

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**

**Mohamad Haikel bin Hilmi**

**Research report submitted in partial fulfillment of  
the requirements for the degree of  
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**Characterization of Fatty Acids in Coral at Redang Island, Terengganu, Malaysia**

oleh **Mohamad Haikel bin Hilmi**

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## TABLE OF CONTENT

	PAGE
<b>ACKNOWLEDGEMENT</b>	<b>i</b>
<b>TABLE OF CONTENT</b>	<b>ii</b>
<b>LIST OF TABLE</b>	<b>iv</b>
<b>LIST OF FIGURE</b>	<b>v</b>
<b>LIST OF APPENDICE</b>	<b>vii</b>
<b>ABSTRACT</b>	<b>viii</b>
<b>ABSTRAK</b>	<b>ix</b>
<b>1.0 CHAPTER 1: INTRODUCTION</b>	
1.1 Introduction	1
1.2 Objectives	2
<b>2.0 CHAPTER 2: LITERATURE REVIEW</b>	
2.1 General Biology of Coral Reefs	3
2.1.1 Corals	4
2.1.2 Zooxanthellae	6
2.2 Ecology Distribution of Coral	7
2.3 Status of Coral	8
2.3.1 Coral Status in Malaysia	9
2.4 Lipid	10
2.5 Fatty acids (FA)	10
2.6 Lipids and Fatty acids in Corals	11
2.6.1 Saturated (SAFA) and Unsaturated Fatty Acids.	12
2.6.2 Monounsaturated (MUFA) and Polyunsaturated Fatty Acids (PUFA).	13
<b>3.0 CHAPTER 3: METHODOGY</b>	
3.1 Sampling Location	15

3.2 Sample Collection and Preparations	17
3.3 Lipid Extraction	17
3.3.1 Extraction and Ultrasonification of Lipids.	17
3.3.2 Saponification	18
3.3.3 Transmethylization	18
3.3.4 Lipids purification	18
3.4 Gas Chromatography (GC) analysis	19
3.5 Statistical analysis	19
<b>4.0 CHAPTER 4: RESULT</b>	
4.1 Species of Coral	20
4.1.1 Family Acroporidae	20
4.1.1.1 <i>Acropora formosa</i>	21
4.1.1.2 <i>Acropora valenciennesi</i>	22
4.1.1.3 <i>Acropora hyacinthus</i>	23
4.1.2 Family Agariciidae.	24
4.1.2.1 <i>Pachyseris speciosa</i> .	25
4.2 Lipid Concentration	26
4.3 Total Fatty Acid Composition	27
4.4 Fatty acid in corals species.	32
4.5 Summary of Anova , Tukey and Fisher's PLSD Post Hoc Test Between the Corals Species.	37
<b>5.0 CHAPTER 5: DISCUSSION</b>	
5.1 Lipid of the Corals	40
5.2 Fatty Acids of <i>Acropora formosa</i> , <i>Acropora valenciennesi</i> <i>Acropora hyacinthus</i> and <i>Pachyseris speciosa</i> .	42
<b>6.0 CHAPTER 6: CONCLUSION</b>	<b>45</b>
<b>REFERENCES</b>	<b>46</b>
<b>APPENDICES</b>	<b>50</b>
<b>CURRICULUM VITAE</b>	<b>59</b>



**LIST OF TABLE**

<b>No.</b>	<b>Title</b>	<b>Page</b>
Table 2.1	Basic demographic statistics of Southeast Asian coral reef countries	8
Table 3.1	The Sampling point in Pasir Akar	15
Table 4.1	Total lipid content ( g g <sup>-1</sup> dry wt ) and lipids composition (%) of <i>A.formosa</i> , <i>A. valenciennesi</i> , <i>A. hyacinthus</i> , <i>P.speciosa</i> from Pasir Akar, Pulau Redang in August 2007.	31
Table 4.2	Fatty acid content (% of total fatty acids) of <i>A.formosa</i> , <i>A.valenciennesi</i> , <i>A. hyacinthus</i> , <i>P.speciosa</i> from Pasir Akar, Pulau Redang in August 2007.	32
Table 4.3	Fatty acids composition (% of total fatty acids) of <i>A.formosa</i> , <i>A. valenciennesi</i> , <i>A. hyacinthus</i> , <i>P.speciosa</i> from Pasir Akar, Pulau Redang in August 2007.	34
Table 4.4	Post Hoc test (Dependent Variable: % of Total FAs ) for type of fatty acids in tissue sample of corals <i>A.formosa</i> , <i>A. valenciennesi</i> , <i>A. hyacinthus</i> and <i>P.speciosa</i> using Tukey and Fisher's PLSD models.	38
Table 4.5	Statistical summary from ANOVA comparing the relative percentages of fatty acids among the coral species ( <i>A.formosa</i> , <i>A. valenciennesi</i> , <i>A. hyacinthus</i> , <i>P.speciosa</i> ) from Pasir Akar, Pulau Redang in August 2007.	39

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**Characterization Of Fatty Acids In Coral At Redang Island, Terengganu, Malaysia**

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**LIST OF FIGURES**

<b>No.</b>	<b>Title</b>	<b>Page</b>
Figure 2.1	Estimates of hard coral species indicate that 50% to 75% of the global total occur in four Southeast Asian countries	19
Figure 2.2	The structure of Fatty acids.	11
Figure 3.1	Sampling location of the Pasir Akar, Pulau Redang, Terengganu.	16
Figure 4.1	Staghorn corals, primarily consist of large upright branch ( <i>Acropora formosa</i> ) from Pasir Akar, Pulau Redang in August 2007.	22
Figure 4.2	Large horizontal branching species with upturned branching, <i>Acropora valenciennesi</i> from Pasir Akar, Pulau Redang in August 2007.	23
Figure 4.3	Species forming table with fine horizontal branches, <i>Acropora hyacinthus</i> from Pasir Akar, Pulau Redang in August 2007.	24
Figure 4.4	The coral sample of Foliose type, ( <i>Pachyseris speciosa</i> ) from Pasir Akar, Pulau Redang in August 2007.	25
Figure 4.5	Toatal lipid composition (g g-1 dry weight) among <i>A. formosa</i> , <i>A. valenciennesi</i> , <i>A. hyacinthus</i> and <i>P. speciosa</i> (mean $\pm$ SD, n =3) from Pasir Akar, Pulau Redang, Terengganu in August 2007.	27
Figure 4.6	Thin-layer chromatography (TLC) plates for the tissue sample of coral from Pasir Akar, Pulau Redang in August 2007.	28
Figure 4.7	The GC Chromatogram standard graphs.	29
Figure 4.8	The GC Chromatogram sample graphs of replicate 1, <i>P. speriosa</i> from Pasir Akar, Pulau Redang in August 2007.	30

Figure 4.9	Total fatty acid content (% of total lipid ) among <i>Acropora formosa</i> , <i>Acropora valenciennesi</i> , <i>Acropora hyacinthus</i> and <i>Pachyseris speciosa</i> (mean $\pm$ SD), n = 3 from Pasir Akar, Pulau Redang in August 2007.	31
Figure 4.10	Example of graph cover area of lipid content for the tissue sample of corals from Pasir Akar, Pulau Reang in August 2007.	31
Figure 4.11	Total lipid percentage in all coral samples by class of lipids from Pasir Akar, Pulau Redang in August 2007.	36
Figure 5.1	Comparison of the relative concentrations of fatty acids classes ( % of total fatty acids) among <i>Acropora formosa</i> , <i>Acropora valenciennesi</i> , <i>Acropora hyacinthus</i> (mean $\pm$ SD), n = 3 from Pasir Akar, Pulau Redang in August 2007.	44

**LIST OF APPENDICES**

<b>No.</b>	<b>Title</b>	<b>Page</b>
Appendix 1	Weight of Sample, Weight of Total Lipids, Weight of Extracted Lipids, TLC data	50
Appendix 2	Concentration of FAs against FAs class	51
Appendix 3	Concentration FAs against Species	53
Appendix 4	Concentration against Type of Lipids.	54
Appendix 5	Concentration of Lipids against Species	56

## 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<sup>-1</sup>, 0.10 g g<sup>-1</sup>, 0.21 g g<sup>-1</sup>, 0.14 g g<sup>-1</sup> 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 hyacinthus* 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  $\omega 3$  and  $\omega 6$  fatty acids.

Palmitic 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  $\omega 6$  PUFAs were more dominant than  $\omega 3$  PUFAs in all tissue samples. It is suggested that  $\omega 6$  PUFAs may be more useful for the biochemical classification of these corals than  $\omega 3$  PUFAs. The coral obtained both type fatty acids maybe through feeding on product from photosynthetic organisms (zooxanthellae). The concentration of total  $\omega 3$  and  $\omega 6$  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  $\omega 3$  and  $\omega 6$  PUFA level in *A. valenciennesi*. There are no significant differences between total  $\omega 3$  and  $\omega 6$  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 ciri-ciri asid lemak telah dijalankan keatas empat jenis spesies karang (*A.formosa*, *A.valenciennesi*, *A.hyacinthus* dan *P.speciosa* ) 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  $0.10 \text{ g g}^{-1}$ ,  $0.10 \text{ g g}^{-1}$ ,  $0.21 \text{ g g}^{-1}$ ,  $0.14 \text{ g g}^{-1}$ . 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 hyacinthus* secara ketara adalah lebih tinggi berbanding sampel lain, 31.3%.

Julat kepekatan kelas asid lemak ditunjukkan 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% dan 27.38%. Komponen PUFA an MUFA kekal dalam bilangan yang tinggi bagi umlah asid lemak dalam semu sampel. Keputusan mungkin atang dari diet pemakanan yang menghasilkan PUFA yang tinggi an MUFA yang rendah.

Keputusan dan kajian ini juga menunjukkan  $\omega 6$  PUFA lebih dominan berbanding  $\omega 3$  PUFA. Ini berkemungkinan,  $\omega 6$  PUFA lebih diperlukan daripada  $\omega 3$  PUFA dalam pengelasan biokimia karang. Cara batu karang mendapatkan kedua-dua jenis asid lemak tersebut hanya melalui pemakanan yang diabil atau diserap daripada produk organisma fotosintetik (zooxanthellae ). Komposisi asid lemak yang tersendiri mungkin sangat berguna dalam kajian siratan makanan pada masa akan datang dimana ia boleh dijadikan sebagai sifat penanda biologi.