Effect of Photoperiodicity on Co2 Fixation By Chlorella vulgaris Buitenzorg in Bubble Column Photobioreactor For Food Supplement Production

Title	Effect of Photoperiodicity on Co2 Fixation By Chlorella vulgaris Buitenzorg in Bubble Column Photobioreactor For Food Supplement Production
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Abstract	To reduce the level of CO2 content in air, effort on converting CO2 to useful products is required. One of the alternatives includes CO2 fixation to produce biomass using Chlorella vulgaris Buitenzorg. Chlorella vulgaris Buitenzorg is applied for production of food supplement. Chlorella vulgaris Buitenzorg is also easy to handle due to its superior adaptation. Currently, Chlorella vulgaris Buitenzorg has been analyzed by some experts for its cellular composition, its ability to produce high quality biomass and the content of essential nutrition. A series of experiments was conducted by culturing Chlorella vulgaris Buitenzorg using Beneck medium in bubbling column photobioreactor. The main variation in this experiment was photoperiodicity, where growth of Chlorella vulgaris Buitenzorg was examined during photoperiodicity condition. The difference between CO2 gas concentration of inlet and outlet of the reactor during operational period, was compared to the same experiment under continuous illumination. Under photoperiodicity of 8 and 9 h/d, the culture cell densities (N) were approximately 40 % higher than under continuous illumination. Final biomass density of Chlorella vulgaris Buitenzorg at 9 h/d illumination was 1.43 g/dm3, around 46% higher than under continuous illumination. Specific carbon dioxide transfer rate (qCO2) in photoperiodicity was 50-80% higher than under continuous illumination. These experiments showed that photoperiodicity affects the growth of Chlorella vulgaris Buitenzorg The specific growth rate (Ãƒ ÂŽÃ‚Â¼) by photoperiodicity was higher than that by continuous ilumination while the growth period was two times longer. Based on the experiments, it can be concluded that photoperiodicity might save light energy consumption. The prediction of kinetic model under continuous illumination as well as under photoperiodicity illumination showed that Haldane model became the fitted kinetic model.
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