426c Optimizing Mixing in Micro-Bioreactors Used for High Throughput Screening of Suitable Biocatalysts in Industrial Fermentation

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There is a growing interest in developing minute laboratories on a 'chip' (Lab-on-a-Chip) and micro-(bio)chemical reactors as clearly shown by the research efforts of many industrial companies and research institutes in recent years.

The development of a new technological platform for fed batch fermentations in very small volume (10-300 µl) reactors in an array format will be described, which in the end will allow to improve production properties of micro organisms by rapid screening under industrially relevant conditions. One of the objectives (besides developing sensing technology) is to design and test methods to analyze and control mixing.

This presentation addresses several mixing methods that can be used in micro-bioreactors. The micro-bioreactor is operated under extreme conditions like high biomass and product concentrations, high oxygen requirement and long residence time (3-4 days). With the help of Computational Fluid Dynamics simulations, the influence of the mixing method on the fermentation efficiency in the micro-reactor is described. These results will be supported by real-life experimental mixing data.

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