

Simulation and Techno-economic analysis of ethanol production from seaweed

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High seaweeds price greatly limits the applicability of seaweeds as feedstocks for bioethanol production and reduction of feedstock price seems the only option to solve this issue. In this study steady state ethanol production from brown algae (*Saccharina japonica*) based on 100,000 ton/year dry feed was simulated using Aspen PLUS software. Different process units such as saccharification and fermentation are modeled based on experimental works from literature. Distillation columns with molecular sieves are used to recover ethanol from the raw fermentation broth to produce 99.5% ethanol. By using Aspen model, techno-economic models are developed to analyze the economy of the ethanol production plant. This study effectively defines maximum dry seaweed price (MDSP) that must be covered by large-scale seaweed production to reach a Return-On-Investment (ROI) break-even point after 10 years plant operation. The MDSP will act as target biomass cost for large-scale cultivation of macroalgae.