

Microalgae utilization in innovative food products

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1 Introduction

Microalgae have demonstrated potential to meet the population's need for a more sustainable food supply. They are promising protein sources and present several advantages over other currently exploited raw materials. Microalgae can be cultivated in **organic production systems** when harvested from wild areas or in other production systems, both guaranteeing high quality products and respect for the environment.

NewAlgae aims at developing **innovative up- and downstream algae processing** approaches based on electroporation stress induction during cultivation, gentle extraction, advanced characterisation of techno functional protein properties and further translation into the development of new product applications.

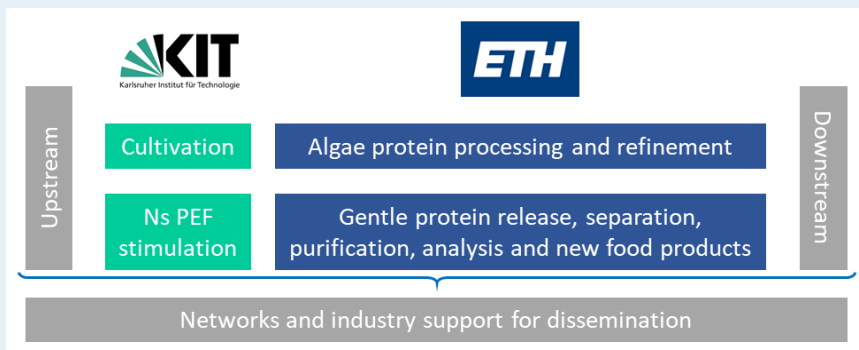
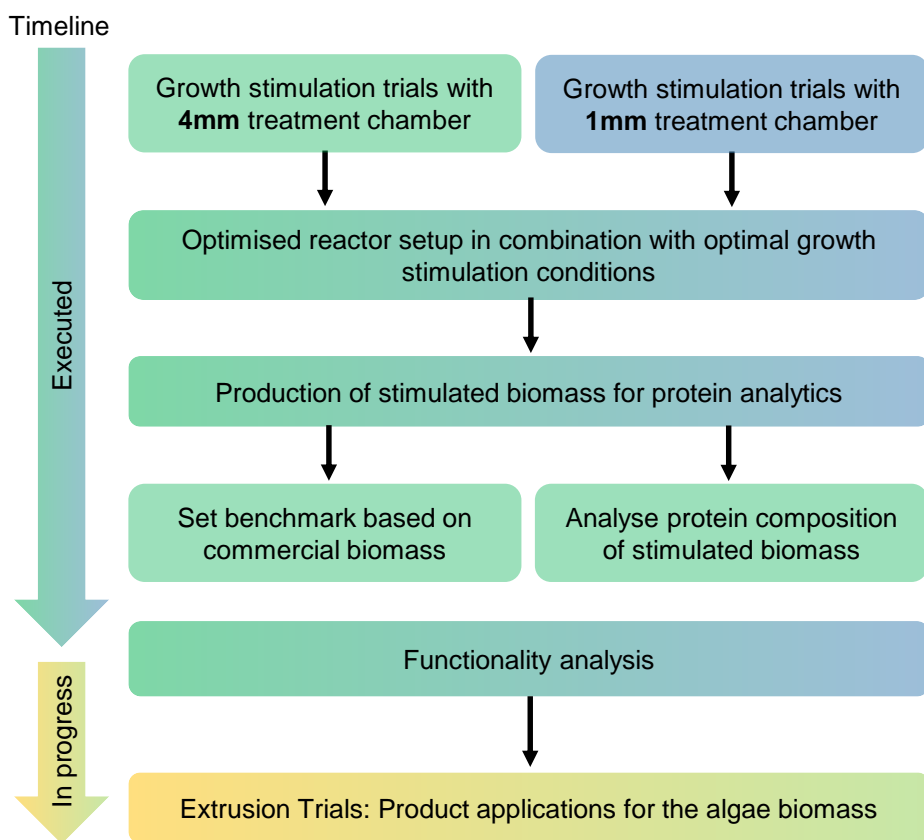


Fig. 1. New sustainable food formulations based on algae proteins. Adapted from NewAlgae, Coop Research Program Call 4_2016.

Multiple applications in the food industry are possible from incorporating microalgae as ingredient; however, systematic approaches investigating techno functional properties for structuring foods are scarce ¹.

High moisture extrusion is an established process for soy, pea and lupine proteins to produce meat like structures during the extrusion process, which can be applied for a more efficient and sustainable protein source from algae.

2 Project results 2-5



3 Ongoing research

Main objective is the development of a meat substitute via high moisture extrusion.

- Evaluation and adaptation of several technologies for a proper protein processing, such as disintegration, extraction, purification and preservation techniques are being performed.
- Commercial microalgal biomass will be extruded.



Fig. 2. Commercial biomass from Corbion Biotech, Inc. Pure Ingredient Source AlgaWise®

The microalgae's green colour is limiting their application, as it adversely affects the consumers' perception about taste and quality ⁶.

- High moisture extrusion will be evaluated within the ETH food processing laboratory and Bühler AG; Bühler AG as leading extrusion equipment supplier supports technology access.

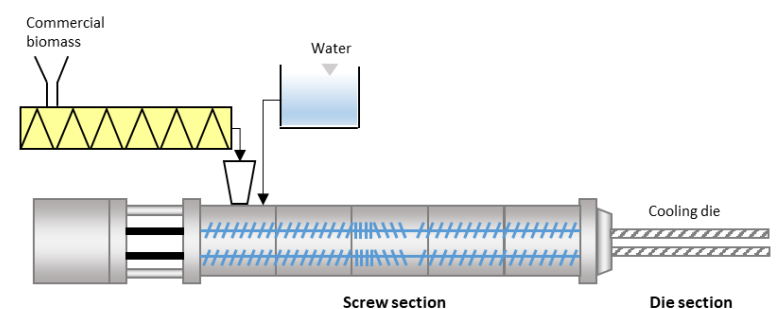


Fig. 3. Experimental setup for high moisture extrusion.

- Mixtures with soy will be extruded if properties of algae proteins, especially protein solubility range and storage module G' (Temperature), are not suitable for extrusion.

4 Conclusions

- Characterisation of microalgal biomass, special focus on the protein fraction and its techno functionality, plays an essential role for extrusion.
- Besides the biomass characteristics, several parameters such as moisture content, rotation speed and temperature can affect the final product, thus need to be investigated.

5 Acknowledgments

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6 References

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