

SOME ASPECT OF NUTRITIONAL COMPOSITIONS OF
FRESHWATER PRAWNS FROM STREAMS IN
TERENGGANU

QIU RAISHAMIAH BINTI JERNUS

FAKULTI SAINS DAN TEKNOLOGI
UNIVERSITI MALAYSIA TERENGGANU
2007

SOME ASPECT OF NUTRITIONAL COMPOSITIONS
OF FRESHWATER PRAWNS FROM STREAMS IN TERENGGANU

By

Qiu Raishaniah Binti Jernus

Research Report submitted in partial fulfillment of
the requirements for the degree of
Bachelor of Science (Biological Sciences)

Department of Biological Sciences
Faculty of Science and Technology
UNIVERSITI MALAYSIA TERENGGANU
2007

1100051169

This project should be cited as:

Qiu Raishaniah Binti Jernus. Some aspect of nutritional compositions of freshwater prawns from streams in Terengganu. Undergraduate thesis, Bachelor of Science (Biological Sciences), Faculty of Science and Technology, Universiti Malaysia Terengganu, Terengganu. 55p.

No part of this project report, or in the form of phonographic recording, nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and the supervisor(s) of the project.



JABATAN SAINS BIOLOGI
FAKULTI SAINS DAN TEKNOLOGI
UNIVERSITI MALAYSIA TERENGGANU

PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II
RESEARCH REPORT VERIFICATION

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:
SOME ASPECT OF NUTRITIONAL COMPOSITIONS OF FRESHWATER PRAWNS FROM
STREAMS IN TERENGGANU oleh QIU RAISHANIAH BINTI JERNUS, no. matrik: UK10738
telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini
dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada
keperluan memperolehi Ijazah SARJANA MUDA SAINS (SAINS BIOLOGI), Fakulti Sains dan
Teknologi, Universiti Malaysia Terengganu.

Disahkan oleh: /Verified by:

Penyelia Utama/Main Supervisor

Nama: En. Amirrudin B. Ahmad

Cop Rasmi: **AMIRRUDIN AHMAD**
Pensyarah
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu.

Tarikh: **14 MAY 2007**

Penyelia Kedua (jika ada)/Co-Supervisor (if applicable)

Nama: En. Masduki B. Mohd. Morni

Cop Rasmi: **MASDUKI MOHAMMAD MORNI**
Pensyarah
Jabatan Sains Perikanan dan Akuakultur
Fakulti Agroteknologi dan Sains Makanan
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Tarikh: **9/5/07**

Ketua Jabatan Sains Biologi/Head, Department of Biological Sciences

Nama: Dr. Aziz B. Ahmad

Cop Rasmi: **DR. AZIZ BIN AHMAD**
Ketua
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Tarikh: **14/5/2007**

ACKNOWLEDGEMENTS

Assalamualaikum warahmatullah.....

I would like to express my special thanks to my supervisor, Mr. Amirrudin Ahmad for providing me with an opportunity to conduct this project and all the necessary guideline to help my studies. My deepest thanks goes to my co. supervisor Mr. Masduki Mohd. Morni who provided immerse encouragement and showed a great deal of patience throughout.

My sincere appreciation also goes to the laboratory staffs of General Biology (MBU) especially Mr. Syed Ahmad Rizal for helping me in sampling. Further thanks to the laboratory staff at the Anatomy and Physiology Lab. especially Mrs. Faridah, Mr. Mohd. Sharol Ali and Mr. Johari Mohd. Nor for their help and guidance and also for those who involved direct or indirectly on the entire time of my project.

I wish to thanks to my coursemate for their encouragement and support. I am also extremely grateful to my parents who have supported and encourages me throughout this complete of thesis. Without all them, I will not able to finish my project by myself, thank you very much!

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	ii
LIST OF TABLE	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
LIST OF APPENDICES	ix
ABSTRACT	x
ABSTRAK	xi
CHAPTER 1 INTRODUCTION	1
1.1 Introduction	1
1.2 Objectives	3
CHAPTER 2 LITERATURE REVIEW	4
2.1 Taxonomy of Freshwater Prawns	4
2.2 Biochemical Composition of Freshwater Prawns	5
2.2.1 Moisture	6
2.2.2 Ash	6
2.2.3 Crude Fat	7
2.2.4 Crude Protein	9
2.2.5 Carbohydrate	11
2.3 Proximate Analysis	12

CHAPTER 3 METHODOLOGY	14
3.1 Samples Collection	14
3.2 Samples Identification	14
3.3 Samples Preparation	14
3.4 Proximate Analysis (Determination of Nutritional Compositions)	15
3.4.1 Moisture Content	15
3.4.2 Ash Content	15
3.4.3 Crude Fat Content	16
3.4.4 Crude Protein Content	17
3.4.5 Carbohydrate Content	19
3.5 Biostatistical Analysis	19
CHAPTER 4 RESULT	20
4.1 Sampling	20
4.1.1 Taxonomy Species of Freshwater Prawns	21
4.2 Proximate Analysis	25
4.2.1 Moisture Analysis	25
4.2.2 Ash Analysis	26
4.2.3 Crude Fat Analysis	27
4.2.4 Crude Protein Analysis	28
4.2.5 Carbohydrate Analysis	29

CHAPTER 5 DISCUSSION	31
5.1 Moisture Analysis	31
5.2 Ash Analysis	31
5.3 Crude Fat Analysis	32
5.4 Crude Protein Analysis	34
5.5 Carbohydrate Analysis	35
CHAPTER 6 CONCLUSION	37
REFERENCES	38
APPENDICES	45
CURRICULUM VITAE	56

LIST OF TABLES

Table		Page
1	The sampling result	20
2	One Way ANOVA for moisture analysis	25
3	One Way ANOVA for ash analysis	26
4	One Way ANOVA for crude fat analysis	27
5	One Way ANOVA for crude protein analysis	28
6	One Way ANOVA for carbohydrate analysis	29
7	The proximate composition for five species of freshwater prawns. Data are means \pm Standard Error (n = 20)	30

LIST OF FIGURES

Figure		Page
1	The FOSS Soxtec TM 2043 based in TM technology Control Unit 2046, made in Sweden are using in crude fat analysis in freshwater prawn	17
2	The BUCHI Distillation Unit K-350, made in Switzerland are using in protein analysis of freshwater prawns.	19
3	<i>Macrobrachium equiden</i>	21
4	<i>Atyopsis moluccensis</i>	22
5	<i>Macrobrachium meridionalis</i>	23
6	<i>Macrobrachium negletum</i>	24
7	<i>Macrobrachium sintangensis</i>	24
8	The moisture value for five species of freshwater prawns. Data are means \pm of Standard Error (n=3).	25
9	The ash value for five species of freshwater prawns. Data are means \pm of Standard Error (n=3).	26
10	The crude fat value for five species of freshwater prawns. Data are means \pm of Standard Error (n=3).	27
11	The moisture value for five species of freshwater prawns. Data are means \pm of Standard Error (n=3).	28
12	The moisture value for five species of freshwater prawns. Data are means \pm of Standard Error (n=3).	29
13	The moisture value for five species of freshwater prawns. Data are means \pm of Standard Error (n=3).	30

LIST OF ABBREVIATIONS

ARA	arachidonic acid (20:4n-6)
DHA	docosahexaenoic acid (22:6n-3)
DM	dry matter
dw	dry weight
EFA	essential fatty acid
EPA	eicosapentaenoic acid (20:5n-3)
FA	fatty acid
FFA	free fatty acid
MUFA	monounsaturated fatty acid
P/E	Protein and Energy ratio
PL	polar lipid
PUFA	polyunsaturated fatty acid
SFA	saturated fatty acid
ST	sterol

LIST OF APPENDICES

Appendix		Page
1	The Taxonomy key Wowor <i>et al.</i> , (2004)	46
2	Anatomy structure of freshwater prawns	47
3	Determination of fat content analysis	48
4	The moisture analysis data for five species of freshwater prawns	50
5	Post Hoc Test, Duncan Multiple Range Test for moisture analysis	50
6	The ash analysis data for five species of freshwater prawns	51
7	Post Hoc Test, Duncan Multiple Range Test for ash analysis	51
8	The crude fat analysis data for five species of freshwater prawns	52
9	Post Hoc Test, Duncan Multiple Range Test for crude fat analysis	52
10	The crude protein analysis data for five species of freshwater prawns	53
11	Post Hoc Test, Duncan Multiple Range Test for crude protein analysis	53
12	The carbohydrate analysis data for five species of freshwater prawns	54
13	Post Hoc Test, Duncan Multiple Range Test for carbohydrate analysis	54
14	Overall crude data for five analysis of five species of freshwater prawns	55

ABSTRACT

This research was to determine the nutritional compositions of freshwater prawns such as crude protein, crude fat, carbohydrate, moisture and ash from freshly samples, not only for food product but also for commercial value. The objective was to compare the nutrition value among five different species of freshwater prawns sampled from Sungai Peres and Lata Belatan, Terengganu using proximate analysis method. Results indicated the significant different ($P < 0.05$) of crude protein, and carbohydrate analysis and no significant difference ($P > 0.05$) of moisture, ash and crude fat analysis in five species of freshwater prawns. The results suggested that *Macrobrachium meridionalis* is a good source of protein with fewer carbohydrate because exhibited significantly higher ($P < 0.05$) content of protein (48.0 ± 4.22 fresh weight percentages) but the lowest content of carbohydrates (45.0 ± 4.29 fresh weight percentages) as compared to other species. *Macrobrachium equidens* showed the higher source of fat value (86.6 ± 3.20 fresh weight percentages) than other four species.

KOMPOSISI NUTRISI DALAM UDANG AIR TAWAR DARIPADA SUNGAI- SUNGAI DI TERENGGANU

ABSTRAK

Kajian ini dilakukan untuk menentukan komposisi nutrisi bagi udang air tawar seperti protein kasar, lemak kasar, karbohidrat, lembapan, dan abu daripada sampel segar bukan sahaja untuk produk makanan tetapi juga untuk nilai komersial. Objektif adalah untuk membandingkan nilai nutrisi di kalangan lima sampel spesis udang air tawar daripada Sungai Peres dan Sungai Lata Belatan, Terengganu dengan menggunakan kaedah analisis proksimat. Keputusan menunjukkan perbezaan nyata ($P < 0.05$) bagi analisis protein kasar dan karbohidrat dan tiada perbezaan nyata ($P > 0.05$) bagi analisis lembapan, abu dan lemak kasar dalam lima spesis udang air tawar. Keputusan mencadangkan *Macrobrachium meridionalis* adalah sumber baik bagi protein dan kurang dengan karbohidrat kerana membuktikan perbezaan nyata ($P < 0.05$) bagi kandungan protein (48.0 ± 4.22 peratus berat segar) tetapi kandungan terendah karbohidrat (45.0 ± 4.29 peratus berat segar) bila dibandingkan dengan spesis yang lain. *Macrobrachium equidens* menunjukkan sumber tinggi bagi nilai lemak dengan (86.6 ± 3.20 peratus berat segar) dan berbeza daripada empat spesis yang lain.