

DEVELOPMENT OF BUTTER CUP  
(*Amorpha canescens*) BEAUTY

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1957



DEVELOPMENT OF BITTER GOURD (*Momordica charantia*) BISCUIT

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RESEARCH PROJECT submitted in partial fulfillment of the requirements for the  
Degree of Bachelor of Food Science  
(Food Service and Nutrition)

FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU  
MENGABANG TELIPOT  
2007

**This project should be cited as:**

**Chin, Y. C. (2007). Development of bitter gourd (*Momordica charantia*) biscuit. Undergraduate thesis, Bachelor of Food Science (Food Service and Nutrition). Faculty of Agrotechnology and Food Science, Universiti Malaysia Terengganu, Mengabang Telipot, Terengganu.**

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## DECLARATION

I hereby declare that this research project is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that this thesis has not been previously or concurrently submitted for any degree at Universiti Malaysia Terengganu (UMT) or other institutions.

Date: 28<sup>th</sup> June 2007



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## ACKNOWLEDGEMENT

First and foremost, I would like to express my warmest and most enthusiastic thanks to my supervisor, Dr. Amir bin Izzwan Zamri, for his precious time, continuous guidance, advices, suggestions and support in helping me to accomplish this final year research project.

I would like to take this opportunity to express my deepest gratitude to the Head of Food Science Department, Prof. Madya Dr. Amiza Mat Amin, and to all the lecturers who have corresponded with me to point out errors and to offer suggestions. I would also like to thank all the staffs of Food Science Department, especially the staffs of Food Science laboratory and kitchen for their cooperation, patience, assistance and kindness throughout this research project.

Finally, to my dearest family and friends, thank you very much for your continuous support, love, concern, encouragement, ideas, and comments in assisting me to complete this final year research project. This project would not have been possible without their help and I feel very grateful and happy to have them by my side when I need them the most.

## ABSTRACT

The purpose of this study was to develop a new bitter gourd biscuit product by incorporating bitter gourd paste into biscuit formulations, and then to determine the effects of different percentages of bitter gourd paste on the physicochemical properties and the sensory acceptance of the bitter gourd biscuits. Biscuits were prepared with different ratio of bitter gourd paste to all-purpose flour. Six formulations of the biscuits including the control sample were prepared. The all-purpose flour was replaced by bitter gourd paste at 0%, 10%, 20%, 30%, 40% and 50% incorporation levels in biscuit preparation. SAS programme was used to determine the Analysis of Variance (ANOVA) and the Duncan's Multiple Range Test (DMRT). The results indicated that an increased of bitter gourd paste resulted in a decreased texture of hardness and fracturability of the biscuits. The lightness and yellowness of the biscuits decreased while the redness increased with the increased levels of bitter gourd paste. No significant difference was observed in the physical characteristics of the biscuits in terms of texture and colour profile. The results from this study also revealed that there was no significant difference in the low moisture content of the biscuits that ranged from 1.85 to 2.73%. The ash content (mineral) increased significantly from 3.46 to 6.05% with a higher percentage of bitter gourd paste. The fibre content also increased from 0.87 to 2.16% with a higher percentage of bitter gourd paste but showed no significant difference. Besides that, the fat content increased significantly from 17.72 to 25.67% with the increased of bitter gourd paste in biscuits. On the other hand, the protein content decreased from 8.83 to 7.77% with a higher percentage of bitter gourd paste but showed no significant difference. The carbohydrate content was also significantly decreased from 43.94 to 36.59% with a higher percentage of bitter gourd paste in biscuits. There were 60 panels involved in the affective sensory test. Sensory evaluation results revealed that biscuit made with 10% of bitter gourd paste and 90% of all-purpose flour (Formulation A) scored highest in terms of colour, aroma, taste and overall acceptability. Formulation A contained  $2.27 \pm 0.27\%$ ,  $3.86 \pm 0.59\%$ ,  $1.58 \pm 1.45\%$ ,  $8.75 \pm 0.59\%$ ,  $19.36 \pm 1.65\%$ , and  $40.10 \pm 0.33\%$  of moisture, ash, fibre, protein, fat, and carbohydrate respectively; and with a hardness of  $0.76 \pm 0.36$  kg, fracturability of  $18.72 \pm 6.10$ , and lightness, redness and yellowness values of  $50.53 \pm 1.52$ ,  $3.16 \pm 0.28$  and  $14.15 \pm 0.59$  respectively. This indicated that proper composition of bitter gourd paste has the potential to substitute part of the all-purpose flour in biscuit-making.

## PERKEMBANGAN BISKUT PERIA (*Momordica charantia*)

### ABSTRAK

Kajian ini dilakukan dengan tujuan untuk menghasilkan satu produk biskut baru dengan memasukkan pes peria ke dalam formulasi biskut, dan kemudian menentukan kesan pes peria dalam peratusan yang berbeza ke atas ciri-ciri fizikokimia dan penerimaan sensori terhadap biskut peria tersebut. Biskut telah disediakan dalam nisbah pes peria kepada tepung serbaguna yang berbeza-beza. Enam formulasi biskut termasuk sampel kawalan telah disediakan. Tepung serbaguna masing-masing telah digantikan dengan pes peria dalam kuantiti 0%, 10%, 20%, 30%, 40% dan 50% semasa proses penyediaan biskut. Program SAS telah digunakan untuk menentukan Analisis Varians (ANOVA) dan *Duncan's Multiple Range Test* (DMRT). Hasil analisis menunjukkan bahawa peningkatan pes peria dalam biskut telah menyebabkan penurunan dalam kekerasan dan kebolehpatahan tekstur biskut yang diukur. Kecerahan dan kekuningan warna biskut telah menurun manakala warna kemerahan biskut telah meningkat selari dengan peningkatan pes peria dalam biskut. Pemerhatian menunjukkan bahawa tiada perbezaan yang signifikan dalam ciri-ciri fizikal biskut yang diukur iaitu tekstur dan warna. Hasil daripada keputusan kajian ini juga menunjukkan bahawa tiada perbezaan yang signifikan dalam kandungan kelembapan biskut yang rendah iaitu dalam lingkungan 1.85 hingga 2.73%. Kandungan abu (mineral) telah meningkat dengan signifikan dari 3.46 kepada 6.05% selari dengan peratusan pes peria yang semakin tinggi. Kandungan fiber juga telah meningkat dari 0.87 kepada 2.16% selari dengan peningkatan pes peria tetapi tidak menunjukkan perbezaan yang signifikan. Selain itu, kandungan lemak telah meningkat dengan signifikan dari 17.72 kepada 25.67% selari dengan peningkatan pes peria dalam biskut. Sebaliknya, kandungan protein telah menurun dari 8.83 kepada 7.77% selari dengan peningkatan pes peria tetapi tidak menunjukkan perbezaan yang signifikan. Kandungan karbohidrat juga telah menurun dengan signifikan dari 43.94 kepada 36.59% selari dengan peningkatan pes peria dalam biskut. Terdapat 60 panel yang telah terlibat dalam ujian sensori afektif. Hasil penilaian sensori menunjukkan bahawa biskut yang diperbuat daripada 10% pes peria dan 90% tepung serbaguna (Formulasi A) mendapat skor yang paling tinggi untuk atribut warna, aroma, rasa, dan penerimaan keseluruhan. Formulasi A masing-masing mengandungi  $2.27 \pm 0.27\%$ ,  $3.86 \pm 0.59\%$ ,  $1.58 \pm 1.45\%$ ,  $8.75 \pm 0.59\%$ ,  $19.36 \pm 1.65\%$ , dan  $40.10 \pm 0.33\%$  kelembapan, abu, fiber, protein, lemak, dan karbohidrat; dan mempunyai kekerasan sebanyak  $0.76 \pm 0.36$  kg, kebolehpatahan sebanyak  $18.72 \pm 6.10$ , dan masing-masing dengan nilai kecerahan, kemerahan dan kekuningan sebanyak  $50.53 \pm 1.52$ ,  $3.16 \pm 0.28$  dan  $14.15 \pm 0.59$ . Kajian ini menunjukkan bahawa komposisi pes peria yang sesuai mempunyai potensi untuk menggantikan sebahagian daripada tepung serbaguna dalam proses penyediaan biskut.