

PRODUCTION OF CHITOSAN FROM HORSESHOE CRAB  
(*Tachypleus gigas*, *Carcinoscorpius rotundicauda*)

KAMALIAH BINTI KASMARUDDIN

FACULTY OF MARITIME STUDIES AND MARINE SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU

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**THE PRODUCTION OF CHITOSAN FROM HORSESHOE CRAB**  
*(Tachypleus gigas, Carinoscorpius rotundicauda)*

**By**

**Kamaliah binti Kasmaruddin**

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Faculty of Maritime Studies and Marine Science  
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JABATAN SAINS MARIN  
FAKULTI PENGAJIAN MARITIM DAN SAINS MARIN  
UNIVERSITI MALAYSIA TERENGGANU

## PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: Production of Chitosan from Horseshoe Crab (*Tachypleus gigas*, *Carcinoscorpius rotundicauda*) oleh Kamaliah binti Kasmaruddin, No.Matrik UK12397 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.

Disahkan oleh:

Penyelia Utama

DR. ZALEHA BT KASSIM  
KETUA PROGRAM

Nama: Dr. Zaleha Kassim

INSTITUT SAINS (AKUAKULTUR), STRUKTUR C  
INSTITUT AKUAKULTUR TROPIKA  
UNIVERSITI MALAYSIA TERENGGANU (UMT)  
21030 KUALA TERENGGANU.

Cop Rasmi

Tarikh: .....

Penyelia Kedua

Nama: Dr. Habsah Mohamad

Cop Rasmi DR. HABSAB MOHAMAD

Pensyarah  
Jabatan Sains Kimia  
Fakulti Sains dan Teknologi  
Universiti Malaysia Terengganu  
21030 Kuala Terengganu

Tarikh: .....14/5/2008





Penyelia Ketiga

Nama: Dr. Ahmad Shamsuddin Bin Ahmad

Cop Rasmi

**DR. AHMAD SHAMSUDDIN BIN AHMAD**  
Lecturer  
Faculty of Maritime Studies and Marine Science  
Universiti Malaysia Terengganu (UMT)  
21030 Kuala Terengganu.

Tarikh: 4.5.2008



Ketua Jabatan Sains Marin

Nama: Dr. Razak Zakariya

Cop Rasmi:

**DR. RAZAK ZAKARIYA**  
Ketua Jabatan Sains Marin  
Fakulti Pengajian Maritim dan Sains Marin  
Universiti Malaysia Terengganu  
(UMT)

12/5/08  
Tarikh: .....

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## LIST OF ABBREVIATIONS

cm	-	centimeter
DD	-	Degree of Deacytelation
DP	-	Deproteinization
DM	-	Demineralization
DC	-	Decolouration
FBC	-	Fat Binding Capacity
g	-	gram
HCl	-	hydrochloric acid
kg	-	kilogram
m/wts	-	molecular weights
min	-	minutes
mg	-	miligram
ml	-	mililitre
M	-	molarity
NaOH	-	natrium hydroxide
nm	-	nanometer
μ	-	micron

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## ABSTRACT

Throughout the years of chitosan production, numerous sources have been tested to produce desired quality of chitosan for commercial use. However, never been reported any study on the potential of chitinous shelled horseshoe crab. This research aims to produce chitosan from two species of horseshoe crab, *Tachypleus gigas* and *C. rotundicauda*. Chitosan from horseshoe crabs, *Tachypleus gigas* and *Carcinoscorpius rotundicauda* has been produced and physico-chemically characterized. The chitosan is made by a common chemical process involving three steps, deproteinization, demineralization, and deacytation. The result shows the percentage yield of chitosan production for *T. gigas* and *C. rotundicauda* were 19.18% and 19.70% respectively. The degree of deacytation were determined by potentiometric method and the value for *T. gigas* is 72.02% while *C. rotundicauda* with value of 60.53%. The physico-chemical properties of chitosan from *T. gigas* are 6.78% of moisture content, 75.9% solubility in 1% acetic acid, 0.1% of ash content, 224% of fat binding capacity with soy bean oil and 332% for sunflower oil. Meanwhile the moisture content of *C. rotundicauda* is 1.67%, 78.96% of solubility, ash content of 0.17%, fat bound with soybean oil of 261% and 323.% for sunflower oil. This study demonstrate that chitosan could be obtained from the two species of horseshoe crabs commonly found in Malaysia with higher percentage yield and within commercial standard for solubility, ash content and moisture content.



**PENGHASILAN KITOSAN DARIPADA BELANGKAS**  
**(*Tachypleus gigas*, *Carcinoscorpius rotundicauda*)**

**ABSTRAK**

Sepanjang penghasilan kitosan, pelbagai sumber telah diuji untuk menghasilkan kitosan mengikut keperluan secara komersial. Namun potensi belangkas yang mempunyai exoskeleton berkitin untuk penghasilan kitosan belum pernah dilaporkan secara saintifik. Kajian ini bertujuan untuk menghasilkan kitosan daripada dua spesies belangkas, *Tachypleus gigas* dan *Carcinoscorpius rotundicauda*. Seterusnya menentukan ciri-ciri kitosan yang terhasil dan membuat perbandingan di antara kitosan yang terhasil dan membuat perbandingan kitosan daripada dua spesies tersebut. Kitosan dalam kajian ini dihasilkan melalui tiga proses lazim iaitu pembuangan protein, nyahmineral dan pembuangan kumpulan asetil. Kajian ini telah menunjukkan peratusan penghasilan kitosan adalah melebihi 19% berdasarkan kiraan berat kering serbuk belangkas. Darjah nyahasetil melalui potentiometri adalah 72% bagi *T. gigas* dan 60% bagi *C. rotundicauda*. Ciri-ciri kitosan yang terhasil daripada *T. gigas* adalah 6.78% kelembapan, 75.9% kelarutan, 0.1% kandungan abu, 224% dan 332% bagi pelekatan dengan minyak kacang soya dan minyak bunga matahari. Manakala bagi *C. rotundicauda* pula, kelembapan adalah 1.67%, kelarutan 78.9%, kandungan abu 0.17% dan pelekatan dengan minyak kacang soya dan minyak bunga matahari adalah 261% dan 323%. Secara keseluruhan, kajian menunjukkan kitosan berjaya dihasilkan daripada kulit belangkas yang biasa terdapat di Malaysia dengan kualiti komersial.