

Kinetics of Growth Rate of Microalga: The Effect of Carbon Dioxide Concentration

Authors : Retno Ambarwati Sigit Lestari

Abstract : Microalga is one of the organisms that can be considered ideal and potential for raw material of bioenergy production, because the content of lipids in microalga is relatively high. Microalga is an aquatic organism that produces complex organic compounds from inorganic molecules using carbon dioxide as a carbon source, and sunlight for energy supply. Microalga-CO₂ fixation has potential advantages over other carbon captures and storage approaches, such as wide distribution, high photosynthetic rate, good environmental adaptability, and ease of operation. The rates of growth and CO₂ capture of microalga are influenced by CO₂ concentration and light intensity. This study quantitatively investigates the effects of CO₂ concentration on the rates of growth and CO₂ capture of a type of microalga, cultivated in bioreactors. The works include laboratory experiments as well as mathematical modelling. The mathematical models were solved numerically and the accuracy of the model was tested by the experimental data. It turned out that the mathematical model proposed can well quantitatively describe the growth and CO₂ capture of microalga, in which the effects of CO₂ concentration can be observed.

Keywords : Microalga, CO₂ concentration, photobioreactor, mathematical model

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