

## Biomass production chlorella vulgaris buttenzorg using series of bubble column photo bioreactor with a periodic illumination

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### Abstrak

Chlorella vulgaris Buitenzorg cultivation using three bubble column photo bioreactors arranged in series with a volume of 200 mL for 130 hours shows an increase of biomass production of Chlorella vulgaris Buitenzorg up to 1.20 times and a decrease of the ability of CO<sub>2</sub> fixation compared to single reactor at a periodic sun illumination cycle. The operation conditions on cultivation are as following: T, 29.0oC; P, 1 atm.; UG, 2.40 m/h; CO<sub>2</sub>, 10%; Benneck medium; and illumination source by Phillip Halogen Lamp 20W /12V/ 50Hz. Other research parameters such as microbial carbon dioxide transferred rate ( $q_{CO_2}$ ), CO<sub>2</sub> transferred rate (CTR), energy consumption for cellular formation (Ex), and cultural bicarbonate species concentration [HCO<sub>3</sub>] also give better results on series of reactor.