

Simultaneous production of alginate and bioethanol from brown seaweed

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A sequential and integrated processes for alginate extraction and bioethanol production from brown seaweed was performed. *Saccharina japonica* containing 50 % carbohydrate per biomass weight was used as feedstock for alginate utilization and bioethanol production. The alginate obtained was 21 % under the following the optimized condition. Alginate in *S. japonica* was extracted more than approximately 90%, and the extracted alginate was analyzed by FT-IR. The enzymatic saccharification of alginate-extracted residual biomass was produced 21 g/L of glucose with a yield of 85% base on the total carbohydrate of residual biomass. Bioethanol fermentation of alginate-extracted residual biomass was conducted via simultaneous saccharification and fermentation (SSF) and fermentation yield was 78% of theoretical yield using *Saccharomyces cerevisiae*. Major components of brown seaweed such as alginate and glucose were successfully utilized for valuable products production to improve the economic feasibility of macroalgae biorefinery.