# CAROTENOIDS FROM TROPICAL MICROALGAE *Chlorella* sp; DETERMINATION OF THE EFFECTS OF CAROTENOIDS ON KNOWN PATHOGEN

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2011



Carotenoids from tropical microalgae, Chlorella sp; determination of the effects of carotenoids on known pathogens / Wan Noor Jumirah Wan Ya'kub.



Lihat sebelah

# CAROTENOIDS FROM TROPICAL MICROALGAE, *Chlorella* sp; DETERMINATION OF THE EFFECTS OF CAROTENOIDS ON KNOWN PATHOGENS

**By**

**Wan Noor Jumirah bt Wan Ya'kub**

**Research Project submitted in partial fulfillment of**
**the requirements for the degree of**
**Bachelor of Science (Marine Biology)**

**Department of Marine Science**
**Faculty of Maritime Studies and Marine Science**
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**DEPARTMENT OF MARINE SCIENCE**

**FACULTY OF MARITIME STUDIES AND MARINE SCIENCE**
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# DECLARATION AND VERIFICATION REPORT
# RESEARCH PROJECT I AND II

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

**Carotenoids from Tropical Microalgae, *Chlorella* sp; Determination of the Effects of Carotenoids on Known Pathogen** by **Wan Noor Jumirah b t Wan Ya'kub**, Matric No. **UK 17542** has been examined and all errors identified have been corrected. This report is submitted to the Department of Marine Science as partial fulfillment towards obtaining the Degree **Bachelor of Science Marine Biology**, Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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## ABSTRACT

A marine microalgae which is local *Chlorella* sp has been used in this study. Carotenoids that were obtained from this microalgae were used in various experiment in this project. Firstly, the percentage of total carotenoid per dry weight of *Chlorella* sp was 47.6% in 30L culture of microalgae. The production of carotenoid in this microalgae was done by using the nutrient starvation stress. When the microalgae were in stress condition, they will produce more carotenoid. Then, the DPPH test was held where the EC50 for this experiment was 58.63%. The EC50 was obtained to know the effective concentration at 50 percent for this *Chlorella* sp crude. If the effective concentration is higher than 50 percent, the crude has more antioxidant properties. The MTT test was done to MCF-7 and normal cell line. The LC50 which is lethal concentration at 50 percent were obtained. MCF-7 and normal cell line show a same concentration which is 0.25mg/ml at LC50. This crude can kill MCF-7 and it also can kill the normal cell, which is mean that this crude was toxic to use to human. The effect on known pathogen had been done using the *Chlorella* sp crude. *E.coli* and *Klebsiella* sp show probiotic reaction towards the crude, while *P.aeruginosa* shows inhibition reaction. Pathogen *Salmonella* sp and *B.cereus* was neutral which is mean no reaction had been seen. Most of the pathogen from gram-negative pathogen resistant to many antibiotic that are effective against gram-positive bacteria.

# ABSTRAK

Microalgae marin, *Chlorella* sp digunakan untuk menjalankan kajian ini. Karotenoid yang diperolehi daripada mikroalga digunakan dalam berbagai experiment di dalam projek ini. Pertama, peratusan jumlah karotenoid dalam berat kering *Chlorella* sp adalah 47.6% dalam 30L kultur mikroalga. Penghasilan karotenoid dilakukan dengan member tekanan nutrient kepada mikroalga. Apabila mikroalga ini berada dalam keadaan tertekan ia akan menghasilkan lebih banyak karotenoid. Kemudian, ujikaji terhadap DPPH dilakukan dimana EC50 untuk eksperimant ini adalah 58.63%. EC50 diambil untuk mengetahui kepekatan efektif sample pada 50 peratus. Jika kepekatan efektif sample melebihi 50 peratus, sample dikatakan mengandungi tahap antioxidant yang tinggi. Kajian MTT kemudian dijalankan terhadap MCF-7 dan sel normal. LC50 diperolehi dimana kepekatan bagi MCF-7 dan normal sel adalah sama iaitu pada kepekatan 0.25mg/ml. Sampel ini dikatan boleh membunuh MCF-7 dan pada masa yang sama turut membunuh sel normal, sample ini toxic kepada manusia. Kesan karotenoid untuk *Chlorella* sp terhadap patogen yang diketahui turut dijalankan. *E.coli* dan *Klebsiella* sp menunjukkan tindak balas probiotic manakala *P.aeruginosa* menunjukkan tindak balas inhibition. Bagi patogen *Salmonella* sp dan *B.cereus* menunjukkan tindak balas neutral dimana tiada sebarang tindak balas dilihat. Kebanyakan patogen gram-negetive mempunyai ketahanan antibiotic yang efektif pada gram-positive bacteria.