Sustainable production of volatile esters

The focus of this project is on metabolic engineering and process design. Special emphasis is paid to in-situ product removal and the comparison of different proposed scenarios.

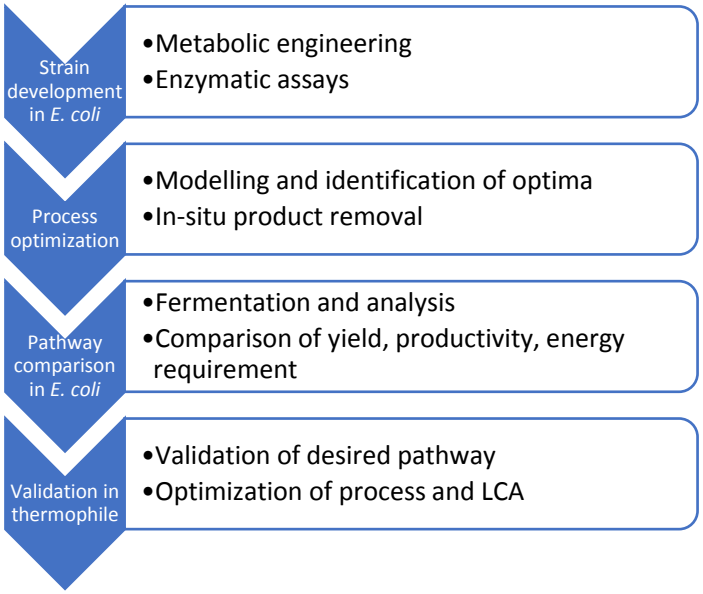
Introduction

Traditionally, bulk chemicals are derived from unsustainable petrochemical resources. Chemical conversions proceed at high temperatures and reaction equilibria prevent complete conversions and high yields. Due to increasing costs and public awareness, industries are seeking for sustainable alternatives. The vast expanding microbial platform offers an attractive solution by converting biomass into a product of interest.

In this project, we aim on producing volatile esters as a bulk product by mesophilic and thermophilic bacteria. Due to the esters volatility a process is designed that makes use of in-situ product removal by gas stripping. This approach would not only lower the toxic effects of the formed product but would also simplify downstream processing.

Scope of the project

The goal of this project is to establish an efficient production process for the microbial production of volatile esters including their in-situ removal. Different metabolic routes are engineered and compared in the model organism *E. coli* and at a later stage transferred to a thermophilic bacteria. Besides pathway design, process optimization will be targeted to find the most promising product removal strategy and optimum fermentation conditions.



Techniques

General techniques used during this project include genetic engineering tools for strain development, strain characterization, fermentations and modelling towards optimum process conditions. Further, we make use of high throughput enzymatic assays, as well as analytical measurements such as high pressure liquid chromatography (HPLC) or gas chromatography (GC). Final projects will of course depend on the stage of the project and on the student's wishes and preferences.

Contact

If you are interested in a BSc or MSc thesis or internship within this project, feel free to contact me via e-mail: anna.bohnenkamp@wur.nl, telephone: 0317 483 595, or drop by my office (E2.133 in Radix building 107).

Anna Bohnenkamp