

Bioethanol fermentation with pretreated marine algae

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The effects of pretreatment and culture conditions on bioethanol production have been studied. Marine algae, which take about 80% of the world's living organisms, contain lots of energy sources, such as sugars and lipids. Therefore, possibility of utilizing unused cellulose from marine algae for bioethanol has been studied. Marine algae contain a high percentage of water, possessing a lower production rate compared to land crops. Nonetheless, bioethanol production potential is high, comparable to land crops, since productivity per area is high. In order to obtain bioethanol, *Undaria pinnatifida* (belonging to macro algae), *Chlorella vulgaris* and *Chlamydomonas reinhardtii* (belonging to micro algae) were used for the pretreatment and fermentation experiments. The pretreatment was carried out in dilute acid hydrolysis. To find optimal condition, experiments were performed at various temperatures, acid concentrations and time distributions. To observe ethanol production rate, batch fermentation was carried out using 4 different *E. coli* w3110 strains (pstv28::adhB::pdc, pstv28 adhB::pdc & ptrc99a galP::glk, pstv28 adhB::pdc::pgm, pstv28 adhB::pdc::pgm & ptrc99a galP::glk).