doi:10.2533/chimia.2017.739 Chimia 71 (2017) 739 © Swiss Chemical Society

BioTech 2017 Conference Report

Wädenswil, 7./8.9.2017

Caspar Demuth*

*Correspondence: Dr. C. Demuth, Zurich University of Applied Sciences, Institute of Chemistry and Biotechnology, Grüental, CH-8820 Wädenswil, E-mail: caspar.demuth@zhaw.ch

Abstract: Almost 200 scientists and professionals from academia and industry attended the BioTech 2017 conference at the Zurich University of Applied Sciences (ZHAW) in Wädenswil on 7./8. September 2017. The focus of this year's conference was (bio) process analytics and sensor technology, taking into account the increasingly prominent role of online measurement and control in the process industry.

Keywords: Biosensors · (Bio)process control · Process analytical technology (PAT) · Sensor technology

Biosensors for Bioprocess Control

BioTech 2017 was opened with a plenary lecture given by ***Prof. Anthony Turner*** (University of Linköping), in which he reviewed his outstanding research and decades of experience in the field of enzymatic biosensors. These sensors have been successfully used in biomedical applications, a fact which is illustrated by the multibillion USD annual market volume of glucose biosensors used in diabetes care. Prof. Turner pointed out that the sensors applied to bioprocess monitoring in single-use cultivation devices need to fulfil similar requirements to those used in point-of-care testing. He concluded that this convergence of biomedical and bioprocess applications could help to promote the use of biosensors in the future.

Prof. Anthony Turner, plenary speaker at the BioTech 2017.

This statement was confirmed by the presentation of ***Dr. Gerhard Jobst*** (Jobst Technologies GmbH/IST AG, Freiburg i. Br.). For online monitoring of glucose concentration in fed-batch cultivations, he demonstrated successful applications of enzymatic biosensors which achieve high accuracy and stability. In spite of these examples of the effective use of biosensors in bioprocesses, more basic research is needed to fully exploit the potential of these devices. In her talk, ***Prof. Ulla Wollenberger*** (University of Potsdam) summarized different strategies that are necessary to achieve a controlled signal transduction between the catalyst protein and redox electrodes. These include controlled immobilization in redox polymers and electronic communication via direct electron transfer.

A Focus on Process Analytical Technology

Initiated more than a decade ago by the FDA, the process analytical technology (PAT) initiative aims to implement advanced process monitoring and measure critical process parameters to control critical quality attributes during production in chemical and (bio)pharmaceutical processes. Although the PAT initiative has been widely discussed for a number of years, successful realizations of this concept have been relatively rare so far.

Professionals from industry and academia attending this year's BioTech conference.

However, several contributions from different experts showed that successful PAT implementations are now underway. As an example, a broad analytical platform that includes dielectric and fluorescence spectroscopy as well as proton transfer mass spectrometry was presented by ***Dr. Markus Luchner*** (BOKU, Vienna). This allows the establishment of soft sensors to assess process variables that are not accessible *via* direct measurements. In a similar approach, ***David Bittner*** (Westfälische Hochschule, Recklinghausen) and colleagues introduced a modular soft sensor platform to obtain secondary data, such as the vital biomass and various relevant process rates from online gas and substrate measurements.

Developments in Online Spectroscopy

BioTech 2017's exhibition of companies active in process analytics and sensor technology.

Spectroscopic methods are perfectly suitable for monitoring critical process parameters, even in complex bioprocess media. Presentations given by suppliers of advanced process instrumentation in NIR, MIR, Raman or fluorescence spectroscopy confirmed that modern devices are becoming more robust and easier to use, although demanding chemometric methods need to be applied. At the same time, new spectroscopic methods are still being developed. As an example, photon density wave spectroscopy, presented by ***Dr. Roland Hass*** (University of Potsdam/PDW Analytics GmbH) is able to independently quantify absorption and scattering properties of liquid dispersions. The method was successfully used to monitor biomass growth in yeast and algae cultivation with high performance in comparison to established inline process analytical technologies.

The support of the member companies of the SISF (Swiss Industry Science Fund; BASF, Novartis, F. Hoffmann-La Roche AG and Syngenta) is gratefully acknowledged. The author also thanks biotechnet Switzerland, the Swiss Chemical Society (Division of Analytical Sciences), and the City of Wädenswil for their financial contributions.

Received: September 21, 2017