EFFECT OF CHITOSAN ON GELLING PROPERTIES,
LIPID OXIDATION AND MICROBIAL LOAD OF
SURIMI GEL FROM AFRICAN CATFISH
(*Clarias gariepinus*)

KANG WOOI CHEN

FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE
UNIVERSITI MALAYSIA TERENGGANU

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By

Kang Wooi Chen

Research Report submitted in partial fulfillment of
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ENDORSEMENT

The project report entitled **Effect of chitosan on gelling properties, lipid oxidation, and microbial load of surimi gel from African catfish (*Clariasgariepinus*)** by **Kang Wooi Chen,** Matric No. **UK 16483** 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, Universiti Malaysia Terengganu.

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(ASSOC. PROF. DR. AMIZA BT. MAT AMIN)

Main supervisor

PROF. MADYA DR. AMIZA MAT
Timbalan Dekan (Hal Ehwal Pelajar
Fakulti Agroteknologi dan Sains Ma
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Date: 31/1/12

DECLARATION

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

Signature : Chen

Name : Kang Wooi Chen

Matric No : UK 16483

Date : 31/1/2012

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ABSTRACT

In this study, the effect of addition of different concentration of chitosan (0%, 0.25%, 0.5%, 0.75%, 1.0%, 1.25%, 1.5%, 1.75% and 2.0% w/w) to surimi gels made from African catfish on gelling properties, lipid oxidation and microbiological changes during 20 days storage at 4°C were evaluated. In general, surimi gels added with 1.5% (w/w) chitosan showed the highest improvement in gel strength (58.92%), whiteness (13.18%), and water holding capacity (36.8%). Incorporation of 2% (w/w) chitosan treated gels also resulted in lowest pH (6.84) and TVB-N value of 36.63 mgN/100g at the end of 20 days storage period. The lipid oxidation of catfish surimi gel were evaluated through measurement of primary (peroxide value) and secondary (malonaldehyde) oxidation products. Both PV and TBA value of chitosan treated gels increased slower than the control gel during the storage period. Chitosan with concentration of 1.75% and 2.0% (w/w) showed the best antioxidant effect on catfish surimi gels. A significant reduction was also observed in aerobic plate count of catfish surimi gels added with chitosan of concentration 1.75% and 2.0% (w/w). Based on microbiological acceptability limit (10^6cfu/g), the shelf life of surimi gels with level of 1.75% and 2.0% (w/w) were estimated to be 4 to 12 days compared to the control samples which last only 8 days in refrigerated storage at 4 °C. Hence, the addition of 1.5 % to 2.0 % (w/w) concentration of chitosan can be considered as a promising approach in the preparation of catfish surimi gels by improving texture, preventing lipid oxidation and inhibiting microbial growth.

ABSTRAK

Dalam kajian ini, kesan penambahan kepekatan chitosan yang berbeza (0%, 0.25%, 0.5%, 0.75%, 1.0%, 1.25%, 1.5%, 1.75% and 2.0% w/w) pada surimi gel yang dibuat daripada ikan Keli Afrika dinilai berdasarkan kebolehan membentuk gel, antipengoksidaan dan antimikrobial sepanjang 20 hari penyimpanan pada suhu 4°C. Secara umum, gel yang ditambah dengan 1.5% (w/w) kepekatan chitosan menunjukkan peningkatan tertinggi dalam kekuatan gel (58.92%), keputihan (13.18%), dan kapasiti memegang air (36.8%). Surimi gel yang ditambah dengan kepekatan chitosan sebanyak 2.0% (w/w) menunjukkan nilai pH dan TVB-N terendah, iaitu 6.84 dan 36.63 mgN/100g pada akhir 20 hari penyimpanan. Pengoksidaan lemak dalam gel surimi ikan Keli telah dinilai melalui pengukuran produk pengoksidaan pertama (nilai peroksida) dan kedua (malonaldehyde). Kedua- dua nilai peroksida (PV) dan nilai asid thiobarbiturik (TBA) yang dihasilkan oleh gel surimi yang ditambahkan dengan chitosan meningkat dengan lebih perlahan berbanding gel kawalan sepanjang tempoh penyimpanan. Chitosan dengan kepekatan sebanyak 1.75% dan 2.0% (w/w) telah menunjukkan kesan antioksidan yang terbaik pada gel surimi ikan Keli. Di samping itu, pengurangan yang ketara juga dapat dilihat dalam pengiraan plat aerobic daripada gel surimi ikan Keli yang telah ditambah dengan kepekatan Chitosan sebanyak 1.75% dan 2.0% (w/w). Berdasarkan had penerimaan mikrobiologi (10^6cfu/g), jangka hayat gel surimi dengan penambahan kepekatan chitosan sebanyak 1.75% dan 2.0% (w/w) adalah dianggarkan sebanyak 4 hari hingga 12 hari manakala sampel kawalan hanya mempunyai jangka hayat selama 8 hari dalam simpanan peti sejuk pada 4°C. Jadi, penambahan chitosan sebanyak 1.5% hingga 2.0% boleh digunakan untuk penambahbaikan tekstur, antipengoksidaan and antimikrobial dalam penyediaan surimi gel ikan Keli.