Propagation and Dissolution of CO$_2$ bubbles in Algae Photobioreactors

SRINIVAS KOSARAJU, Northern Arizona University — Research grade photo-bioreactors are used to study and cultivate different algal species for biofuel production. In an attempt to study the growth properties of a local algal species in rain water, a custom made bioreactor is designed and being tested. Bioalgae consumes dissolved CO$_2$ in water and during its growth cycle, the consumed CO$_2$ must be replenished. Conventional methods use supply of air or CO2 bubbles in the growth medium. The propagation and dissolution of the bubbles, however, are strongly dependent on the design parameters of the photo-bioreactor. In this paper, we discuss the numerical modeling of the air and CO$_2$ bubble propagation and dissolution in the photo-bioreactor. Using the results the bioreactor design will be modified for maximum productivity.