

Fixed-bed cultivations of the probiotic strain *Bacillus coagulans* for functional food applications

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Cell immobilization techniques have become an interesting alternative to suspension cultures due to many advantages. Conventional fermentation processes with cell suspensions such as batch or fed-batch process have several limitations. The low productivity and the variation from batch to batch are only two of them. Using a fixed-bed bioreactor system with immobilized cells in macroporous carriers has the opportunity to achieve high volumetric productivity, improved process control, accelerated reaction rates, improved production efficiency and no possibility of wash-out.

In the presented project the continuous cultivation of *Bacillus coagulans* in a fixed-bed reactor is studied in comparison to suspension cultures. *Bacillus coagulans* is a probiotic microorganism and therefore interesting for functional food product development. In this context different capabilities of continuous fixed-bed cultivations are imaginable. One possibility is to use this system for the production of lactose free beverages. Alternatively, the production of cells could be of interest to use them in probiotics. With a continuously operating fixed-bed bioreactor a stable generation of cells with high volumetric productivity and reduced susceptibility of system to contamination could be achieved.