Identifying antioxidant components from a complex methanotrophic biomass

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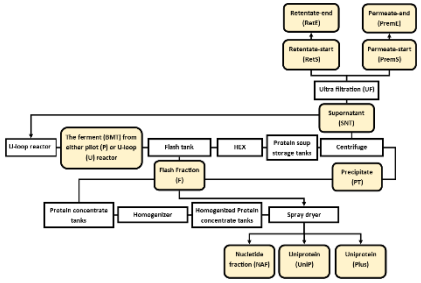
Helix Lab

Introduction

The global population is estimated to reach 10 billion by 2050, requiring a 50 to 60% increase in food production, while still reducing emissions, water, and land use[1].

Unibio a Danish biotech company utilizes methanotrophic bacteria to produce protein-rich microbial proteins for feed for short lived animals. This methanotrophic biomass could be more than just feed; it could be a potential source of valuable bioactive compounds.



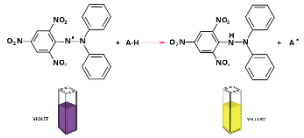
An overview of samples from production steam

This project explores the potential of the production streams as a source of bioactive antioxidative compounds.

[1]Ranganathan, J. et. Al. 2018 "How to Sustainably Feed 10 Billion People by 2050, in 21 Charts"

Methods

Antioxidative assays (DPPH and ABTS) are used to measure the radical scavenging activity of the various production streams.



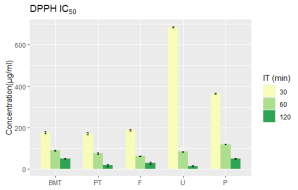
The general reaction scheme for DPPH radical with an antioxidant (AH).

Fractions using ultrafiltration or size exclusion chromatography, followed by screening with antioxidative assays.

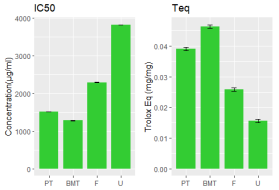
Outcome

Several production streams displayed radical scavenging activity in both the DPPH - and ABTS assay, where some have potential for value extraction.

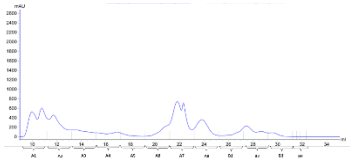
Fractionation of the homogenate sample, showed antioxidative activity in DPPH assay in several fraction.



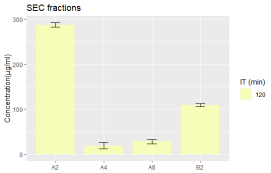
The IC50 from the DPPH assay for the different production streams measured after 30, 60 and 120 minuets of incubation.



The IC50 and the trolox equivalent form the ABTS assay, which already showed activity in the DPPH assay



SEC chromatogram of the homogenate sample.



The DPPH IC50 of the different fraction measured after 120 minuets of incubation.

Perspectives

Future research:

- More R&D for in-vitro confirmation of the radical scanning activity
- Further isolation and identification of the bioactive compound(s)
- Further exploration of extracting the compound form the process

Opportunities as Helix-Lab fellow:

- Meeting and networking with industry
- Creating a social network
- Collaboration between academia and the industry