

Project/Master thesis:

Fermentation yield optimization using an exponential feeding profile and downscaling of applied Crossflow Microfiltration (CFMF) to a Sartoflow CFF system

Komagataella phaffii (formerly known as *Pichia pastoris*) is a well-known microbial workhorse and widely used in the biotechnological industry for large-scale enzyme production. To increase the product yield of the respective enzyme, the yeast can be genetically engineered and cultivated in a fed-batch process. Since these recombinant yeasts secrete most of the enzymatic products into the fermentation broth downstream strategies to isolate the product are often based on crossflow microfiltration (CFMF). In this way, enzymes can be isolated cost-effectively without inducing cell lysis.

In this thesis, a fed-batch process for a recombinant *K. phaffii* to produce an enzyme for dairy products will be developed. The established linear feeding will be replaced by an exponential feeding profile to increase the product titers in the fermentation

In addition, the separation of the product from the biomass via CFMF will be further characterized and important key parameters e. g. membrane resistance, biomass, etc. affecting the permeability of the product will be investigated. For this purpose, the broth from the fermentation will be filtered using an automated SartoFlow filtration system. The recorded results will be compared to data sets of experiments conducted in pilot-scale.

Your tasks will be:

- Planning and implementation of fermentations in fed-batch mode (19 L and 300 L Pilot scale)
- Planning and implementation of crossflow filtration experiments (SartoFlow Advanced)
- Online analytics (**Fermentation:** Offgas, DO, biomass; **Crossflow filtration:** pressure, permeate flow, UV)
- Offline analytics (biomass, enzyme activity, viscosity)

We are seeking for:

- An intrinsically motivated student with background in bioprocess engineering and passion for process development

We offer:

- Work in an interdisciplinary environment of bioprocess development
- Close and intensive support in a good working environment
- Pilot plant and well-equipped laboratory

Study Level: Graduate student (Duration: 6 months)

Starting date: February 2024

Contact for application or further information:

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