

UNIVERSITI TEKNOLOGI MARA

THE DETECTION OF PYROGALLOL IN  
DIFFERENT TYPES OF TEA

NOR IDHA LIANA BINTI ISHAK

Dissertation submitted in partial fulfillment of the  
requirements for the  
BACHELOR OF PHARMACY (Hons)

2014

## **ACKNOWLEDGEMENT**

First and foremost praise to Allah S.W.T that I can complete the final year project smoothly. Next, I would like to express my gratitude and deep regards to my supervisor, Dr. Ibtisam Abdul Wahab for her constant assistance and constructive suggestion in completing this project. My special thanks to my second supervisor, Dr. Hannis Fadzillah Mohsin for her guidance and suggestions throughout these 2 semesters. I would like to dedicate this success to my family especially my mother for their constant encouragement. I also would like to thank UiTM and the staffs for giving me the opportunity to do the project and help me a lot during completing it. Last but not least, thank you to those who are helping me directly or indirectly throughout the thesis completion.

## **ABSTRACT**

Next to water, tea has become one of the most consumed beverages in the world. Many researches performed the antioxidant tests of the tea extract. Mainly, phenolics compound in the tea are responsible towards all the health benefits. The major phenolics in the tea are catechins. These compounds were targeted by the researchers as they are predominant in tea. The role of antioxidant activities are basically played by this compound. However, its quantity decreases along with the fermentation process. This research will evaluate the amount of pyrogallol (the moiety in catechins) that present in different types of tea. Pyrogallol showed to have the highest antioxidant and antitumor properties in previous studies. The methods involved were Thin Layer Chromatography (TLC) and chemiluminescence assay. Therefore, qualitative observation was applied, instead of quantitative measurement. From the results, pyrogallol could be detected using TLC in Twinning Lotus Green Tea. In addition, chemiluminescence reaction showed very weak luminescence intensity of red color solution in green tea.

# TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	i
ABSTRACT	ii
TABLE OF CONTENT	iii
LIST OF TABLES	iv
LIST OF FIGURES	v
LIST OF ABBREVIATIONS	vi
<b>CHAPTER ONE: INTRODUCTION</b>	
1.1 History of Tea	1
1.2 Research Problem Statement	2
1.3 Objectives of the Study	6
1.4 Hypothesis of the Study	7
<b>CHAPTER TWO: LITERATURE REVIEW</b>	
2.1 Oxidative Stress in Human Body	8
2.2 Antioxidant Properties of Tea	8
2.2.1 Antioxidant Activity Based on Processes of the Tea	9
2.2.2 Antioxidant Activity Based on Different Brewing Method	15
2.2.3 Total Antioxidant Capacity (TAC) of Tea based on the Addition of Bovine Milk and Soya Milk	16
2.2.4 Antioxidant Properties of Fruit and Flavored Black Teas	18
2.2.5 Antioxidant Activity of Tea Infusion with some Herbs	21
2.3 Chemiluminescence Assay of Catechins in Tea	23
<b>CHAPTER 3: METHODOLOGY</b>	
3.1 Chemical and Materials	25
3.2 Extraction of Tea	26
3.2.1 For Thin Layer Chromatography (TLC)	26
3.2.2 For Trautz-Schorigin Reaction of Polyphenols	26
3.3 Thin Layer Chromatography (TLC) of the Tea Samples	26
3.4 Trautz-Schorigin Reaction of Polyphenols	27
<b>CHAPTER 4: RESULTS AND DISCUSSION</b>	
4.1 Thin Layer Chromatography (TLC)	28
4.2 Trautz-Schorigin Reaction of Polyphenols	33
<b>CHAPTER 5: CONCLUSION</b>	35
<b>GANTT CHART</b>	36
<b>REFERENCES</b>	37

# 1.0 INTRODUCTION

## 1.1 History of Tea

Tea has become one of the consumed beverages after water. It was widely cultivated in the Southeast Asia(Y.-L. Lin, Juan, Chen, Liang, & Lin, 1996; Wu, Xu, H  ritier& Andlauer, 2012). People have been drinking tea because of its advantages towards health as well as its unique taste and aroma (Zhang *et al.*, 2013). The ‘tea’ word itself brings several meaning such as a plant, a drink, a meal service, an agricultural good, an art or a dedicated pastime(Joliffe, 2003).

In this context, tea is referred as herb that is consumed in the form of tea by infusion. The infusion can be made by extraction of the plant parts such as leaves, seeds, fruits, flowers and roots. The extraction can be prepared either by brewing into hot or cold water (Aoshima, Hirata, & Ayabe, 2007; Oh, Jo, Cho, Kim,& Han, 2013). There are many types of plants that can be considered as tea that came from different species or family. For example common tea that people usually consume came from family Theaceae (*Camellia sinensis*). Other types of tea from different species and family that have been consumed are stated in **Table 1.1**.

**Table 1.1:** Different types of tea from different species and family (United States Department of Agriculture, 2013).

Tea	Family	Species
Common tea	Theaceae	<i>Camellia sinensis</i>
Lemongrass	Poaceae	<i>Cymbopogon citratus</i>
Chamomile	Asteraceae	<i>Matricaria inodora</i> <i>Chamaemelum nobile</i>
Screwpine (Pandanus leaves)	Pandanaceae	<i>Pandanus amaryllifolius</i>