

Biological enhancement of CO<sub>2</sub> mass transfer in microalgal reactors

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CO<sub>2</sub>, which is one of the essential nutrients for microalgae, takes in charge of a large portion in the biomass production cost. Thus, accurate calculation of CO<sub>2</sub> concentration in microalgal reactors is important to develop optimal CO<sub>2</sub> supplement strategy which maximizes algal growth rate while minimizing CO<sub>2</sub> leakage. However, conventional transfer models for CO<sub>2</sub> concentration estimation are inaccurate as they underestimate CO<sub>2</sub> mass transfer rate. Therefore, estimated CO<sub>2</sub> concentration is typically lower than measured concentration. In this research, biological enhancement, which is defined as the enhancement of mass transfer in the presence of the biological micro-organism, is incorporated into the conventional CO<sub>2</sub> transfer model to estimate accurate CO<sub>2</sub> mass transfer rate. By comparison with the conventional model results and measured data, impact of biological enhancement on CO<sub>2</sub> supplement strategy is evaluated.