

Effect of Microalgae Cell Characteristics on Harvesting and Cell Disruption Process of
Microalgal Biorefinery: Modeling and Economic Analysis

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Microalgae are being considered as promising biodiesel feedstock owing to their high lipid productivity and low land requirement. Many economic analysis were studied with various scenarios and assumptions to investigate economic feasibility of microalgae based biodiesel. However, the cell characteristics of microalgae are not considered in the current available literature. Microalgae has different cell characteristics like cell wall structure, lipid composition between algae species and their cultivation condition or harvesting cycle. These cell characteristics differences affect efficiency and economics of microalgal biofuel production processes. To consider this biological aspect, in this study, mathematical models are developed to correlate process parameters with cell characteristics. Among various process stages in biorefinery, cell disruption and harvesting processes are considered, which are highly affected by different cell characteristic (cell diameter, salinity, cell wall strength). Each process model are integrated techno-economic analysis and case studies with various scenarios are performed to identify effect of cell characteristics on biorefinery economics.