CHARACTERIZATION OF FATTY ACIDS IN CORAL AT REDANG ISLAND, TERENGGANU, MALAYSIA

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CHARACTERIZATION OF FATTY ACIDS IN CORAL AT REDANG ISLAND, TERENGGANU, MALAYSIA

By

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk :

Characterization of Fatty Acids in Coral at Redang Island, Terengganu, Malaysia

oleh **Mohamad Haikel bin Hilmi** No. Matrik: **UK 12036**

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ABSTRACT

A study of lipid content and lipid composition of fatty acids (FA) was made for 4 corals species *Acropora formosa, Acropora valenciennesi, Acropora hyacinthus* and *Pachyseris speciosa* from Pasir Akar, Pulau Redang, Terengganu. The coral samples were collected in August 2007. The lipid content and fatty acids characteristics were compared in all tissue samples of coral in order to study the characteristic differences or similarity among them. In all species, the lipid classes' concentrations were significantly different.

The average dry weight of total lipids in tissue sample of *A. formosa*, *A. valenciennesi, A. hyacinthus* and *P. speciosa* were 0.10 g g^{-1} ,0.10 g g^{-1}, 0.21 g g^{-1}, 0.14 g g^{-1} respectively .From the result shows in this study the mean percentage of total FA composition in *Acropora Formosa, Acropora valenciennesi* composed of 25.6% and 27.5% in the total lipid content whereas in *Pachyseris speciosa* corals was significantly lower, composed of 15.3%. The mean percentages of total lipid in *Acropora hyaci*nthus was significantly higher than others, 31.3%.

The average concentration fatty acids classes were shown in this study. In SAFA of *A. formosa*, *A. valenciennesi, A. hyacinthus* and *P. speciosa* were 22.36%, 0.60%,15.55% and 22.30% respectively. In PUFA class for *A. formosa*, *A. valenciennesi, A. hyacinthus* and *P. speciosa* were 33.07 %, 23.38%, 35.42% and 37.25 % respectively. In MUFA class for *A. formosa*, *A. valenciennesi, A. hyacinthus* and *P. speciosa* were 36.84%, 25.20%, 36.28% and 27.38. The PUFA and MUFA component was maintained as higher number of total FAs in all corals sample. These results maybe from the dietary to produces higher PUFA and lower MUFA proportion in tissues and the negative relationship reported between ω3 and ω6 fatty acids.

Palmatic acid (16:0) was the main fatty acid contained in all tissues sample because it was the first product of biosynthesis. The result also indicated ω6 PUFAs were more dominant than ω3 PUFAs in all tissue samples. It is suggested that ω6 PUFAs may be more useful for the biochemical classification of these corals than ω3 PUFAs. The coral obtained both type fatty acids maybe through feeding on product from photosynthetic organisms (zooxanthellae). The concentration of total ω3 and ω6 PUFAs among corals samples were shown in *.A. formosa* was significantly higher than others. In addition, maybe the loss of key factor such as zooxanthellae in certain corals samples may explain differences in FA composition and low total ω3 and ω6 PUFA level in *A. valenciennesi*. There are no significant differences between total ω3 and ω6 PUFA in *A. hyacinthus* and *P. speciosa.* The distinctive fatty acid compositions may be useful in future food web studies utilizing fatty acids as biomarkers of trophic behavior.

ABSTRAK

Kajian kandungan lipid dan cirri-ciri asid lemak telah dijalankan keatas empat jenis spesies karang (*A.formosa, A.valenciennesi, A.hyacinthus* dan *P.spe*ciosa) yang telah diambil sampelnya di Pasir Akar, Pulau Redang, Terengganu . sampel tersebut telah ambil pada ogos 2007. Hasil daripada kajian ini, kandungan lipid dan ciri-ciri asid lemak telah dibandingkan antara satu sama lain dengan tujuan untk mengkaji perbezaan dan persamaan antara sampel tisu karang. Dalam semua spesies , kepekatan setiap kelas lipid mempunyai perbezaan yg ketara.

Julat berat kering bagi jumlah lipi alam sampel tisu *A. formosa, A. valenciennesi, A. hyacinthus* and *P. speciosa* ialah 0.10 g g^{-1} ,0.10 g g^{-1}, 0.21 g g^{-1}, 0.14 g g^{-1}. Dari keputusan kajian ini, purata peratusan umlah asid lemak dalam karang *Acropora Formosa, Acropora valenciennesi* mengandungi 25.6% and 27.5% alam kandungan lipid dimana *Pachyseris speciosa* mengandungi kepekatan yang rendah, 15.3%. Purata peratusan bagi jumlah lipid dalam *Acropora hyaci*nthus secara ketara adalah lebih tinggi berbanng sampel lain, 31.3%.

Julat kepekatan kelas asid lemak ditunukkan dalam kajian ini. Dalam SAFA bagi sampel *A. formosa, A. valenciennesi, A. hyacinthus* and *P. speciosa* mengandungi 22.36%, 0.60%,15.55% dan 22.30%. Bagi kelas PUFA bagi *A. formosa, A. valenciennesi, A. hyacinthus* dan *P. speciosa* ialah 33.07 %, 23.38%, 35.42% dan 37.25 %. Dalam kelas MUFA bagi *A. formosa, A. valenciennesi, A. hyacinthus* and *P. speciosa* ialah 36.84%, 25.20%, 36.28% dan27.38%. Kompenan PUFA an MUFA kekal dalam bilangan yang tinggi bagi umlah asid lemk dalam semu sampel. Keputusan mungkin atang dari diet pemakanan yang menhasilkan PUFA yang tinggi an MUFA yang rendah.

Keputusan dan kajian ini juga menunjukkan ω6 PUFA lebih dominan berbanding ω3 PUFA. Ini berkemungkinan, ω6 PUFA lebih diperlukan daripada ω3 PUFA dalam pengkelasan biokimia karang. Cara batu karang mendapatkan kedua-dua jenis asid lemak tersebut hanya melalui pemakanan yang diabil atau diserap daripada produk organisma fotosintetik (zooxantheallae). Komposisi asid lemak yang tersendiri mungkin sangat berguna dalam kajian siratan makanan pada masa akan datang dimana ia boleh dijadikan sebagai sifat penanda biologi.