

**ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES OF
TWO LOCAL EDIBLE MUSHROOMS**

WAN ELYN AMIRA WAN ADNAN

**BACHELOR OF SCIENCE (Hons.) APPLIED CHEMISTRY
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA**

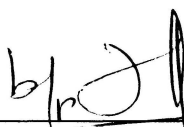
APRIL 2009

This Final Year Project Report entitled “**Antioxidant and Antimicrobial Properties of Two Local Edible Mushrooms**” was submitted by Wan Elyn Amira Wan Adnan, in partial fulfillment of the Requirements for the Degree Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences and was approved by



Assoc. Prof. Dr. Noriham Abdullah
Supervisor

B. Sc. (Hons.) Food Science and Technology
Faculty of Applied Science
Universiti teknologi MARA
40450, Shah Alam
Selangor



Assoc. Prof. Dr. Zainon Mohd Noor
Co-supervisor

B. Sc. (Hons.) Biomolecular Science
Faculty of Applied Science
Universiti teknologi MARA
40450, Shah Alam
Selangor



Cik Sabrina M Yahaya
Project Coordinator
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Science
Universiti teknologi MARA
40450, Shah Alam
Selangor



Dr. Yusairie Mohd
Head of Programme
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Science
Universiti teknologi MARA
40450, Shah Alam
Selangor

Date: 25/5/2009

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. Besides, I would like to take this opportunity to thank the people who had helped me to complete this final project.

My special gratitude is dedicated to Associate Professor Dr. Noriham Abdullah, as my outstanding supervisor for her help valuable guidance and support throughout the completion of this final project. Not to forget also to my co-supervisor, Assoc. Prof. Dr Zainon Mohd Noor. Their advice, guidance, encouragement, ideas and support made this final project far better than it would have been otherwise.

Nevertheless, I wish my special thanks to Dr. Yusairie Mohd as Head Programme of Applied Chemistry course and our Project Coordinator, Cik Sabrina M Yahya for their advices and support. Without them, I would not be able to complete my final project successfully.

Not forgotten my sincere gratitude to all staff from the Applied Science Faculty, especially laboratory assistances that have helped me a lot with my laboratory work and analysis. Their assistance and guidance are very meaningful to me.

Last but not least, I would like to express my deepest thanks to my lovely family and friends for their understanding and commitment during completing this final project.

Thank you.

Sincerely,

Wan Elyn Amira Wan Adnan

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	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 and problem statement	1
1.2 Significant of study	2
1.3 Objectives of study	3
CHAPTER 2 LITERATURE REVIEW	
2.1 Oxidation	4
2.1.1 Radical	4
2.2 Antioxidant	5
2.2.1 Types of antioxidant	7
2.2.1.1 Natural antioxidant	7
2.2.1.2 Synthetic antioxidant	10
2.2.2 Phenolic compound in antioxidant	13
2.2.2.1 Phenolic compound as antioxidant	13
2.2.2.2 Mechanism of phenols as antioxidant	14
2.2.3 Antioxidant in defense system	15
2.2.4 Antioxidant activity	17
2.3 Antimicrobial	18
2.3.1 Antimicrobial activity	18
2.3.2 Antimicrobial mode of action	19
2.4 Mushroom	20
2.4.1 <i>Lentinula edodes</i> (Shitake Mushroom)	21
2.4.2 <i>Pleurotus sajorcaju</i> (Grey Oyster Mushroom)	22
CHAPTER 3 METHODOLOGY	
3.1 Materials	23
3.1.1 Raw materials	23
3.1.2 Chemicals	23
3.2 Methods	23
3.2.1 Extraction method	23
3.2.2 Total phenolic compound	24
3.2.2.1 Preparation of gallic acid standard	24
3.2.2.2 Determination of total phenolic compound	25
3.2.3 Antioxidant activity	25

ABSTRACT

ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES OF TWO LOCAL EDIBLE MUSHROOMS

This study was carried out to compare the antioxidant and antimicrobial properties of some selected mushrooms, *Lentinula edodes* (shitake mushroom) and *Pleurotus sajorcaju* (grey oyster mushroom). The mushrooms were extracted using ethanol. The antioxidant properties is detected using total phenolic compound assay, free radical scavenging activity (DPPH) and ferric reducing power activity (FRAP) assays. Disk diffusion method was used to determine the antimicrobial properties of *Lentinula edodes* and *Pleurotus sajorcaju*. Total phenolic compound are natural antioxidant components found in the ethanolic extracts of *Lentinula edodes* and *Pleurotus sajorcaju* were 10.71 and 0.542 µgGAE/mg respectively. The reducing power of mushroom species and standard used followed in the decreasing order of BHA/BHT > Ascorbic acid > *Lentinula edodes* > *Pleurotus sajorcaju*. The free radical scavenging activity of mushroom species and standards were decreased in the order of BHA/BHT > Ascorbic acid > *Pleurotus sajorcaju* > *Lentinula edodes*. The reactivity of antimicrobial properties *Lentinula edodes* and *Pleurotus sajorcaju* were investigated against selected microorganisms such as *S. aureus* (gram positive), *B. subtilis* (gram positive), *P. aeruginosa* (gram negative), *E. coli* (gram negative), *C. albicans* (mould and yeast) and *A. niger* (mould and yeast). Generally, *Lentinula edodes* and *Pleurotus sajorcaju* have moderately antimicrobial properties against all selected microorganisms except *A. niger*.