Use of oCelloScope to develop new parameters for advanced process control

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Introduction

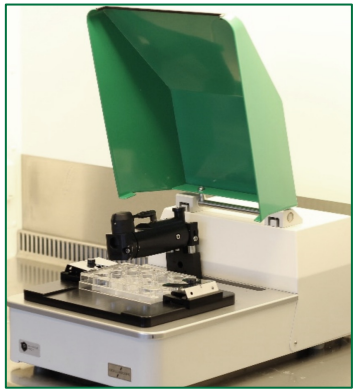
With continuous optimization of production strains, the concentration of produced enzymes reach higher concentrations. This can lead into spontaneous crystallization of the enzymes.

This thesis investigates the spontaneous crystallization occurring in two products and the solubility of the enzyme crystals. Finally, a correlation between crystal properties and the enzyme activity is examined for both products.

Methods

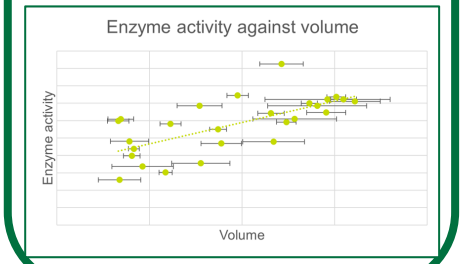
The oCelloScope is an innovative solution for monitoring objects in a fermentation broth. The microscope scans through the sample and creates an image. By applying an advanced algorithm, the software can detect different object properties.

In this thesis the sample is diluted and injected into a flow cell for analyzing.



Outcome

A mapping of the crystal nucleation and growth was revealed and compared to the enzyme activity in both the supernatant (not bound to the crystals) and the total sample. Furthermore, the solubility was estimated to create the right protocol for future measurements. Finally, a correlation between the total crystal volume and the enzyme activity was not found. For future purposes, the equipment should only be used for monitoring.



Perspectives

Being part of Helix Lab was a great experience. I have learnt a lot about the industries of Kalundborg and is left with a positive view on the city. Being a Helix Lab Fellow has made me clearer on my future career ambitions and the possibilities in the industry.

Furthermore, I obtained some good contacts in the industry, which I can hopefully benefit from in my future career.