

In-situ Magnetic separation (ISMS): Protein fishing in reactor-scale

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ABSTRACT

Magnetic separation has shown to be a technology for the specific adsorption of proteins from crude bio suspensions. By integrating this separation process to the bio reaction, advantages can be taken from the reduced number of downstream unit operations, the decrease of product inhibition and the lowered of the interferences by product and other present substances. One example for the latter are proteases which degrade other proteins.

As a model process subtilisin (alkaline protease) production was carried out with *Bacillus licheniformis*. Production kinetics can be used to model the course of the magnetic separation benefits. The bioprocess was carried out as a fed-batch process, which allows to form distinctive growth and production phases. During the production phase ISMS is carried out. The magnetic supports consist of bacitracin functionalized glutaraldehyde particle. These particles are treated with washing and elution agents after the bio suspension is re-fed to the reactor.

The results show the integration of magnetic separation technology to the bio process in an industry relevant concentration level. The overall product yield can be enhanced by the in-situ separation and the product could be recovered in an active form after elution.

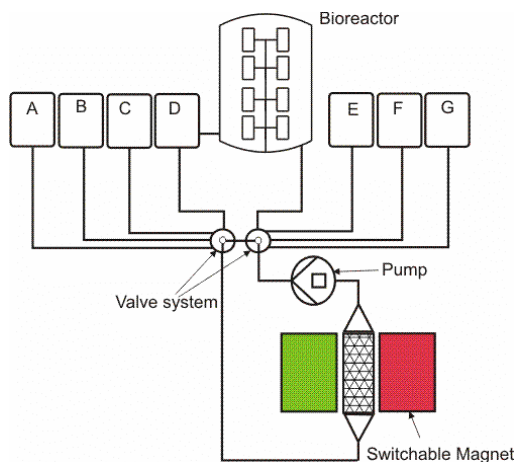


Figure 1: Outline of the In-situ Magnetic separation rig. A-C contain different buffer solutions. E-G are for the liquids after the usage