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SHAN YONG GEE

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EFFECTS ON GROWTH AND PIGMENTS CONTENT OF *Nannochloropsis* sp.
UNDER HETEROTROPHIC CONDITION WITH
ORGANIC CARBON SOURCE

By
CHAN YONG GEE

Research Report submitted in partial fulfillment of
the requirements for the degree of
Bachelor Science of Agrotechnology (Aquaculture)

Department of Fisheries Science and Aquaculture
FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE
UNIVERSITI MALAYSIA TERENGGANU
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**FAKULTI AGROTEKNOLOGI DAN SAINS MAKANAN
UNIVERSITI MALAYSIA TERENGGANU**

**PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK ILMIAH I DAN II**

Adalah ini diakui dan disahkan bahawa laporan ilmiah bertajuk:

Effects on growth and pigments content of *Nannochloropsis* sp. under heterotrophic condition with organic carbon source.

Oleh **Chan Yong Gee**, No.Matrik **UK 14408** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan **Sains Perikanan dan Akuakultur** sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda **Sains Agroteknologi (Akuakultur)**, Fakulti Agroteknologi dan Sains Makanan, Universiti Malaysia Terengganu.

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ABSTRACT

This study was conducted on *Nannochloropsis* sp. with intention to determine the growth and pigments content under heterotrophic condition with supplement of organic carbon source. This study was also conducted to test the sustainability of *Nannochloropsis* sp. population under the adverse conditions. The specimen microalgae were culture in the f/2 medium enriched with glucose at 0 ppm, 10 ppm, 50 ppm, 200 ppm and 500pm, in order to determine the best concentration for their growth and pigments content development under heterotrophic condition. Growth were determined by counting in haemocytometer while the pigments content were extracted with 90% acetone and determined through spectrophotometric method. There result has shown significance ($p < 0.05$) in treatments regards to the growth of microalgae. *Nannochloropsis* sp. could not grow well under heterotrophic condition but shown better result with 10 ppm of glucose content and obtained highest carotenoids/chlorophyll ratio 0.765 compared to 0.484 in 0 pm and 0.572 in 50 ppm. The concentrations of glucose for 200 ppm and 500 ppm were not suitable for microalgae production due to over concentrated and not cost effective. In future, the result is useful in determining the widely tolerate of the species under heterotrophic condition, where intended to develop a cost-effective and simple method of cultivation.

ABSTRAK

Kajian ini dijalankan pada organisma *Nannochloropsis* sp. untuk menentukan keadaan pertumbuhan dan kandungan pigmen dalam keadaan heterotrof. Kajian ini juga bertujuan untuk menguji ketahanan populasi *Nannochloropsis* sp. terhadap keadaan bersongsangan dengan keadaan normalnya. Spesimen microalgae ini dikultur dalam f/2 media yang dikayai dengan glukos pada 0 ppm, 10 ppm, 50 ppm, 200ppm dan 500ppm untuk menentukan tumpuan glukos terbaik untuk pertumbuhan dan kandungan pigmen pada keadaan heterotrof. Pertumbuhan alga ditentukan dengan menggunakan haemocytometer, manakala kandungan pigmen diestrak dengan 90% aseton dan ditentukan melalui kaedah spektrofotometer. Terdapat perbezaan terhadap pertumbuhan microalgae dalam rawatan-rawatan yang berbeza ($p < 0.05$). Dalam kajian ini mendapati *Nannochloropsis* sp. tidak dapat tumbuh dalam keadaan heterotrof tetapi memberi keputusan terbaik pada rawatan glukose 10 pmm dan mencapai nisbah karotenoids/klorofil 0.765 tertinggi berbanding dengan 0.484 pada rawatan glucose 0 ppm dan 0.572 pada rawatan glucose 50 ppm. Rawatan glucose 200 ppm dan 500 ppm adalah tidak sesuai dipraktikan dalam penghasilan mikroalgae disebabkan ketumpatan terlampau dan tidak kos efektif. Keputusan seumpama ini penting untuk menentukan toleransi spesies microalgae ini terhadap keadaan heterotrof di mana bakal menjadi rujukan untuk pembangunan teknik pengkulturan yang mudah dan kos efektif pada masa depan.