DETERMINATION OF TOTAL PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY IN BARK OF CINNAMON (*Cinnamomum Verum*)

NUR SHARENE BINTI CHE MAHMOOD

Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Applied Chemistry
in the Faculty of Applied Sciences,
Universiti Teknologi MARA

MAY 2010

This Final Year Project Report entitled **"Determination of Total Phenolic Content and Antioxidant Activity in Bark of Cinnamon *(Cinnamomum Verum)*"** was submitted by Nur Sharene Binti Che Mahmood, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

Puan Ruhani Ibrahim
Supervisor
B. Sc. (Hons.) Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Cik Sabrina M. Yahya
Project Coordinator
B. Sc. (Hons) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Dr. Hajah Siti Halimah Sarijo
Head of Programme
B. Sc. (Hons) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Date: _____

ACKNOWLEDGEMENTS

First and foremost, I would like to express my indent to ALLAH S.W.T for giving me the strength to complete this final project. This project would never been completed without a lot of help from all people surrounding me. I take this opportunity to thank the people who had helped me to complete this final project.

My special gratitude is dedicated to Puan Ruhani Binti Ibrahim, as my outstanding supervisor for her valuable guidance and support throughout the completion of this final project. Her support made this project far better than it would have been otherwise. Nevertheless, I wish a special thanks to the Dr. Siti Halimah Binti Sarijo as Head of Programme Bachelor (Hons.) Applied Chemistry and Project Coordinator, Miss Sabrina M Yahya for their advices, guidance, encouragement, ideas and support. Without them, I would not be able to complete my project.

Not forgotten to Mr. Rahimi, Mr. Khadim, Mr. Kamarudin, Mrs. Julia and Mrs. Noor Haida, the laboratory assistant that have helped me a lot with my lab work. Last but not least, I would like to express my special thanks to my special family and friends for their understanding and commitment during completing this final project.

Nur Sharene Binti Che Mahmood.

TABLE OF CONTENTS

		Page
ACKNOWLEDGEMENTS		iii
TABLE OF CONTENTS		iv
LIST OF TABLES		vi
LIST OF FIGURES		vii
LIST OF ABBREVIATIONS		viii
ABSTRACT		ix
ABSTRAK		x
CHAPTER 1 INTRODUCTION		
1.1	Background	1
1.2	Problem statement	3
1.3	Significance of study	5
1.4	Objectives of study	6
1.5	Scope of work	6
CHAPTER 2 LITERATURE REVIEW		
2.1	History of antioxidant	7
2.2	Mechanism of antioxidant action	8
2.3	Types of antioxidants	8
	2.3.1 Synthetic antioxidant	8
	2.3.1.1 Butylated Hydroxyanisole (BHA)	9
	2.3.1.2 Butylated Hydroxytoluene (BHT)	9
	2.3.1.3 Propyl gallate (PG)	10
	2.3.1.4 *Tert*-butylhydroquionone (THBQ)	10
	2.3.2 Natural antioxidant	12
	2.3.2.1 Vitamin C (Ascorbic acid)	12
	2.3.2.2 Vitamin E (tocopherol and tocotrienols)	13
	2.3.2.3 Flavonoids	14
2.4	Lipid oxidation	16
2.5	Cinnamon Verum	17
2.6	Previous research on Antioxidant	20
	2.6.1 Antioxidant in fruit	20
	2.6.2 Antioxidant in seed	21
	2.6.3 Antioxidant in leafy	22
	2.6.4 Antioxidant in herbs and spices	23

ABSTRACT

DETERMINATION OF TOTAL PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY IN BARK OF CINNAMON (*Cinnamomum verum)*

This study was aimed to compare the total phenolic activity in bark of three different forms of cinnamon bark which is fresh cinnamon, dried cinnamon and powder cinnamon were used in this study. The barks are taken in edible portion and were extracted using ethanol. The antioxidant properties are detected using total phenolic compound (TPC) and analysis of antioxidant activity by scavenging of 1, 1-diphenyl 2-picrylhydrazyl (DPPH). The total phenolic content of cinnamon bark was in the following order of fresh bark> dried bark > powder bark. The total phenolics (mg/100g) are 9.86, 8.22 and 5.78 respectively in descending order. The results of the study revealed that the maturation cause a significant increase in total phenolic content. Fresh bark showed the highest total phenolic content followed by dried bark and powder bark. Analysis of antioxidant activity by using DPPH method also showed the same result of the order of cinnamon bark which is fresh cinnamon (11.6667 μM TE/g fresh mass), dried cinnamon (8.3333 μM TE/g fresh mass) and powder cinnamon (6.6667 μM TE/g fresh mass). In view of this it can be concluded that total phenolic contents are different between the three form samples of cinnamon.