

Optimal Design of Algae Biorefinery Processing Networks for the production of Protein, Ethanol and Biodiesel - DTU Orbit (08/11/2017)

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In this study, optimal design of algal biorefinery using microalgae with respect to techno-economic criteria is studied. A systematic methodology using superstructure-based optimization is used to this end. A superstructure representing a wide range of technologies developed for processing microalgae to produce end products is formulated. The corresponding technical and economic data is collected and structured using a generic input-output mass balance models. An optimization problem is formulated and solved to identify the optimal designs. The effect of uncertainties inherent in economic analysis such as microalgae production cost, composition of microalgae (e.g. oil content) and biodiesel/bioethanol market prices is considered. New optimal processing paths are found with potential of producing higher amount of biodiesel. Last, the methodology is intended as decision support tool for early-stage concept screening to enhance the future development of algal biorefinery.

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