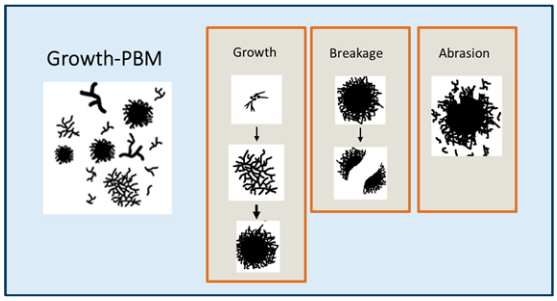
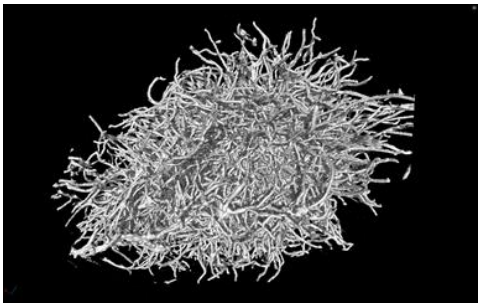
Lehrstuhl für Systemverfahrenstechnik
Wissenschaftszentrum Weihenstephan
Technische Universität München

Master thesis

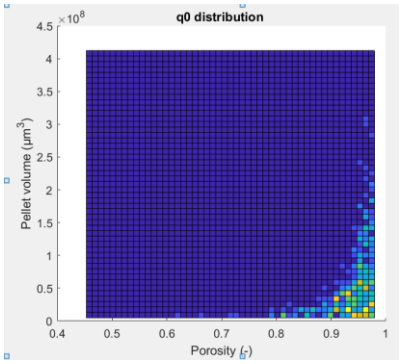
Development of a population balance model for cultivation of filamentous microorganisms





Motivation

Filamentous microorganisms play a central role in biotechnology and the circular economy, producing organic acids, enzymes, life-saving antibiotics and drugs. Furthermore, they can drive the transition from our petroleum-based economy to a bio-based circular economy. However, for optimal benefit, the processes need to be better understood. The growth forms (morphology) of the microorganisms during cultivation have a great influence on the required power input and product yield. With the help of mathematical models, it is possible to understand influencing factors and predict the outcome of the cultivation.



Work Objectives

In our chair it was possible for the first time to study the microstructure (micromorphology) of filamentous fungi by using microtomography measurements of a large number of fungal structures (done by Henri Müller). You will use the data to develop a population balance model (PBM). With the model it will be possible to determine the evolution of the fungal population over time. This work is supervised by Gurmeet and me (Charlotte). Gurmeet is a real expert in PBMs and you will greatly benefit from her knowledge. I will help you understand the biological background.
Matlab basics are useful but not required.

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