

**EFFECTS OF DIFFERENT MEDIA ON THE GROWTH AND
PROXIMATE COMPOSITION OF *Dunaliella* sp. AT
DIFFERENT GROWTH PHASE**

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**SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
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COMPOSITION OF *Dunaliella* sp. AT DIFFERENT GROWTH PHASE**

By

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**Research Proposal submitted in partial fulfillment of
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**SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
UNIVERSITI MALAYSIA TERENGGANU**

**DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled Effects of Different Media on the Growth and Proximate Composition of *Dunaliella* sp. at Different Growth Phase by Siti Anisha Binti Azahar Matric No. UK26046 have been examined and all errors identified have been corrected. This report is submitted to the School of Marine Science and Environment as partial fulfillment towards obtaining the Degree Bachelor of Science Marine Biology School of Marine Science and Environment, Universiti Malaysia Terengganu.

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LIST OF ABBREVIATIONS

g	-	gram
L	-	liter
ml	-	milliliter
mg	-	milligram
nm	-	nanometer
ppt	-	part per thousand
rpm	-	revolutions per minute
CO ₂	-	carbon dioxide
NaCl	-	sodium chloride
NaOH	-	sodium hydroxide
AA	-	arachidonic acid
DHA	-	docosahexaenoic
EPA	-	eicosapentaenoic acid
PUFA	-	polyunsaturated fatty acid

ABSTRACT

Microalgae *Dunaliella* sp. has been examined for the growth rate and its proximate composition under different growth phase. The growth rate of *Dunaliella* sp. showed there are no significant different ($P>0.05$) when culture in Conway and F2 media even though the cell density of *Dunaliella* sp. in F2 media is higher than the cell density of *Dunaliella* sp. in Conway media. It only takes 7 days for *Dunaliella* sp. to reach its maximum cell density in F2 media and it takes 9 days to reach its maximum cell density in Conway media. The highest cell density of *Dunaliella* sp. in F2 media is 7.8×10^6 cells mL^{-1} while for Conway media is 4.1×10^6 cells mL^{-1} . The proximate composition of *Dunaliella* sp. such as protein, carbohydrate and lipid was study at lag, log and stationary phase in both F2 and Conway media. Protein content was significant higher ($P>0.05$) in Conway media compared in F2 media but there are no significant different of protein at different growth phase for both media.. In Conway media, the log phase dominant the amount of protein with 67.58 % dry weight followed by lag and stationary phase with 57.53 % dry weight and 51.1 % dry weight. The carbohydrate content of *Dunaliella* sp. in both media increase at every growth phase but there are no significant different ($P>0.05$) of the carbohydrate content of *Dunaliella* sp. in both media at different growth phase. Stationary phase has the highest amount of carbohydrate compared with other phases with 19.78 % in Conway media and 23.93 % in F2 media.

There were no significant different ($P>0.05$) the lipid content of *Dunaliella* sp. in both media at different growth phase, however Conway media posse higher lipid content of *Dunaliella* sp. compared in F2 media especially in lag phase with 12.90 % followed by log and stationary phase both with 9.80 % and 9.05 %.

Conway media is the best medium culture for the protein at log phase and lipid at lag phase but for carbohydrate the F2 media is the suitable medium culture for the higher carbohydrate content especially in stationary phase. The finding from this study can be apply in aquaculture field where it is can tell agriculture people to chose the best culture medium for the algae cultivation based on the cell and optical density and know the specific time to harvest the microalgae for the maximum production of protein, carbohydrate and lipid.

**KESAN BERBEZA MEDIA KE ATAS PERTUMBUHAN DAN KOMPOSISI
PROKSIMAT *Dunaliella* sp. PADA FASA PERTUMBUHAN YANG BERBEZA**

ABSTRAK

Mikroalga *Dunaliella* sp. mempunyai banyak potensi dalam bidang akuakultur. Kajian di atas spesies ini ialah pertumbuhan dan komposisi proksimat *Dunaliella* sp. di bawah fasa pertumbuhan yang berbeza. Kadar pertumbuhan *Dunaliella* sp. menunjukkan tidak ada perbezaan yang signifikan di antara media Conway dan F2 walaupun media F2 menghasilkan lebih banyak sel density *Dunaliella* sp. daripada media Conway. Ia hanya mengambil masa 7 hari untuk *Dunaliella* sp. untuk mencapai kepadatan sel maksimum dalam media F2 dan 9 hari untuk mencapai kepadatan sel maksimum dalam media Conway. Ketumpatan sel tertinggi *Dunaliella* sp. dalam media F2 adalah 7.8×10^6 cells/mL manakala bagi Conway media adalah 4.1×10^6 cells/mL.

Komposisi proksimat *Dunaliella* sp. seperti protein, karbohidrat dan lipid dikaji di dalam fasa pertumbuhan lag, log dan fasa pegun *Dunaliella* sp. dilakukan dalam kedua-dua F2 dan Conway media. Kandungan protein adalah tinggi dalam media Conway berbanding media F2 tetapi tiada perbezaan yang signifikan protein pada fasa pertumbuhan yang berbeza bagi kedua-dua media. Dalam media Conway, fasa log mendominasi jumlah protein dengan 67,58 % diikuti oleh lag dan fasa pegun dengan 57.53 % dan 51.1 % berat kering.

Kandungan karbohidrat *Dunaliella* sp. meningkat dalam kedua-dua media pada setiap fasa pertumbuhan tetapi tidak ada perbezaan yang signifikan ($P > 0.05$) bagi kandungan karbohidrat *Dunaliella* sp. dalam kedua-dua media pada pasa pertumbuhan yang berbeza.. Fasa pegun mempunyai jumlah tertinggi karbohidrat berbanding fasa lain dengan 19.78 % berat kering dalam media Conway dan 23.93 % berat kering dalam media F2. Tidak ada perbezaan yang signifikan ($P < 0.05$) di antara kedua-dua media pada fasa pertumbuhan yang berbeza tetapi Conway media mempunyai kandungan lipid yg tinggi berbanding dalam media F2 terutama dalam fasa lag dengan 12.90 % diikuti oleh log dan fasa pegun kedua-duanya dengan 9.80 % dan 9.05 %.

Conway media adalah medium kultur terbaik untuk protein pada fasa log dan lipid pada fasa lag tetapi untuk karbohidrat media F2 lebih sesuai digunakan untuk kandungan karbohidrat yang lebih tinggi terutama dalam fasa pegun untuk *Dunaliella* sp.. Dapatan dari kajian ini boleh digunakan dalam bidang akuakultur di mana ia boleh memberitahu orang pertanian untuk memilih medium kultur terbaik untuk penanaman alga berdasarkan sel dan ketumpatan optik dan mengetahui masa yang tertentu untuk menuai alga untuk pengeluaran maksimum protein , karbohidrat dan juga lipid.