Batch Cultivation of Tetraselmis Chui Using NaHCO₃ as Carbon Source

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ABSTRACT

With the increase of CO₂ in the atmosphere, the effect towards the earth is becoming more and more serious. Among all, the most specific effect is Global Warming. Nowadays, one potential method is to fix the CO₂ with algae by the light energy. By integrating mitigation the alkaline absorption process for industrial CO₂ transaction, the mitigation of CO₂ emission can be achieved effectively. In this work, solution of sodium bicarbonate was used to simulate the absorption duration from a scrubber in which carbon dioxide was absorbed by the solution of sodium bicarbonate. Bicarbonate ion in medium is the only carbon source for the growth of Tetraselmis chui. The effects of light intensity and concentration of sodium bicarbonate on the growth of Tetraselmis chui were studied in batch cultures. By batch development method with the factor control of inorganic carbon consistency and the light strength, the growing effect of the Tetraselmis chui were discussed as follows: The concentration of NaHCO₃ was changed from 0 g/L to 3.5 g/L for cultivation Tetraselmis chui. Above 2.0 g/L, it showed no significant differences on growth rate but the increase of growing period. The variations of dissolved oxygen and pH value are not specific till the mid-term of the whole experiment. The significant effects of alkalinity are mainly on the length and the max value of growing period. With the increase in alkalinity, the dissolved oxygen and the PH value increased. With the increase in alkalinity, the amount of carbonate ion absorbed by Tetraselmis chui was increased. Furthermore, the growth period of Tetraselmis chui was significantly increased. The other cultivation conditions are: light intensities 7500 Lux and 15000 Lux; the medium is of the modified Walne’s medium. The compare of Light strength, which influenced the raising of Tetraselmis chui, is between 7500 Lux and 15000 Lux. The work of this research showed that the light intensity of 15000 Lux is better than 7500 Lux. The significant increasing was showed in the parts of growth rate, period of growing, pH value and the dissolved oxygen.

Keywords: carbon dioxide; sodium bicarbonate; micro algae; Tetraselmis chui
3.5.4 鹼度的測量方法 ............................................ 33
3.5.5 周氏扁藻所剩餘的碳量的計算方式 ............ 34
3.6 實驗設
計 ................................................................. 35
3.6.1 微藻生長與碳源濃度之關係........................ 35
3.6.2 微藻生長與光照強度的關
係........................ 36

第四章 實驗結果與討論................................................................. 38
4.1 不同光照強度實
驗 ................................................. 38
4.1.1 對於生長曲線的影響.................................... 38
4.1.2 對於溶氧值的影
響........................................40
4.1.3 對於pH值的影響........................................42
4.2 不同碳酸氫鈉濃度實
驗........................................45
4.2.1 對於生長曲線的影響.................................... 45
4.2.2 對於溶氧值的影響……………................47
4.2.3 對於pH值的影響…………………............49
4.2.4 對於碳酸根離子的吸收.........…..........….…52

第五章 結
論與未來展望................................................................. 55
5.1 結論......................................................................... 55
5.2 未來展
望................................................................. 56

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