DASGIP AG optimizes its cultivation system to conditions of anaerobic micro-organisms and thus facilitates biofuel development

Juelich, 5th September 2007. DASGIP AG, a leading manufacturer of parallel bioreactor systems, has optimized its technology for the process development of anaerobic micro-organisms via their parallel design. Through this type of parallel control and monitoring, a more efficient development of biofuels like bioethanol is facilitated. DASGIP will present these fermentation control systems during the Biotechnica 2007 in Hanover.

Bioethanol is produced by a variety of micro-organisms under anaerobic conditions, i.e. in the absence of oxygen. For biotechnical methods of fuel production to be competitive with conventional procedures, it is necessary to use such variants of micro-organisms whose enzymes can produce biofuels at low temperatures, with a high pH tolerance, and with minimal energy consumption. With this goal in mind, DASGIP has optimized its parallel bioreactor systems: The user can ferment and compare several different micro-organisms under the same conditions (screening), or the same micro-organism can be compared under different conditions (optimization). The system allows continuous monitoring of important variables such as pH value and redox potential, gassing parameters and temperature.

The separate measuring of pH and redox potential is particularly important. In anaerobic metabolism of micro-organisms a negative redox potential is essential for specific enzyme activities. As even small changes in pH can influence the redox potential, one can see how the pH value is an important parameter that must be monitored individually. DASGIP's PH4RD4 module can measure redox potential and pH simultaneously and individually in four reactors. By controlling these conditions with very high precision, the identification of the ideal reaction parameters for the cells is simplified. The information density accelerates the selection of strains and the best fermentation parameters. In addition, the gassing module MF4 supplies the bioreactor with up to four input gasses. Each gas has its own independent lead, which can be selected as necessary. The user can even combine gasses that react with each other in the same gassing system and thus optimize the conditions of testing.

DASGIP's parallel bioreactor systems are already used worldwide in industrial biotechnology. One example is in the field of enzyme technology and biocatalysis. Professor Mani Subramanian, Director of the Center for Biocatalysis and Bioprocessing at the University of Iowa, utilizes the DASGIP fermentation system in the field of enzyme technology: This is being done in two steps. First, the Pichia biomass and enzyme expression is optimized by monitoring and controlling pH, temperature, oxygen and enzyme induction by methanol. In a second step the product yield with the Pichia cells is maximized by "reaction engineering" in the DASGIP system. The enzyme system they are working with is glycolate oxidase. The research activities of Professor Dirk Weuster-Botz from the Technical University of Munich, Germany, which has already been presented by DASGIP, are addressed to the development of alternative procedures in industrial biotechnology as well. The project is supported by the Deutsche Bundesstiftung Umwelt (DBU, one of Europe's largest foundations promoting innovative and exemplary environmental projects). The goal is to develop a fermentation process for the industrial production of succinic acid in *Sacharomyces cerevisiae*. Succinic acid

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is an important chemical resource which is used widely in the pharmaceutical and chemical industry.

Background

Within the industrial biotechnology, a big challenge for science and industry has recently emerged: How to identify new anaerobic micro-organisms that are able to produce biofuels from organic substrates efficiently and economically. In its resolution to decrease the yearly CO_2 emission, the European Commission has decided that by 2010, at least 5.75% of the total fuel consumption in the EU should come from biological sources. This corresponds to about 27 billion litres of biofuel. In the USA, it is intended to increase the admixture of bioethanol up to 17% by 2017. This breaks an important operational area to DASGIP's parallel bioreactor systems, in a market with a high growth potential.

At the Biotechnica in Hanover (9 - 11 October 2007, booth G25, hall 9) DASGIP will present a fermentation system optimized for anaerobic microbiology.

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About DASGIP

DASGIP AG develops and manufactures technologically advanced Parallel Bioreactor Systems for the cultivation of microbial and mammalian cells at bench top and pilot scale. Process engineers, scientists and product developers from biotechnological, pharmaceutical and chemical companies as well as research institutions use DASGIP Parallel Bioreactor Systems for their biotechnological processes and benefit from increased productivity, high reproducibility, and ease of scale up, resulting in accelerated product development cycles.
DASGIP is located in Juelich (Germany) and Shrewsbury MA (USA).

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