An Efficient Experimental Design Strategy for Modelling and Characterization of Processes

Designing robust, efficient and economic processes is a main challenge for the biotech industries. To achieve a well-designed bioprocess, understanding the ongoing phenomena and the involved reaction kinetics is crucial. By development of advanced miniaturized reactors, a promising opportunity arises for parallel screening of multiple processes in reduced volumes within high throughput platforms. However, the level of accessible information from each set of experimental design remains to be one of the main issues particularly in the case of complex biosystems. This work introduces a novel generic Model-based Design of Experiments (M-DoE) routine with its main target being model development and system characterization. With the new M-DoE strategy, an improved set of informative experiments are suggested, which consequently reduces the demand for physical resources and analysis. The routine proposes a set of optimum experimental settings to support structural model definition, kinetic order estimation and parameter estimation during a model building procedure and process characterization.