

**GROWTH AND PROXIMATE COMPOSITION
OF *Nannochloropsis* sp. CULTURED USING
DIFFERENT MEDIA IN INDOOR AND
OUTDOOR CONDITION**

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**FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
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CULTURED USING DIFFERENT MEDIA IN INDOOR AND OUTDOOR
CONDITION

By
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Research Report submitted in partial fulfillment of
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**DEPARTMENT OF MARINE SCIENCE
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**DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled:

*GROWTH AND PROXIMATE COMPOSITION OF Nannochloropsis sp.
CULTURED USING DIFFERENT MEDIA IN INDOOR AND OUTDOOR CONDITION*

by *SITI HASLINDA BT KAMARUL ZAMAN*....., Matric No. *UK 22789*..... have

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LIST OF ABBREVIATION

SGR	-	Specific Growth Rate
μm	-	Micrometer
SPSS	-	Statistical Product and Service Solutions
df	-	Degree of Freedom
F	-	<i>F</i> -statistic
Sig.	-	Significant

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GROWTH AND PROXIMATE COMPOSITION OF *Nannochloropsis* sp. CULTURED USING DIFFERENT MEDIA IN INDOOR AND OUTDOOR CONDITION

ABSTRACT

Nannochloropsis sp. was widely used in aquaculture as it has a great source of protein, lipid and carbohydrate. Microalgae's major applications for aquaculture are related to nutrition, being used fresh as a sole component, as a food additive to basic nutrients, for coloring the flesh of salmonids and for other biological activities. Study on *Nannochloropsis* sp. was conducted to determine the growth and the proximate composition of *Nannochloropsis* sp. cultured using different media in indoor and outdoor culture condition. This study was conducted at Universiti Malaysia Terengganu. Marine microalgae, *Nannochloropsis* sp., was collected and cultured in two different media – Conway and KW21; and two different culture conditions – indoor and outdoor. The growth and proximate composition – protein, lipid and carbohydrate; of all culture treatments were determined. *Nannochloropsis* sp. was grown best in both culture media even though growth in KW21 was slightly higher ($P>0.05$) when compared to Conway medium. *Nannochloropsis* sp. culture in indoor (laboratory) condition was significantly shown higher growth ($P<0.05$) when compared to the outdoor (natural) culture condition. The protein production seems to be significantly high ($P>0.05$) in KW21 culture medium (39.58% and 32.99% for indoor and outdoor respectively) when compared to Conway medium (26.74% and 19.05% for indoor and outdoor respectively). However, microalgae culture under indoor culture condition (26.74% and 39.58% for Conway and KW21 media respectively) has shown significantly high ($P>0.05$) percentage of protein as compared to outdoor condition (19.05% and 32.99% for Conway and KW21 media respectively). Lipid accumulation in *Nannochloropsis* sp. was significantly high ($P>0.05$) when cultured under indoor condition (27.2% and 25.6% for Conway and KW21 respectively) when compared to outdoor condition (18.13% and 12.73% for Conway and KW21 respectively). The percentage (%) of carbohydrate in microalgae cultured in Conway medium for indoor condition (34.01%) was slightly high ($P<0.05$) compared to outdoor condition (32.29%). All of the results obtained might be affected by some physical factors such as light intensity and temperature; as well as nutrient composition such as nitrogen, phosphate and trace metals. From the results obtain, we also can make a conclusion that *Nannochloropsis* sp. can grow best in both Conway and KW21 media under indoor culture condition.

PERTUMBUHAN DAN KOMPOSISI PROKSIMAT BAGI *Nannochloropsis* sp. YANG DIKULTUR MENGGUNAKAN MEDIA YANG BERBEZA DI DALAM BILIK KULTUR DAN DILUAR BILIK KULTUR

ABSTRAK

Nannochloropsis sp. telah digunakan secara meluas dalam industry akuakultur kerana ia mempunyai sumber protein, lipid dan karbohidrat. Penggunaan mikroalga telah digunakan untuk tujuan yang berkait rapat dengan pemakanan, diimana dia digunakan sebagai bahan mendatah, makanan tambahan, pewarna kepada daging ikan salmon dan beberapa aktiviti biologi lain. Kajian keatas *Nannochloropsis* sp. telah dijalankan untuk menentukan pertumbuhan dan komposisi proksimat dalam *Nannochloropsis* sp. yang dikultur menggunakan media yang berbeza di dalam bilik kultur dan di luar bilik kultur. Kajian ini telah dijalankan di Universiti Malaysia Terengganu. Mikroalga marin, *Nannochloropsis* sp., telah dikultur di dalam dua jenis media yang berasingan iaitu media Conway dan media KW21; dan dua keadaan kultur yang berbeza iaitu di dalam bilik kultur dan di luar bilik kultur. Kajian mendapati bahawa *Nannochloropsis* sp. tumbuh dengan baik didalam kedua-kudua media kultur, walaupun pertumbuhan didalam media KW21 sedikit tinggi ($P>0.05$) berbanding media Conway. Pertumbuhan *Nannochloropsis* sp. yang dikultur didalam bilik kultur adalah cukup tinggi ($P<0.05$) berbanding pertumbuhan diluar bilik kultur. Penghasilan protein adalah tinggi ($P>0.05$) didalam media KW21 (39.58% dan 32.99% masing-masing untuk bilik kultur dan diluar bilik kultur) berbanding media Conway (26.74% dan 19.05% masing-masing untuk bilik kultur dan diluar bilik kultur). Mikroalga yang dikultur didalam bilik kultur (26.74% dan 39.58% masing-masing untuk media Conway dan KW21) menunjukkan peratusan protein yang lebih tinggi ($P>0.05$) berbanding kultur diluar bilik (19.05% dan 32.99% masing-masing untuk media Conway dan KW21). Penghasilan lipid di dalam *Nannochloropsis* sp. adalah lebih tinggi ($P>0.05$) apabila dikultur di dalam bilik kultur (27.2% dan 25.6% masing-masing untuk media Conway dan KW21) berbanding di luar bilik kultur (18.13% dan 12.73% masing-masing untuk media Conway dan KW21). Peratusan karbohidrat di dalam mikroalga yang dikultur di dalam media Conway untuk kultur di dalam bilik kultur (34.01%) adalah tinggi ($P<0.05$) berbanding kultur di luar bilik kultur (32.29%). Semua keputusan yang diperolehi dipengaruhi oleh beberapa factor fizikal seperti intensiti cahaya dan suhu; begitu juga dengan komposisi nutrient seperti nitrogen, fosfat dan logam surih. Dari keputusan yang diperolehi, kita dapat menyimpulkan bahawa species *Nannochloropsis* sp. boleh tumbuh dengan baik didalam kedua-dua media Conway dan KW21 didalam bilik kultur.