

DEVELOPMENT OF BLACK SOYBEANS  
(*Glycine max* (L.) Merrill) NUGGET

GAN CHWEY YAU

FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCES  
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By  
Gan Chuey Yau

Research Report submitted in partial fulfillment of  
the requirements for the degree of  
Bachelor of Food Science (Food Service and Nutrition)

Department of Food Science  
FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU  
2008



FAKULTI AGROTEKNOLOGI DAN SAINS MAKANAN  
UNIVERSITI MALAYSIA TERENGGANU

PENGAKUAN DAN PENGESAHAN LAPORAN  
PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

*Development of Black Soybeans [ Glycine max (L.) Merrill] Nugget*

oleh..... *GAN CHUEY YAU* ....., No.Matrik *UK11494*

telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini  
dikemukakan kepada Jabatan *Sains Makanan*

sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda  
*Sains Makanan (Perkhidmatan Makanan dan Penakanan)*

Fakulti Agroteknologi dan Sains Makanan, Universiti Malaysia Terengganu.

Disahkan oleh:

Penyelia Utama  
Nama: **DR. AMIR IZZWAN ZAMRI**  
Ketua  
Jabatan Sains Makanan  
Fakulti Agroteknologi dan Sains Makanan  
Cop Rasmi Universiti Malaysia Terengganu  
21030 Kuala Terengganu,

Tarikh: *21/9/08*

Penyelia Kedua (jika ada)

Nama:

Cop Rasmi

Tarikh: .....



**FAKULTI AGROTEKNOLOGI DAN SAINS MAKANAN  
UNIVERSITI MALAYSIA TERENGGANU**

**PENGAKUAN DAN PENGESAHAN LAPORAN  
PROJEK PENYELIDIKAN I DAN II**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: 'Development of Black Soybeans [*Glycine max* (L.) Merrill] Nugget' oleh Gan Chuey Yau, No.Matrik UK11494 telah diperiksa dan semua pembedaan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Makanan sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah Sarjana Muda Sains Makanan (Perkhidmatan Makanan dan Pemakanan). Fakulti Agroteknologi dan Sains Makanan, Universiti Malaysia Terengganu.

Disahkan oleh:

.....  
Penyelia Utama

Nama: Dr. Amir Izzwan Bin Zamri


Cop Rasmi:

DR. AMIR IZZWAN ZAMRI  
Ketua  
Jabatan Sains Makanan  
Fakulti Agroteknologi dan Sains Makanan  
Universiti Malaysia Terengganu  
21030 Kuala Terengganu.

Tarikh: 21/12/08

## DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged.

Signature :  .....

Name : Gan Chuey Yau

Matric No. : UK11494

Date : 07 December 2008

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## ABSTRACT

In the present study, development of black soybean nugget was made from different percentage of black soybean and wheat flour as variable. There were an overall of five formulations for black soybean (20% black soybean, 30% black soybean, 40% black soybean, 50% black soybean, 60% black soybean) nugget samples, and one control nugget sample. For chemical analysis, sample E (60% black soybean) shows significant higher in moisture content, fiber content, fat content, and oil uptake content among the black soybean nugget samples. Sample E also shows highest protein content among the black soybean nugget samples with no significant difference. Sample A (20% black soybean) shows significant higher carbohydrate content among the black soybean nugget samples. For physical analysis, sample E also shows the highest cooking loss among the black soybean nugget samples with no significant difference. Sample A, however, shows significant higher in cutting strength and work of shear among the black soybean nugget samples. Lightness ( $L^*$ ) for both raw and fried nugget was highest for sample E with no significant difference. Redness ( $a^*$ ) for both raw and fried nugget was significant higher in sample A than those of other samples. Sample A also shows significant higher in yellowness ( $b^*$ ) for raw nugget than those of other samples. However, sample E shows significant higher in yellowness ( $b^*$ ) for fried nugget than those of other samples. In sensory evaluation, sample R (Control) shows significant higher mean scores in color attributes, aroma attributes, firmness attributes, crispiness attributes, taste attributes, and overall acceptability attributes than all of the black soybean nugget samples. However, sample D shows the most acceptances among the black soybean nugget samples.

## ABSTRAK

Dalam kajian ini, pengembangan nuget kacang soya hitam telah dibuat daripada dua pembolehubah, iaitu kacang soya hitam dan tepung gandum dengan bilangan peratus yang berlainan. Sebanyak lima formulasi untuk sampel nuget kacang soya hitam (20% kacang soya hitam, 30% kacang soya hitam, 40% kacang soya hitam, 50% kacang soya hitam, 60% kacang soya hitam) dengan satu sampel nuget kawalan telah dikembangkan. Untuk analisis kimia, sampel E (60% kacang soya hitam) menunjukkan tinggi secara signifikan dalam kandungan lembapan, kandungan serat, kandungan lemak, dan kandungan serapan minyak antara sampel nuget kacang soya hitam. Sampel E juga menunjukkan kandungan protein yang tertinggi dengan tiada perbezaan signifikan antara sampel nuget kacang soya hitam. Sampel A (20% kacang soya hitam) menunjukkan tinggi secara signifikan dalam kandungan karbohidrat antara sampel nuget kacang soya hitam. Untuk analisis fizikal, sampel E juga menunjukkan kandungan kehilangan masakan yang tertinggi dengan tiada perbezaan signifikan antara sampel nuget kacang soya hitam. Walau bagaimanapun, sampel A menunjukkan tinggi secara signifikan dalam daya memotong dan daya ricihan antara sampel nuget kacang soya hitam. Nilai kecerahan ( $L^*$ ) untuk nuget mentah dan digoreng adalah tertinggi untuk sampel E dengan tiada perbezaan signifikan. Nilai kemerahan ( $a^*$ ) untuk nuget mentah dan digoreng adalah tinggi secara signifikan dalam sampel A berbanding sampel lain. Sampel A juga menunjukkan tinggi secara signifikan dalam nilai kekuningan ( $b^*$ ) untuk nuget mentah berbanding sampel lain. Akan tetapi, sampel E menunjukkan tinggi secara signifikan dalam nilai kekuningan ( $b^*$ ) bagi nuget digoreng berbanding sampel lain. Untuk penilaian sensori, sampel R (Kawalan) menunjukkan tinggi secara signifikan dalam sifat warna, sifat aroma, sifat kental, sifat rangup, sifat rasa, dan sifat penerimaan keseluruhan berbanding sampel nuget kacang soya hitam. Walau bagaimanapun, sampel D menunjukkan sifat paling diterima antara sampel nuget kacang soya hitam.