- Rapid 1–2 minute measurements
- 100 measurements per replaceable cap
- Fast 3-point calibration

In-line System

- Autoclave, SIP, and gamma compatible
- Continuous measurement
- Extended lifetime suitable for cell cultures
- Simple external calibration

Sensor Specifications

Temperature	5 – 65° C
pH	2 – 9
Accuracy	10%
Precision	8%
Glucose Detection Range	0.05 – 150 g/L
Ethanol Detection Range	0.05 – 150 g/L

Customer trials now in progress

Sensor Specifications

Temperature	15 – 55° C
pH	5 – 8
Accuracy	10%
Precision	8%
Glucose Detection Range	1 – 40 g/L
Ethanol Detection Range*	1 – 30 g/

Customer trials starting Q3 2018

For further information contact:

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