

Life cycle assessment of potential microalgae based biodiesel production system

Ali Gumarov, 강성환, 이재형†  
KAIST  
(jayhlee@kaist.ac.kr†)

In this research, environmental and energy aspects of superstructure based optimization model of microalgae-based biorefinery was analyzed for the sustainable energy production. Model consists of biofuel production processing steps such as cultivation, flocculation of biomass, drying of biomass, acidic in-situ transesterification of dried biomass, post-transesterification, and microalgae residue conversion. The “cradle to gate” life cycle analysis (LCA) was performed to analyze the global warming potential (GWP) and energy consumption of the designed microalgae based biorefinery process. Additionally, sensitivity analysis on our LCA results was applied to determine the major challenges which makes process environmentally unsustainable. Analysis of “cradle to gate” LCA show that microalgae-based biofuels are still environmentally unsustainable compared to conventional energy sources.