

Direct Wet Extraction of Lipid from Microalgae Using Osmotic Shock for Biodiesel Production

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Global warming caused by increased concentration of carbon dioxide (CO₂) and fossil fuel depletion is a great threat to human. Biodiesel made from microalgae is a promising alternative of fossil fuel because of its high carbon fixation efficiency and lipid productivity. Lipid extraction is one of the greatest bottlenecks of microalgal biodiesel production due to massive energy consumption in microalgae drying process. Therefore, lipid extraction from wet microalgae is crucial. In wet extraction, however, it is much harder to recover lipid from the cells due to immiscibility of extraction solvents and water. This prevents the organic solvents from contacting with the cell's rigid cell wall, so disruption of this cell wall is the key technology of the wet extraction. In this study, osmotic shock using high concentration of NaCl was applied to concentrated *Chlamydomonas reinhardtii* culture, and it was followed by extraction using mixtures of n-hexane (H) and methanol (M) having different ratio. As a result, osmotic shock enhanced lipid extraction efficiency except when only n-hexane was used. H:M = 7:3 was found to be the most suitable.