FATTY ACID BIOMARKERS TO INDICATE THE ORGANIC FOOD SOURCES OF MUDSKIPPER SPECIES *Boleophthalmus boddarti* and *Periophthalmus gracilis* IN SETIU WETLANDS, TERENGGANU

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By

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

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PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I DAN II

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FATTY ACID BIOMARKERS TO INDICATE THE ORGANIC FOOD SOURCES OF MUDSKIPPER SPECIES *Boleophthalmus boddarti* AND *Periophthalmus gracilis* IN SETIU WETLANDS, TERENGGANU Oleh ROKIAH BINTI SURIADI, No.Matrik UK 12857 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Marin sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains (Biologi Marin), Fakulti Pengajian Maritim dan Sains Marin, Universiti Malaysia Terengganu.

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TABLE OF CONTENTS

		Page
ACKNOWLEDGEMENTS		i
LIST OF TABLES		ii
LIST OF FIGURES		iv
LIST OF ABBREVIATIONS		v
LIST OF APPENDICES		vi
ABSTRACT		vii
ABSTRAK		vii
CHAPTER 1: INTRODUCTION		
1.1	**Introduction**	1
1.2	**Importance of Study**	3
1.3	**Objectives of Study**	4
CHAPTER 2: LITERATURE REVIEW		
2.1	**Mangrove ecosystems**	5
2.2	**Mudskippers in mangrove**	6
	2.2.1 ***Periophthalmus*** **sp.**	7
	2.2.2 ***Boleophthalmus*** **sp.**	7
2.3	**Biomarkers**	8
	2.3.1 Lipid and Fatty Acid	10
	2.3.2 Rationale using the fatty acid markers	13
2.4	**Seasonal conditions in Terengganu**	14

CHAPTER 3: METHODOLOGY

3. 1 Study Area 15

3. 2 Study species 17

3. 3 Sample collections 17

3. 3. 1 Mudskipper sample 18

3. 3. 2 Sediment sample 18

3. 3. 3 Feces samples 18

3. 4 Sample preparations

3. 4. 1 Mudskipper samples 19

3. 4. 2 Sediment samples 19

3. 4. 3 Feces samples 19

3. 5 Lipid extraction analysis 20

3. 6 Lipid purification

3. 6. 1 Thin-layer chromatography (TLC) technique 21

3. 7 Gas Chromatography (GC) analysis 22

3. 8 Statistical analysis 23

3. 9 Stomach content analysis 23

CHAPTER 4: RESULTS

4. 1 Lipid concentrations 24

4. 2 Lipid components 26

4. 3 Fatty acid compositions 27

4. 4 Markers composition 39

4. 5 Stomach content analysis 44

CHAPTER 5: DISCUSSION

5.1 Lipid concentrations in the tissue of mudskipper species, their feces and sediments 46

5.2 Lipid components 47

5.3 Fatty acid compositions in mudskippers 48

5.3.1 MUFAs concentration 49

5.3.2 PUFAs, ω3 and ω6 PUFAs concentration 49

5.3.3 SAFAs concentration 51

5.3.4 BrFA concentrations 51

5.4 Major markers in the diets of mudskippers 51

5.4.1 Bacteria markers 52

5.4.2 Mangrove (detritus) markers 53

5.4.3 Dinoflagellates markers 53

5.4.4 Green macroalgae markers 54

5.4.5 Copepod markers 55

5.4.6 Diatom markers 56

5.5 Effects of seasons to the food sources 57

CHAPTER 6: CONCLUSION 58

REFERENCES 59

APPENDICES 62

CURRICULUM VITAE 65

LIST OF TABLES

Table		Page
Table4.1(A)	Statistical summary from two-way ANOVAs for the concentrations of lipids in the tissue of *Periophthalmus gracilis,* tissue of *Boleophthalmus boddarti,* feces of *Periophthalmus gracilis,* feces of *Boleophthalmus boddarti,* sediment of Pengkalan Gelap and sediment of Kampung Fikri in August and October.	25
Table4.1(B)	Statistical summary from two-way ANOVAs for the component of lipids in the tissue of *Periophthalmus gracilis,* tissue of *Boleophthalmus boddarti,* feces of *Periophthalmus gracilis,* feces of *Boleophthalmus boddarti,* sediment of Pengkalan Gelap and sediment of Kampung Fikri in August and October.	27
Table 4.2	Total lipids (mg g^{-1} dry weight), lipid components (% of total lipids) and fatty acid compositions (% of total fatty acids) in the tissue and feces of *Periophthalmus gracilis* and surface sediment at Pengkalan Gelap in August 2007.	30
Table 4.3	Total lipids (mg g^{-1} dry weight), lipid components (% of total lipids) and fatty acid compositions (% of total fatty acids) in the tissue and feces of *Boleophthalmus boddarti* and surface sediment at Kampung Fikri in August 2007.	31
Table 4.4	Total lipids (mg g^{-1} dry weight), lipid components (% of total lipids) and fatty acid compositions (% of total fatty acids) in the tissue and feces of *Periophthalmus gracilis* and surface sediment at Pengkalan Gelap in October 2007.	32
Table 4.5	Total lipids (mg g^{-1} dry weight), lipid components (% of total lipids) and fatty acid compositions (% of total fatty acids) in the tissue and feces of *Boleophthalmus boddarti* and surface sediment at Kampung Fikri in October 2007.	33

Table 4.6 Statistical summary from two-way ANOVAs for the concentrations of fatty acids in the tissue of *Periophthalmus gracilis* , tissue of *Boleophthalmus boddarti*, feces of *Periophthalmus gracilis*, feces of *Boleophthalmus boddarti*, sediment of Pengkalan Gelap and sediment of Kampung Fikri in August and October in main fatty acid classes. 38

Table 4.7 Statistical summary from two-way ANOVAs for the concentrations of fatty acids in the tissue of *Periophthalmus gracilis*, tissue of *Boleophthalmus boddarti*, feces of *Periophthalmus gracilis*, feces of *Boleophthalmus boddarti*, sediment of Pengkalan Gelap and sediment of Kampung Fikri in August and October in main markers. 43

LIST OF FIGURES

Figure		Page
Figure 2.1	Structure of fatty acid	11
Figure 3.1	Sampling site 1 and 2 in Setiu Wetlands	16
Figure 3.2	*Periophthalmus gracilis*	17
Figure 3.3	*Boleophthalmus boddarti*	17
Figure 4.1	Total lipid concentrations (mg g^{-1} dry weight) in the tissues and feces of *Periophthalmus gracilis* and *Boleophthalmus boddarti,* and surface sediment at Pengkalan Gelap and Kampung Fikri in August and October 2007.	24
Figure 4.2	Thin-layer chromatography (TLC) plate for the sediment samples of Kampung Fikri and Pengkalan Gelap.	28
Figure 4.3	The GC Chromatogram graphs (A) standard, (B) sample	29
Figure 4.4	Compositions of fatty acid class in tissues and feces of *Periophthalmus gracilis* and *Boleophthalmus boddarti,* and surface sediment at Pengkalan Gelap and Kampung Fikri in August and October 2007. (A) MUFAs compositon, (B) PUFAs composition, (C) SAFAs composition, (D) BrFAs composition, (E) ω3 and ω6 PUFAs composition.	37
Figure 4.5	Compositions of fatty acid markers in tissues and feces of *Periophthalmus gracilis* and *Boleophthalmus boddarti,* and surface sediment at Pengkalan Gelap and Kampung Fikri in August and October 2007. (A) Bacteria markers composition, (B) Mangrove (detritus) markers composition, (C) Dinoflagellate markers composition, (D) Green macroalgae markers composition, (E) Copepod markers composition, (F) Diatom markers.	42

Figure 4.6 Pictures of organic particles that have been found in the guts of *Periophthalmus gracilis and Boleophthalmus boddarti* 45

LIST OF ABBREVIATIONS

Ω	-	omega
FA	-	fatty acid
SAFA	-	saturated fatty acid
PUFA	-	polyunsaturated fatty acid
MUFA	-	monounsaturated fatty acid
EFA	-	essential fatty acid
EPA	-	eicosapentanoic acid
DHA	-	docosapentanoic acid
GC	-	gas chromatography
TLC	-	thin layer chromatography
HPLC	-	high performance liquid chromatography
GC-FID	-	gas chromatography flame ionized detector
FAMEs	-	fatty acid methyl ester
mg	-	milligram
ANOVA	-	Analysis of Variance
Pg. Gelap	-	Pengkalan Gelap
Kg. Fikri	-	Kampung Fikri
Dry wt	-	Dry weight
HCL	-	Hydrochloric acid
NaOH	-	Sodium hydroxide
ns	-	Not significant

LIST OF APPENDICES

Apendix 1 : Anova results in mudskippers analysis

Apendix 2: 2. Table of study schedule

ABSTRACT

Fatty acid compositions in the tissue and feces of two mudskipper species; *Periophthalmus gracilis* and *Boleophthalmus boddarti*, and sediment samples from Pengkalan Gelap (*Periophthalmus gracilis*) and Kampung Fikri (*Boleophthalmus boddarti*) which were collected in August and October 2007 from the mangrove area of Setiu Wetlands were identified, in order to assess the diet of these two mudskippers. Both species contain a total of 45 identifiable fatty acid methyl esters in their tissues, feces and sediments where they were collected from. Total lipid concentration was highest in the tissue of *Periophthalmus gracilis* when compared to the *Boleophthalmus boddarti.* There were a total of five components of lipid that has been found in all samples which are phospholipids, sterols, triglycerols, fatty acid and waxes. Fatty acid dominated the lipid components in all samples, except for the sediment samples in Pengkalan Gelap and Kampung Fikri in August. Overall, the tissue of *Periophthalmus gracilis* showed the highest concentrations of PUFAs, and the tissue of *Boleophthalmus boddarti* showed the highest concentrations of MUFAs. There were six food sources that can be identified in the diets of mudskipper species *Periophthalmus gracilis* and *Boleophthalmus boddarti,* namely bacteria, dinoflagellates, green macroalgae, mangrove detritus, diatoms, and copepods. Bacteria were the major food sources that have been consumed by these two mudskipper species in this study. The diet pattern of these mudskippers did not differ significantly between August and October 2007 ($p>0.05$).

ASID LEMAK SEBAGAI PENANDA BIOLOGI UNTUK MENENTUKAN SUMBER MAKANAN ORGANIK SPESIS IKAN TEMBAKUL *Periophthalmus gracilis* DAN *Boleophthalmus boddarti* DI TANAH LEMBAP SETIU.

ABSTRAK

Kajian komposisi asid lemak ke atas spesis ikan tembakul dari kawasan bakau Tanah Lembap Setiu iaitu *Periophthalmus gracilis* dan *Boleophthalmus boddarti* telah dilakukan pada bulan Ogos dan Oktober 2007 untuk mengetahui sumber makanan organik ikan tersebut. Di samping itu, permukaan sedimen dari Pengkalan Gelap (*Periophthalmus gracilis*) dan Kampung Fikri (*Boleophthalmus boddarti*) dan najis ikan tersebut turut dikaji. Sebanyak 45 jenis asid lemak metil ester telah berjaya dikenalpasti di dalam setiap sampel yang dikaji. Terdapat lima komponen lipid yang telah dikenalpasti sewaktu kajian ini dijalankan iaitu fosfolipid, sterol, trigliserol, asid lemak, dan wax. Secara keseluruhannya, tisu *Periophthalmus gracilis* menunjukkan kepekatan PUFAs yang paling tinggi manakala *Boleophthalmus boddarti* mempunyai kepekatan MUFAs yang paling tinggi. Terdapat enam jenis sumber makanan organik ikan tembakul yang dapat dikenalpasti iaitu bakteria, dinoflagellate, makroalgae hijau, detritus bakau, diatom, dan kopepod. Bakteria merupakan sumber makanan utama bagi kedua-dua spesis dalam kajian ini. Corak pemakanan spesis *Periophthalmus gracilis* dan *Boleophthalmus boddarti* antara bulan Ogos dan Oktober 2007 tidak menunjukkan perbezaan yang nyata ($p>0.05$).