

4/10: 9274

1100090216



LP 27 FASM 1 2012



1100090216

Effect of banana peel flour substitution on physicochemical properties, shelf life and sensory acceptance of wholemeal bread / Lim Ray Yang.

PUSAT PEMBELAJARAN DIGITAL SULTANAH NUR ZAHIRAH
UNIVERSITI MALAYSIA TERENGGANU (UMT)
21030 KUALA TERENGGANU

1100090216		

Lihat Sebeah

HAK MILIK
PUSAT PEMBELAJARAN DIGITAL SULTANAH NUR ZAHIRAH

EFFECT OF BANANA PEEL FLOUR SUBSTITUTION ON PHYSICOCHEMICAL
PROPERTIES, SHELF LIFE AND SENSORY ACCEPTANCE OF
WHOLEMEAL BREAD

By
Lim Ray Yang

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
UNIVERSITI MALAYSIA TERENGGANU

2012

ENDORSEMENT

The project report entitled **Effect of Banana Peel Flour Substitution on Physicochemical Properties, Shelf Life and Sensory Acceptance of Wholemeal Bread** by **Lim Ray Yang**, Matric No. **UK 17163** 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 Food Science (Food Technology), Faculty of Agrotechnology and Food Science, Universiti Malaysia Terengganu.



(ZURAIDAH NASUTION)

Main Supervisor

ZURAIDAH NASUTION

Pensyarah

Jabatan Sains Makanan

Fakulti Agroteknologi dan Sains Makanan

Universiti Malaysia Terengganu

21030 Kuala Terengganu.

Date: 18/6/2012



(WAN HAFIZ WAN ZAINAL SHUKRI)

Co-supervisor

WAN HAFIZ WAN ZAINAL SHUKRI

Pensyarah/Food Science Club Coordinator

Jabatan Sains Makanan

Fakulti Agroteknologi dan Sains Makanan


Universiti Malaysia Terengganu

21030 Kuala Terengganu

Date: 18.6.12.

DECLARATION

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

Signature : 

Name : Lim Ray Yang

Matric No. : UK 17163

Date : 18/6/2012

ACKNOWLEDGEMENT

I would like to express my humble thank to God for the strength, inspiration and encouragement given to me throughout the completion of this thesis. Countless experiences and knowledge were gained along the way.

I would like to express my sincerest gratitude to Ms. Zuraidah Nasution, my main supervisor, with a bundle of appreciation for her precious continuous guide patience, substantial discussions and endless support throughout this study. Also, never forgetting my co-supervisor, Encik Wan Hafiz Wan Zainal Shukri, for his encouragement, generous support and his expertise in bakery during the progress of my preliminary studies. Further appreciation is sent to Encik Aziz for allowing me to join the bread making session with the juniors. Thank you too, for your constructive advices in solving my problems in bread making.

To my parents, my responsible father Lim Wee Siang, and my loveable mother Fong Yoke Keng, this is for the both of you. Words can't express my gratitude! Thank you very much for showing me how grateful you are to have me as the only son in the family. Thanks for your endless support and unconditional love. My sister, Lim Huey Kuen, thanks for believing in me, and you have given me the strength to pursue what I wanted in my life. I love all of you more than ever!

A million thanks said to Puan Ku Rafah, the director of Gong Pauh Plantation Department, for putting in her time and energy in searching for my banana fruit supply. My grateful appreciation also goes to the staff of FAMA for directing me to my banana fruit supply. Thanks too, Encik Fauzi and Encik Wan Ahmad for the bottomless supply of banana fruit as well as information regarding banana fruits. Special thanks to the lab assistant, Encik Azman for sacrificing his precious Raya celebrations to assist my lab progression during the weekends. Your patience is much appreciated. Thank is also expressed to Encik Ihwan for granting the permission to use the tabletop microscope in the Parasitology Laboratory, AKUATROP. To the rest of the lab assistant, thanks for your kind and valuable assistance.

I wished to thank all my fellow course mates who involved in my completion of sensory evaluation, thesis writing, as well as laboratory analysis. To Cheong Wai Ching, Chai Kong Fei, Lee Ching Ciang, Bernard Lai Kok Kit, Chan Kin Wah, Lew Kok Fang, Chong Lin Siew and Lau Chen Chen, you guys have been a bunch of crazy, great and supportive friends now and since. Thanks for your trust, criticisms and support. I hereby wish all of you all the best in your future undertakings!

Last but not least, to the special one, Cheong Yau Wen, who had given me her unforgiving patience. Thanks for not giving up on me. Also, thanks for being by my side, believing in me, and putting up with me during the good and bad times. Once again, thank you, with love.

ABSTRACT

Banana fruits are highly consumed in Malaysia. Nevertheless, an issue of enormous disposal of banana peels should never be underestimated. Previous studies have shown that banana peels have high potential as functional ingredients to be added in a food product. This study was aimed to investigate the effect of different enrichment percentages of banana peel flour (BPF) on the properties of whole meal bread (WMB). Six different formulations of bread in total (3.5%, 7.0%, 10.5%, 14.0%, and 17.5%), along with control sample (0% BPF) were prepared. Physical properties including specific volume, color of crust and crumb and texture profile analyses were evaluated. Sensory acceptance test of the samples on several attributes such as color of crust and crumb, odor, porosity, taste, texture and overall acceptance was carried out. The nutritional properties were also assessed. Results showed that incorporation of BPF in WMB were significantly affecting ($p < 0.05$) the color characteristics, specific volume and texture quality of WMB. BPF could be incorporated up to 7% without significantly affecting ($p < 0.05$) the acceptance of crumb color, odor, and taste as well as overall acceptance of WMB. Meanwhile, there were significant changes ($p < 0.05$) in terms of moisture, ash, protein, fat, crude fiber, total available carbohydrate and calorie content of WMB with increasing BPF substitution. Comparative study was done on control WMB and 7% BPF substituted WMB. Both were analyzed for their microstructure, total dietary fiber, antioxidant activity and microbiological shelf life. Sample with 7% BPF gave significantly lower ($p < 0.05$) pore size, which resulted in denser structure. No significant difference ($p > 0.05$) was observed on the inhibition activity of lipid peroxidation in both formulations after seven days of storage. The total dietary fiber content was higher (14.4%) in 7% BPF compared to control sample (11.3%). Similarly, the phenolic content was improved from 19.16 ± 1.59 mgGAE/g in control sample to 36.06 ± 1.90 mgGAE/g in sample with 7% BPF. However, incorporation of BPF could not give WMB a significantly longer shelf life. This study shows that banana peels have potentials to be added into healthy food products such as WMB, since it could improve the nutritional quality of WMB with satisfying sensory acceptance.

ABSTRAK

Buah pisang banyak dimakan dalam kalangan masyarakat Malaysia. Oleh sebab itu, tidak bolehlah dinafikan tentang isu kekerapan pembuangan kulit pisang. Kajian lepasan telah menunjukkan potensi tinggi kulit pisang sebagai bahan yang mampu menambah nilai pemakanan sesuatu makanan. Malahan, kulit-kulit pisang merupakan sumber gentian and antioksidan yang baik. Tujuan kajian ini adalah untuk menguji kesan-kesan pengayaan serbuk kulit pisang (SKP) dalam peratusan yang berbeza (3.5%, 7.0%, 10.5%, 14.0%, and 17.5%) atas sifat-sifat roti gandum penuh (RGP). Jumlah sebanyak enam formulasi, bersamaan dengan pengawal (0%SKP), telah dihasilkan. Sifat-sifat fizikal seperti isipadu spesifik, warna kerak dan remah dan analisis profil tekstur telah dinilai. Penerimaan sensori roti berdasarkan ciri-ciri seperti warna kerak dan remah roti, bau, keliangan, rasa, tekstur dan penerimaan keseluruhan telah dijalankan. Sifat-sifat nutrisi telah juga dinilai. Keputusan menunjukkan bahawa pemerbadanan SKP dalam RGP telah mempengaruhi sifat warna, isipadu spesifik dan kualiti tekstur secara signifikan ($p < 0.05$). Penambahan SKP boleh dilakukan sehingga 7% tanpa mempengaruhi penerimaan warna remah, bau, rasa dan penerimaan keseluruhan RGP secara signifikan ($p < 0.05$). Sementara itu, perbezaan signifikan ($p < 0.05$) dapat diperhatikan dari segi kelembapan, abu, protein, lemak, gentian kasar, karbohidrat tersedia dan kandungan kalori RGP dengan penambahan pemerbadanan SKP. Darjah pemerbadanan BPF yang paling diterima didapati berada pada peringkat 7%. Ujian perbandingan juga telah dijalankan atas RGP pegawal dan RGP yang digantikan dengan 7% SKP. Kedua-dua roti ini diuji dari segi mikrostruktur, jumlah gentian pemakanan, aktiviti antioksidan, dan jangka hayat mikrobiologi. Keputusan peringkat pemerbadanan ini telah menunjukkan penurunan signifikan ($p < 0.05$) dari segi saiz liang yang turut mengakibatkan struktur roti yang lebih mampat. Tiada perbezaan signifikan ($p < 0.05$) diperhatikan dari segi aktiviti perencatan peroksidasi lipid bagi kedua-dua formulasi selepas 7 hari penyimpanan. Secara bercanggah, jumlah gentian pemakanan dalam formulasi dengan 7% SKP adalah lebih tinggi (14.4%) daripada formulasi kawalan (11.3%). Demikian juga, kandungan fenolik juga telah meningkat dari 19.16 ± 1.59 mgGAE/g kepada 36.06 ± 1.90 mgGAE/g. Walaubagaimanapun, penambahan SKP dalam RGP tidak memberi jangka hayat mikrobiologi yang lebih panjang secara signifikan kepada RGP. Kajian ini menunjukkan bahawa kulit pisang mempunyai potensi untuk ditambah ke dalam makanan berkhasiat seperti RGP sedangkan ia mampu meningkatkan kualiti nutrisi RGP dengan penerimaan sensori yang memuaskan.