

# Design, Characterization and Cultivation of Microalgae for Biodiesel Production in an Airlift Flat Panel Photobioreactor

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## **Abstract**

A novel airlift flat panel photobioreactor was designed, modeled and experimentally characterized in view of cultivating microalgae for biodiesel production. The photobioreactor was designed and constructed in a way that the cell culture circulated inside the flat panel section from bottom to top in a serpentine manner, with an external airlift providing the hydraulic head for liquid flow and oxygen removal. The gas holdup, liquid flow velocity and oxygen mass transfer of the reactor were modeled and experimentally determined. The microalgal growth in the photobioreactor was also modeled and measured. The modeling results and the experimental data correlated well, which indicated that the reactor could be scaled up to larger scales based on the developed models. The advantages and disadvantages of this novel photobioreactor over conventional ones, especially industrial flat panel and tubular bioreactors, are discussed.