

EFFECT OF ZEATIN ON GROWTH AND FATTY ACID COMPOSITION IN
CHLORELLA SP. (UMT-M1)

By

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **EFFECT OF ZEATIN ON GROWTH AND FATTY ACID COMPOSITION IN CHLORELLA SP. (UMT-M1)** oleh **NUR FATIN BINTI AHMAD**, no. matrik: **UK17274** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh ijazah **SARJANA MUDA SAINS (SAINS BIOLOGI)**, Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu.

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DECLARATION

I hereby declare that this PITA research report entitled **Effect of Zeatin on Growth and Fatty Acid Composition in *Chlorella* sp. (UMT-M1)** is the result of my own research except as cited in the references.

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ABSTRACT

Cytokinin is believed can trigger cell division in *Chlorella* sp. but for production of fatty acid remain unknown. Thus, the influence of zeatin at various concentrations; 0.7, 1.4 and 2.8mg/L were studied for their impact on growth and fatty acid composition in *Chlorella* sp. (UMT-M1) that cultured in F/2 medium with aeration. The culture conditions were maintained as follows; salinity at 30ppt, light illustration 24 hours, temperature at $25\pm 1^{\circ}\text{C}$, and light intensity at $150\mu\text{mol photon m}^{-2}\text{s}^{-1}$. The growth of *Chlorella* sp. was measured every two days until day 42 in terms of number of cells according to the values of optical density (OD_{600}). At late of stationary phase on day 42, the cells were harvested for total oil extraction, and gas chromatography for determination of fatty acid composition. The cells number of *Chlorella* sp. (UMT-M1) was highest, $2.68\pm 0.06 (\times 10^7 \text{ cells/ml})$ when treated with 2.8 mg/L zeatin. The total oil content was highest, $9.96\pm 7.57 (\text{w/w } \%)$, in 2.8mg/L zeatin. SFA was major saturation fatty acid found in *Chlorella* sp. (UMT-M1), but was inhibited when zeatin promoted in it. For MUFA and PUFA, zeatin at 1.4mg/L enhanced the most for production of these fatty acids. Collectively, these data suggest that zeatin was favorable to promote growth in *Chlorella* sp. (UMT-M1), but no significant different in fatty acid composition.

KESAN ZEATIN KE ATAS PERTUMBUHAN DAN KOMPOSISI ASID LEMAK DI DALAM *CHLORELLA* SP. (UMT-M1)

ABSTRAK

Sitokinin dipercayai mampu untuk meningkatkan pembahagian sel di dalam *Chlorella* sp. (UMT-M1), namun masih tidak diketahui untuk penghasilan asid lemak. Maka, kesan pelbagai kepekatan zeatin; 0.7, 1.4, dan 2.8mg/L dikaji ke atas pertumbuhan dan komposisi asid lemak di dalam *Chlorella* sp. (UMT-M1) yang dikultur di dalam media F/2 dengan aerasi . Kondisi kultur ditetapkan seperti berikut; paras kandungan garam 30ppt, ilustrasi cahaya 24jam, suhu pada $25\pm 1^{\circ}\text{C}$, dan keamatan cahaya $150\mu\text{mol foton m}^{-2}\text{s}^{-1}$. Pertumbuhan *Chlorella* sp. diukur setiap dua hari hingga hari ke-42 iaitu bilangan sel berdasarkan nilai ketumpatan optic (OD_{600}). Sel dituai pada akhir fasa tetap iaitu pada hari ke-42 untuk penentuan komposisi asid lemak. Bilangan sel *Chlorella* sp. (UMT-M1) adalah tertinggi, $2.68\pm 0.06 (\times 10^7 \text{ sel/ml})$ pada zeatin 0.7mg/l. Kandungan minyak adalah tertinggi, $9.96\pm 7.57 (\text{w/w } \%)$ pada zeatin 2.8mg/L. SFA merupakan asid lemak utama di dalam *Chlorella* sp. (UMT-M1). Bagi MUFA dan PUFA, zeatin pada kepekatan 1.4mg/L paling tinggi meningkatkan penghasilan kedua-dua asid lemak ini. Kesimpulannya, kehadiran zeatin dapat membantu untuk meningkatkan pertumbuhan *Chlorella* sp. (UMT-M1), namun tiada perbezaan signifikansi bagi komposisi asid lemak.