Chlorella vulgaris LOGISTIC GROWTH KINETICS MODEL IN HIGH CONCENTRATIONS OF AQUEOUS AMMONIA

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Abstract

The ability of microalgae to utilize CO2 during photosynthesis and grow rapidly shows their potential in CO2 bio-fixation to capture and store the gas. However, CO2 capture by this biological approach is very slow compared to chemical reaction-based processes such as absorption using amine or aqueous ammonia. Integration between chemical (aqueous ammonia) and biological (microalgae) aspects might enhance the capturing process and at the same time the microalgae can assimilate CO2 for beneficial bioproduct formation. Thus, it is important to assess the growth of the microalgae in various concentrations of ammonia with CO2 supply. Hence, the main objective of this study is to investigate Chlorella vulgaris growth and its kinetics in aqueous ammonia. To achieve that, C. vulgaris was cultivated in various concentrations of aqueous ammonia between 0 to 1920 mg/L at room temperature (i.e. 27 degrees C) and supplied with 15% (v/v) of CO2 under illumination of 3500 lux of white fluorescent light. Result shows that the maximum growth capacity (X-max) of C. vulgaris is deteriorating from 1.820 Au to 0.245 Au as the concentration of aqueous ammonia increased. However, no significant change in maximum specific growth rate (mu(max)) was observed. The growth data was then fitted into the logistic growth model. The model coefficient of determination (R-2) is decreasing, which suggests modification of the model is required.

Keywords

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KeyWords Plus: CO2 BIO-MITIGATION; OPTIMIZATION

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