

Siriphan Channamtum 2014: Isolation of *Botryococcus braunii* and Optimization of Culture Conditions for Hydrocarbon Production. Master of Science (Microbiology), Major Field: Microbiology, Department of Microbiology. Thesis Advisor: Ms. Duenrut Chonudomkul, Ph.D. 179 pages.

A total of 206 isolates of *Botryococcus braunii* were isolated from 90 water samples collected from all over Thailand. There were 102 isolates could produce hydrocarbons and isolate No. J4-1 exhibited the highest biomass and hydrocarbon production. Among 8 medium formula used for cultivation of green algae AF-6 medium supported better growth, chlorophyll and hydrocarbon production of *B. braunii* J4-1 This medium yielded $2.324 \text{ g}\cdot\text{L}^{-1}$ of biomass, $0.381 \text{ mg}\cdot\text{L}^{-1}$ of chlorophyll and $0.731 \text{ g}\cdot\text{L}^{-1}$ of hydrocarbon production. Screening of the culture variables including NaNO_3 , KH_2PO_4 , Fe-citrate, pH, NaHCO_3 , CO_2 and light intensity were carried out by using Plackett-Burman design. The results revealed that three variables i.e. Fe-citrate, pH and CO_2 significantly affected biomass, chlorophyll and hydrocarbon production. Central Composite Design (CCD) and response surface plots were used to find out the optimal valued of these factors that contributed to maximum biomass, chlorophyll and hydrocarbon production. The optimum values of Fe-citrate $1.5 \text{ mg}\cdot\text{L}^{-1}$, pH 6.8 and CO_2 2.5 % (v/v) were the optimum condition to achieve maximum yield were $5.74 \text{ g}\cdot\text{L}^{-1}$ of biomass, $13.51 \text{ mg}\cdot\text{L}^{-1}$ of chlorophyll and $1.44 \text{ g}\cdot\text{L}^{-1}$ of hydrocarbon production. The validation of the optimal conditions by analysis of CCD, the validation experiments were performed comparing the experimental values with the predicted values. The results of the deviations for production of biomass, chlorophyll and hydrocarbon were 10.17 %, 11.19 % and 1.41 %, respectively. Therefore, it could be concluded that the experimental design in this study is effective for factors affecting on the biomass, chlorophyll and hydrocarbon production by *B. braunii* J4-1, which can be utilized in the development of technology for the production of biodiesel.

Student's signature

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