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PROTEIN AND FATTY ACID CONTENTS IN MEAT AND EGGS OF HORSESHOE CRABS FROM TWO LOCATIONS IN MELAKA

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PROTEIN AND FATTY ACID CONTENTS IN MEAT AND EGGS OF HORSESHOE CRABS FROM TWO LOCATIONS IN MELAKA

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A project paper submitted to the Faculty of Veterinary Medicine, Universiti Putra Malaysia In partial fulfillment of the requirement for the DEGREE OF DOCTOR OF VETERINARY MEDICINE
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It is hereby certified that we have read this project paper entitled "Protein And Fatty Acid Contents In Meat And Eggs of Horseshoe Crabs From Two Locations In Melaka", by Siti Nurain Binti Sabri and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4901-Project.

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DEDICATION

Alhamdulillah ALLAH.

Special thanks to my family.

Without their support I will never dreaming

to finish my final year project.

To my best friends.

Nurul izzati,saidah,nana,rai,

kimah,aj, iffah, cik nas, fura,

kak raihan, kak ieqa, kak waafa,

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Abstrak

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 4901 -Projek.

KANDUNGAN PROTEIN DAN ASID LEMAK DALAM DAGING DAN TELUR BELANGKAS DARIPADA DUA TEMPAT DI MELAKA.

Siti Nurain binti Sabri

2015

Penyelia: Prof. Dr. Mohamed Ariff bin Omar

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Sebanyak 20 sampel belangkas dewasa betina telah dikumpulkan dari Melaka: 10 dari Pantai Puteri dan 10 yang lain dari Pulai untuk mengkaji tentang komposisi nutrient daging dan telur belangkas. Daging dan telur dituai dan kemudiannya diproses menjadi 20 sampel daging dan 20 sampel telur. Ukuran morfologi belangkas yang diambil ialah perimeter prosoma (sephalothoraks), panjang telson (ekor), panjang opisthosoma (abdomen), berat hidup dan berat daging dan telur. Komposisi nutrien daging dan telur belangkas dari dua lokasi itu juga disiasat. Untuk kedua-dua lokasi Pantai Puteri dan Pulai semua parameter yang dikaji tidak menunjukkan perbezaan yang signifikan ($p>0.05$). Purata bagi kedua-dua lokasi untuk berat badan, perimeter prosoma, panjang

telson dan panjang opisthosoma, masing-masing ialah 1.7 ± 0.05 kg, 64.9 ± 1.06 cm, 20.4 ± 0.46 cm dan 9.0 ± 0.12 cm. Purata daging dan telur hasil belangkas masing-masing ialah 2.7 ± 0.22 g dan 218.3 ± 27.67 g. Analisis protein kasar mendedahkan bahawa kandungan protein kasar daging belangkas adalah 1.1 ± 0.50% manakala bagi telur adalah 17.2 ± 0.77%. Daging belangkas mengandungi asid lemak tepu tertinggi diikuti dengan asid lemak tak tepu dan mono-asid lemak tak tepu. Asid lemak tepu adalah 54.8 ± 2.92%, asid lemak tak tepu 45.2 ± 2.92%, mono-asid lemak tak tepu 24.4 ± 1.42%, α-Linolenik asid 2.00 ± 0.20 % dan asid docosaheksanoik 2.51 ± 0.44 % untuk daging. Sementara bagi telur mengandungi asid lemak tak tepu tertinggi diikuti dengan asid lemak tepu dan mono-asid lemak tak tepu. Asid lemak tak tepu adalah 64.81 ± 0.51%, asid lemak tepu 35.20 ± 0.51%, mono-asid lemak tak tepu 29.03 ± 0.69 %, α-Linolenik asid 1.79 ± 0.08% dan asid docosaheksanoik 3.39 ± 0.16% untuk telur. Purata jumlah darah biru yang diambil ialah 150 ml daripada seekor belangkas. Kesimpulannya, kedua-dua lokasi Pantai Puteri dan Pulai berkongsi habitat yang sama bagi belangkas, dan ini menyumbang kepada persamaan ciri-ciri morfologi, kandungan protein kasar dan komposisi asid lemak belangkas dari dua lokasi.

Kata kunci: Belangkas (Tachypleus gigas), protein kasar, asid lemak, morfologi dan darah.

Abstract

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfillment of the course VPD 4901 – Project.

PROTEIN AND FATTY ACID CONTENTS IN MEAT AND EGGS OF HORSESHOE CRABS FROM TWO LOCATIONS IN MELAKA

Siti Nurain binti Sabri

2015

Supervisor: Prof. Dr. Mohamed Ariff bin Omar

Co-supervisors: Assoc. Prof. Dr. Hassan bin Mohd Daud,

Dr. Hasliza binti Abu Hassim.

A total of 20 samples of adult female horseshoe crabs were collected from Melaka: 10 from Pantai Puteri and another 10 from Pulai to determine nutrient composition of meat and eggs of horseshoe crabs. Meat and eggs of the horseshoe crabs were harvested and processed into 20 meat and 20 egg samples. Morphological measurements of the horseshoe crabs taken were perimeter of prosoma (cephalothorax), length of telson (tail), length of opisthosoma (abdomen), live weight and weight of meat and eggs. For both locations: Pantai Puteri and Pulai all parameters studied showed no significant difference ($p>0.05$). Means of live weight, perimeter of prosoma, length of

telson and length of opisthosoma were 1.7 ± 0.05 kg, 64.9 ± 1.06 cm, 20.4 ± 0.46 cm and 9.0 ± 0.12 cm respectively. Mean meat and egg yields of horseshoe crabs were 2.7 ± 0.22 g and 218.3 ± 27.67 g, respectively. The crude protein analysis revealed that the crude protein of horseshoe crabs was 1.1 ± 0.50% for meat and 17.2 ± 0.77% for eggs. Meat of horseshoe crabs had high saturated fatty acids, followed by unsaturated fatty acids and monoenes. The saturated fatty acids of meat was 54.8 ± 2.92%, unsaturated fatty acids 45.2 ± 2.92%, monoenes 24.4 ± 1.42%, α-Linolenic acid 2.00 ± 0.20% and docosahexaenoic acid 2.51± 0.44%. Eggs of horseshoe crabs had high unsaturated fatty acids, followed by saturated fatty acids and monoenes. The unsaturated fatty acids of eggs was 64.81 ± 0.51%, saturated fatty acids 35.20 ± 0.51%, monoenes 29.03 ± 0.69%, α-Linolenic acid 1.79 ± 0.08% and docosahexaenoic acid 3.39 ± 0.16%. Mean blue blood volume collected was 150 ml per horseshoe crab. It can be concluded that both locations, Pantai Puteri and Pulai, share a similar habitat for horseshoe crabs, thus this could contribute to the similarity in morphological characteristics, crude protein content and fatty acid composition of the horseshoe crabs in the two locations.

Keywords: Horseshoe crabs (*Tachypleus gigas*), crude protein, fatty acids, morphology and blood.

1.0 INTRODUCTION

Horseshoe crab is an ancient chelicerata arthropod under Merostomata family that had lives about 600 million years ago. It is also being under family of Merostomata (Xiphosura) which is meant by sword tailed. There are several horseshoe crabs species, namely *Tachypleus gigas*, *Tachypleus tridentatus* and *Carcinoscorpius rotundicauda*, which are ancient chelicerate arthropods, found living in many estuarine locations in Malaysia and many other parts of South East Asia. Horseshoe crabs are consumed by humans living in coastal settlements and are considered as a delicacy by some. They are also harvested for their blue blood, which is claimed to have many medicinal and curative properties such as agglutination of bacteria by their blood component, amebocyte lysate (John *et al*., 2010). Information on the nutrient content of horseshoe crabs is scanty. Knowing the chemical content (protein and fatty acids) of its meat and egg would provide valuable information on their health benefits and risks of consumption. Horseshoe crabs found in the different locations such as mangrove swamps and river mouths may differ in their chemical composition of the meat and egg.

Horseshoe crab dish is very famous in Asia due to its huge distribution around Asia. There are 3 types of horseshoe crabs that can be found in Asia including Malaysia: *Tachypleus gigas*, *Tachypleus tridentatus* and *Carcinoscorpius rotundicauda*. But not many people know about the fatty acids content of their meat and egg. Normally for horseshoe crab, people tend to order the dish for its very delicious egg and of different taste. But there were other people who had consumed the eggs had experienced some

symptoms such as weaknesses of body, dilated pupil and respiratory problem. According to many people who have long consumed horseshoe crab's egg it is advised to cook it longer and also some parts of the internal organs such as the gastrointestinal tract are considered toxic and should be removed carefully to avoid contaminating the egg and meat meant for consumption.

This study was conducted with the following objectives: to determine the protein and fatty acids content in meat and egg of horseshoe crabs and to determine the volume of blood and meat and egg yield of horseshoe crabs obtained from two locations in Melaka.

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