

DEVELOPMENT OF NATURAL COLOURING POWDER
FROM BUTTERFLY PEA FLOWERS (*Clitoria ternatea*)

RUBY ZAINUREEN BINTI ZAHEDI

RESEARCH PROPOSAL submitted in partial fulfilment of the requirement 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:

Ruby, Z.Z. 2007. Development of natural colouring powder from Butterfly pea flowers (*Clitoria ternatea*). Undergraduate thesis, Bachelor of Food Science (Food Service and Nutrition), Faculty of Agrotechnology and Food Science, Universiti Malaysia Terengganu. Mengabang Telipot, Terengganu. 59 pg.

No part of this report may be reproduced by any mechanical, photographic or electronic process or in the form of photographic recording, nor may it stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and the supervisor(s) of the project.

HP
GO
FARM
3
2007

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any degree at UMT or other institutions.

Date: 17 JUNE 2007



RUBY ZAINUREEN BINTI ZAHEDI
UK 9841

Approved by

Date: 17 JUNE 2007



(PUAN ZAMZAHAILA BINTI MOHD ZIN)

ACKNOWLEDGEMENTS

Alhamdulillah, I am grateful to Allah the Almighty s.w.t. for the strength, patience and earnestness that He has given me in order to complete this project and thesis writing. I would like to express that the completion of this project is not by one but by the generous contribution of many. Thus, this success is especially dedicated to all.

Gratitude is firstly dedicated to my supervisor, Puan Zamzahaila binti Mohd Zin for her guidance, concern and valuable advices that has provided me a clear route to successfully complete my project. I really appreciate your patience and enthusiasm in teaching, Puan Zam. It is also my pleasure to give thanks to Encik Mohamad Khairi bin Mohd Zainol who is the project coordinator for his guidance throughout completing the project. A million thanks to Associate Professor Dr. Amiza binti Mat Amin, Dr. Amir Izzwan bin Zamri,, Puan Faridah binti Yahya, Encik Aziz bin Yusof, Puan Khairil Shazmin binti Kamarudin, Cik Norizah binti Sarbon, Encik Wan Hafiz bin Wan Zainal Shukri and Puan Wan Sarah binti Wan Abdullah for their valuable suggestions and sincere advices. A big thank you is also expressed to Encik Khairul Anuar and Dr Janna Ong Abdullah from Universiti Putra Malaysia for their great help and guidance on this project.

A special word of thank you to all Food Science Department staffs and lab technicians, Cik Nasrenim, Puan Fadlina, Puan Suzana, Puan Aniza, Cik Rose Haniza, Puan Faridah, Puan Dayang Normiah, Puan Zarina, Encik Zamani and Encik Roslan for their continuous help. I am also thankful to Agrotechnology Department and Marine Department for their permission in the usage of the freeze dryer and blast freezer.

My love and special gratitude to my mother, Puan Zabreena Abdullah, my sister , Intan and my brother, Zackry for their prayers, love, care and motivation that have keep me going. I am also very thankful to Puan Noor, Liyana, Huda, Amanina dan Muslihati for their great help in providing the raw samples. My heartiest gratitude goes to all my friends for their motivation and support. Last but not least, I am grateful to the Faculty of Agrotechnology and Food Science of UMT for their generous financial support for this project. Thank you, all...

ABSTRACT

Butterfly pea (*Clitoria ternatea*) is a multi-purpose forage legume with deep blue flowers. Natural colouring powder is worth developing since the use of food colorant from natural sources is much in demand worldwide. This study was done to develop natural colouring powder from Butterfly pea flowers, differentiate the effect of drying towards the natural colouring powder and determine the anthocyanin concentration. Analysis on colour profile, moisture, ash and anthocyanin were done. Freeze dried sample gave better value for colour profile, moisture, ash and anthocyanin content. The moisture content for freeze dried sample was 9.00 ± 0.10 compared to oven dried sample 11.96 ± 1.58 while ash content for freeze dried sample was 4.87 ± 0.29 and 2.08 ± 0.91 for oven dried sample. They were not significantly different for both analyses. Colour profile analyses exhibited that freeze dried and oven dried sample were significantly different for 'L', 'a' and 'b' attributes. The values for freeze dried sample were 28.97 ± 0.30 , 2.44 ± 0.02 and -1.56 ± 0.04 respectively. Oven dried sample showed the values at 34.75 ± 0.20 , 2.86 ± 0.05 and -0.13 ± 0.09 for 'L', 'a' and 'b' attributes. The highest anthocyanin concentration for freeze dried sample was 504.92 mg per 1 gram sample and the lowest anthocyanin content was 243.85 ± 41.12 mg per 1 gram sample. For oven dried sample, the highest anthocyanin content was 504.92 mg per 1 gram sample and the lowest value was 280.14 ± 62.58 mg per 1 gram sample. Fresh petal contained the highest anthocyanin content with 326.44 mg per 1 gram sample and the lowest value with 65.53 ± 3.66 mg per 1 gram sample. All samples were significantly different. Extraction should be done up to the second hour only since the anthocyanin concentration in the freeze dried sample maintained till the second hour. This study showed that Butterfly pea flowers are suitable to be developed as natural colouring since the anthocyanin content is quite high. The suitable drying method to develop natural colouring powder from Butterfly pea flower could be freeze drying.

Penghasilan Pewarna Semula Jadi daripada Bunga Telang

ABSTRAK

Bunga telang (*Clitoria ternatea*) adalah sejenis pokok yang mempunyai pelbagai kegunaan dan mempunyai bunga yang berwarna biru gelap. Permintaan terhadap pewarna semula jadi berasaskan sumber semula jadi sangat tinggi maka penghasilan pewarna semula jadi adalah berbaloi. Kajian ini telah dijalankan untuk menghasilkan pewarna semula jadi dan mengkaji kesan perbezaan pengeringan dan menentukan kandungan anthocyanin di dalam pewarna tersebut. Analisis kandungan kelembapan, kandungan abu, atribut warna dan kandungan anthocyanin telah dilakukan. Sampel yang dikeringkan secara sejuk beku menunjukkan nilai kandungan kelembapan, kandungan abu, atribut warna dan kandungan anthocyanin yang lebih baik berbanding sampel yang dikeringkan di dalam oven. Nilai kandungan kelembapan bagi sampel yang dikeringkan secara sejuk beku ialah 9.00 ± 0.10 manakala sampel yang dikeringkan di dalam oven menunjukkan nilai kelembapan sebanyak 11.96 ± 1.58 . Analisis abu pula menunjukkan kandungan sebanyak 4.87 ± 0.29 bagi sampel yang dikeringkan secara sejuk beku manakala kandungan abu bagi sampel yang dikeringkan di dalam oven sebanyak 2.08 ± 0.91 . Semua sampel tidak menunjukkan perbezaan yang signifikan bagi kedua-dua analisis. Analisis warna menunjukkan perbezaan yang signifikan bagi nilai 'L', 'a' dan 'b' bagi kedua-dua sampel. Sampel yang dikeringkan secara sejuk beku menunjukkan 28.97 ± 0.30 , 2.44 ± 0.02 dan -1.56 ± 0.04 bagi nilai 'L', 'a' dan 'b' manakala sampel yang dikeringkan di dalam oven memberikan nilai 34.75 ± 0.20 , 2.86 ± 0.05 dan -0.13 ± 0.09 . Kandungan maksimum anthocyanin bagi sampel yang dikeringkan secara sejuk beku ialah 504.92 mg bagi setiap 1 gram sampel dan kandungan minimum ialah 243.85 ± 41.12 . Sampel yang dikeringkan di dalam oven pula menunjukkan kandungan anthocyanin paling tinggi sebanyak 504.92 mg bagi setiap 1 gram manakala kandungan terendah sebanyak 280.14 ± 62.58 . Sampel segar iaitu sampel yang tidak dikenakan sebarang rawatan

pengeringan menunjukkan kandungan anthocyanin maksimum sebanyak 326.44 bagi setiap 1 gram sampel dan kandungan terendah sebanyak 65.53 ± 3.66 mg bagi setiap gram sampel. Semua sampel menunjukkan perbezaan yang signifikan. Pengekstrakan anthocyanin patut dilakukan sehingga jam yang ke-2 sahaja memandangkan kandungannya dapat dikekalkan sehingga jangka masa tersebut apabila menggunakan kaedah pengeringan sejuk beku. Bunga telang sesuai dijadikan pewarna semula jadi kerana kandungan anthocyanin yang agak tinggi. Pengeringan yang paling sesuai digunakan untuk menghasilkan serbuk pewarna semula jadi daripada bunga telang ialah pengeringan sejuk beku.