

**UNIVERSITI TEKNOLOGI MARA**

***IN VITRO* ANTIOXIDANT ACTIVITIES OF  
SEVERAL LOCAL HERBS**

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**Dissertation submitted in partial fulfillment of the  
requirements for the degree of  
Bachelor of Pharmacy (Hons)**

**Faculty of Pharmacy**

**October 2005**

## ACKNOWLEDGEMENTS

In the name of God, the compassionate, the Merciful. Alhamdulillah, with his will and guidance, this research project and thesis is completed.

I wish to express my deepest gratitude and extent special thanks to my supervisor Professor Dr. Aishah Adam for her interest, support, and unfailing guidance throughout the study and in the preparation of this thesis. Her suggestions and constructive criticism are greatly appreciated.

My special appreciation is also due to Mizatun Hazizul Hassan, for her interest, unfailing guidance, and helpful suggestions throughout the progress of this study. Special thanks are extended to Professor Dr. Fredrick Jean Faizal Weber for his guidance in the extraction of *Diplazium Esculentum* herb and for his constructive comments. Many thanks are due to Sarah and Carol for their guidance in operating the Photochem, TBARS and preparing the microsomes.

I also would like to thank all the lecturers and the technical staff in the Faculty of Pharmacy, UiTM for their assistance and cooperation, and to my friends Noorul Aimi and Farah Nadwa for their assistance and support. To both my parents, I wish to express my gratitude and high appreciation for their moral support and prayers.

# TABLE OF CONTENTS

## TITLE PAGE

APPROVAL FORM	
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	x
<b>CHAPTER ONE (INTRODUCTION)</b>	<b>1</b>
1.1 Introduction	1
<b>CHAPTER TWO (LITERATURE REVIEW)</b>	<b>6</b>
2.1 Sources of reactive oxygen species	6
2.2 Free radicals and reactive oxygen species	8
2.3 Lipid peroxidation	10
2.4 Antioxidants	11
2.5 Phenolic compounds in plants	12
<b>CHAPTER THREE (MATERIALS AND METHODS)</b>	<b>14</b>
3.1 Materials	14
3.2 Screening for the antioxidant activities of several local herb (Figure 3.1)	14
3.2.1 Aqueous extraction of herbs	14
3.2.2 Measurement of antioxidant activities using the photochemiluminescence method (Photochem®, Analytic Jena AG, Germany)	16
3.3 Development of an in vitro model of lipid peroxidation (Figure 3.2)	18
3.3.1 Preparation of homogenizing buffer (Potassium phosphate 0.25 M)	18
3.3.2 Preparation of storage buffer (Potassium phosphate 0.25 M)	18
3.3.3 Preparation of rat liver microsomes	18
3.3.4 Preparation of reagents for determination of microsomal protein concentration	21
3.3.5 Quantification of microsomal protein concentration	21
3.3.6 Preparation of Tris – HCL (0.05 M) and t-BOOH (9 mM)	22
3.3.7 Time course for induction of lipid peroxidation	23
3.3.8 Concentration response for induction of lipid peroxidation	23

## ABSTRACT

Antioxidants play an important role in inhibiting lipid peroxidation and scavenging radicals, thus providing protection to humans against infections and degenerative diseases. The literature showed that the antioxidant capacity of herbs and vegetables are high (Rahmat *et al.* 2003). This study was thus carried out to determine the *in vitro* antioxidant capacity of a Malaysian herb. Nineteen types of herbs that are commonly consumed by Malaysian people were screened for antioxidant activity measured by photochemiluminescence. This method tests the ability of the herbs to scavenge free radicals. Among the screened herbs, the most potent radical scavenging activities was found in *Eugenia polyantha* (daun salam). *Diplazium esculentum* (pucuk paku) had the second highest antioxidant activity. From these results, *Diplazium esculentum* (pucuk paku) was selected for further study in an *in vitro* lipid peroxidation assay. Daun salam was not selected for the above mentioned assay as it was difficult to obtain the herb in large enough amounts. In the *in vitro* lipid peroxidation assay, tert-butylhydroperoxide (t-BOOH) was used to induce lipid peroxidation in rat liver microsomes. The t-BOOH induced lipid peroxidation assay system was first optimized, before it was used to test the antioxidant activities of the *Diplazium esculentum* extract. Lipid peroxidation was monitored by the thiobarbituric reactive substance (TBARS) method. The optimum microsomal protein concentration for use in the lipid peroxidation assay was found to be 0.2 mg/ml while the optimum period for incubating the microsomes with t-BOOH was 30 minutes. The ability of *Diplazium esculentum* extract to inhibit microsomal lipid peroxidation induced with t-BOOH was then measured. Trolox was used as a positive control. Both *Diplazium esculentum* extract and Trolox were capable of reducing the TBARS levels with IC<sub>50</sub> values of  $4.10 \pm 0.06$  µg/ml for Trolox and  $5.62 \pm 0.06$  µg/ml for the *Diplazium esculentum* extract. The IC<sub>50</sub> value of *Diplazium esculentum* extract was comparable to that of Trolox. Overall, the results obtained suggested that the extract possessed an *in vitro* antioxidant activity through radical scavenging ability and inhibition of lipid peroxidation. The antioxidant activity of extract was comparable to Trolox, a fact that should encourage more *in vitro* studies and future *in vivo* work.

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

An antioxidant is a substance which is capable of trapping free radicals and suppressing the formation of reactive oxygen species. Highly reactive free radicals and oxygen species are present in biological systems from a wide variety of sources (Prakash, 2001). These free radicals may oxidize nucleic acids, proteins, lipids, or DNA and can initiate chronic degenerative diseases including cancer, autoimmune, inflammatory, cardiovascular, and neurodegenerative (e.g. Alzheimer's disease, Parkinson's disease, multiple sclerosis, Down syndrome) (Prakash, 2001; Aruoma, 2003).

As antioxidants scavenge free radicals and oxidants and terminate their reactions with biological molecules, the assumption is that antioxidants in diets may prevent diseases (Aruoma, 2003). Scientific evidence suggests that antioxidants reduce the risk for chronic degenerative diseases including cancer and heart disease (Prakash, 2001). Both epidemiological and in vitro studies have shown that supplementation of the diet with antioxidant agents can enhance the antioxidant capacity of the body and help to attenuate the damage induced by oxidative stress (Zhao *et al.*, 2005). Plant sourced food antioxidants like vitamin C, vitamin E, carotenes, phenolic acids, phytate, phytoestrogens, polyphenols and flavonoids remove the products of reactive oxygen