Investigation of sustainable sludge reuse from API fermentation

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Characterisation → Product Suggestion → Feasibility Study

Introduction

A typical process for the core production of an API – Insulin consists of three main stages: fermentation, recovery and purification. The API produced in the fermentation is removed from the fermentation mixture at the first step of the recovery process. In the current state, this biomass sludge is sent to a GMO waste treatment system before it is sent to Kalundborg Bioenergy plant and turned into fertilizer and biogas. However, it would be interesting to extend the limits of this process and re-use, sustainably, the sludge, to a more value adding product. Why should this be investigated? The sludge is high in mass flowrate and consists mainly of yeast cells. Therefore, can a possible future state be an internal site recycle system? That is, can the sludge be processed and transformed into a new value-added product?

Methods

- **Literature Review**
  - Similarity with food industry
  - Brewery spent yeast
- **Yeast Characterisation**
  - Dry mass
  - pH
  - Ash
  - YE yield
  - β Glucan yield
- **Product Characterisation**
  - Protein
  - Amino Acid
  - Vitamins
- **Feasibility Assessment**

Outcome

- **Suggested Products**
  - Yeast extract
  - β Glucan
- **Product Yields**
  - Used for mass balance calculations and feasibility
- **Yeast and Product Characterised**
- **Process Design**

Perspectives

- **Repeating tests for different batches**
- **Relating the yeast and product characteristics with growth condition**
- **Pilot plant testing for accurate unit efficiencies**