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Physicochemical characterization of chitosan and determination of carotenoid extracted from scylla olivacea (mud crab) and cherax quadricarinatus (red claw) / Sylvia Sandanasamy Sandanamsamy

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PUSAT PEMBELAJARAN DIGITAL SULTANAH NUR ZAHIRAH

PHYSICOCHEMICAL CHARACTERIZATION OF CHITOSAN AND  
DETERMINATION OF CAROTENOID EXTRACTED FROM *SCYLLA OLIVACEA*  
(MUD CRAB) AND *CHERAX QUADRICARINATUS* (RED CLAW)

By  
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Research Report submitted in partial fulfillment of the requirements for the degree of  
Bachelor of Food Science (Food Technology)

DEPARTMENT OF FOOD SCIENCE  
FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE  
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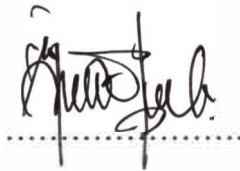
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## ENDORSEMENT

The project entitled **Physicochemical Characterization of Chitosan and Determination of Carotenoid Extracted from Mud Crab (*Scylla Olivacea*) and Red Claw (*Cherax Quadricarinatus*)** by Sylvia Sandanasamy A/P Sandanamsamy, Matric No. **UK 17073** has been reviewed and corrections have been made according to the recommendations by examiners. This report is submitted to the Department of Food Science in partial fulfillment of the requirement of the degree of Bachelor of Food Science (Food Technology), Faculty of Agrotechnology and Food Science, University Malaysia Terengganu.



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Date: 2 / 2 / 2012



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## DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged.

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## ABSTRACT

In this study, chitosan and carotenoids were extracted from *Scylla olivacea* and *Cherax quadricarinatus* respectively. Carotenoid content in each species was determined by calculation in terms of astaxanthin which extracted from oil base method. The physicochemical property of chitosan determined includes moisture, ash, degree of deacetylation, colour, water and fat binding capacities. All the characteristics determined were compared with commercial chitosan. The degree of deacetylation and also water and fat binding capacities were determined by using direct titration and centrifuge respectively. The yield of carotenoid obtained from *Cherax quadricarinatus* and *Scylla olivacea* were 34.58 $\mu$ g/g and 30.88 $\mu$ g/g respectively. Meanwhile, the yield of chitosan obtained from *Scylla olivacea* was 44.57 % and 26.33% from *Cherax quadricarinatus*. The moisture and ash content of chitosan for *Cherax quadricarinatus* and *Scylla olivacea* were 7.20% and 56.46%; 3.53% and 47.95% respectively compared to commercial which was 2.25% moisture and 62.25% ash. Degree of deacetylation for *Scylla olivacea* and *Cherax quadricarinatus* was 53.42% and 53.45% respectively compared to the commercial which was 58.42%. Commercial chitosan showed higher whiteness (77.82%) than chitosan extracted from *Scylla olivacea* (62.07%) and *Cherax quadricarinatus* (62.95%). Extracted chitosan from both *Scylla olivacea* and *Cherax quadricarinatus* showed lower water and fat binding capacities which were 186.67%; 260% and 222.22%; 288.89% respectively compared to commercial chitosan which had 312.67%; 339.33%. This study showed that *Scylla olivacea* and *Cherax quadricarinatus* has a high potential for chitosan and carotenoid production respectively.

## ABSTRAK

Dalam kajian ini, kitosan dan karotenoid diekstrak daripada *Scylla olivacea* dan *Cherax quadricarinatus*. Kandungan karotenoid dalam setiap spesies ditentukan dengan pengiraan dari segi astaxanthin yang diekstrak menggunakan kaedah asas minyak. Ciri-ciri fiziokimia kitosan yang ditentukan adalah lembapan, abu, tahap diasitelalasi, warna, dan kapasiti mengikat lemak dan air. Semua ciri-ciri yang ditentukan dibandingkan dengan kitosan komersial. Tahap diasitelasi dan kapasiti mengikat air dan lemak ditentukan dengan menggunakan kaedah titratan langsung dan centrifuge masing-masing. Hasil karotenoid yang diperolehi daripada *Cherax quadricarinatus* dan *Scylla olivacea* adalah 34.58 $\mu$ g/g dan 30.88 $\mu$ g/g masing-masing. Sementara itu, hasil kitosan yang diperolehi daripada *Scylla olivacea* dan *Cherax quadricarinatus* ialah 44.57% dan 26.33% masing-masing. Kelembapan dan kandungan abu dalam kitosan *Cherax quadricarinatus* dan *Scylla olivacea* adalah 7.20% dan 56.46%; 3.53% dan 47.95% masing-masing berbanding dengan kitosan komersial yang mempunyai kelembapan dan kandungan abu 2.25% dan 53.42%. Tahap diasitelasi untuk *Scylla olivacea* yang diperolehi ialah 53.42% dan untuk *Cherax quadricarinatus* ialah 53.45% berbanding dengan kitosan komersial yang mempunyai tahap diasitelasi sebanyak 58.42%. Kitosan komersial menunjukkan warna dari segi keputihan yang lebih tinggi (77.82%) daripada kitosan yang diekstrak dari *Scylla olivacea* (62.07%) dan *Cherax quadricarinatus* (62.95%). Kitosan daripada kedua-dua *Scylla olivacea* dan *Cherax quadricarinatus* menunjukkan kapasiti mengikat air dan kapasiti mengikat lemak yang rendah 186.67%;260% dan 222.22%; 288.89% masing-masing berbanding dengan kitosan komersial yang mempunyai peratusan sebanyak 312.67%;339.33%. Kajian ini menunjukkan bahawa *Scylla olivacea* dan *Cherax quadricarinatus* masing-masing mempunyai potensi yang tinggi untuk pengeluaran kitosan dan karotenoid.