

Continuous Cultivation of *Tetraselmis chui* in Photobioreactor Using Sodium Carbonate and Sodium Bicarbonate as Carbon...

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ABSTRACT

Continuous cultivations in a light/dark dual-tank photobioreactor were conducted to study the effects of culture conditions on the growth of *Tetraselmis chui* using sodium bicarbonates as the carbon sources. The solution of sodium bicarbonate was used to simulate the alkaline solution after absorbing carbon dioxide. The main results and conclusion are as the following : (1) The effects of the concentrations of sodium bicarbonate on the growth of *Tetraselmis chui* During the continuous cultivation, the biomass concentration of *Tetraselmis chui* was almost unaffected by changing the concentration of sodium bicarbonate in the feed tank from 3g/L to 10g/L. The biomass concentration and the specific growth rate were 0.245g/L and 0.053h⁻¹, respectively, in the light tank and those were 0.174g/L and 0.039 h⁻¹ in the dark tank. The pH in culture was lower with the higher concentration of sodium bicarbonate in the feed tank. (2) The effects of light intensities on the growth of *Tetraselmis chui* It was shown that the biomass concentration of *Tetraselmis chui* was unaffected as the light intensity increased from 30000Lux to 50000Lux. The light intensity of 30000Lux was identified in the light saturation region. Further cultures were conducted at the intensity of 30000Lux. (3) The effects of dilution rates on the growth of *Tetraselmis chui* The effects of dilution rates on the growth of *Tetraselmis chui* were performed with the dilution rate in the range from 0.033 to 0.099h⁻¹. The specific growth rate in the light tank and the specific respiration rate in the dark tank increased as the dilution rate increased, while the pH of the culture decreased. However, the relationship between the specific growth rate and the specific respiration rate was not a linear one. (4) The effects of aeration on the growth of *Tetraselmis chui* Aeration in the continuous cultivations of *Tetraselmis chui* not only lowered the dissolved oxygen, but also the biomass concentration. Aeration had a negative effect on the growth of *Tetraselmis chui*.

Keywords : carbon dioxide ; light/dark dual-tank photobioreactor ; carbon sources

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