## Design of a pilot scale outdoor photobioreactor

## Abstract

Presently microalgae are considered as an alternative biodiesel source and have been cultivated in large scale for commercial use. However, there is lack of efficient systems which utilize solar energy effectively for mass cultivation of microalgae. In this study, a scaled up 280 L flat panel airlift photobioreactor (FP-ALPBR), based on previous work by Issarapayup and co-workers [1], was designed and constructed fiberglass as an alternative system for the large scale outdoor cultivation of microalgae in Malaysia. A local strain, Chlorella sp. was used to assess the growth productivity. The 280 L FP-ALPBR was capable of giving cell productivity of 2.63×105 cells ml-1 d-1, maximum cell density of 6.01×106 cells ml-1 and specific growth rate of 0.15 day-1. The performance of this photobioreactor was compared with the 17 L FP-ALPBR and 90 L FP-ALPBR of the same design. The 280 L FP-ALPBR gave a better performance in terms of maximum cell density, but as expected for large scale it resulted in a considerable decrease in specific growth. This photobioreactor was found to produce a larger harvesting volume and cell density but could not compare in growth rate produced by the smaller 17 L FP-ALPBR and the 90 L FP-ALPBR.