

CHEMICAL COMPOSITION OF BOILED AND RAW *Muntingia calabura* LEAVES

ZULIYANA BINTI GHAZALI

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

JULY 2019

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF ABBREVIATIONS	vii
ABSTRACT	viii
ABSTRAK	ix
CHAPTER 1 INTRODUCTION	
1.1 Background of study	1
1.1.1 Natural product	1
1.1.2 Studies on <i>Muntingia calabura</i>	2
1.2 Problem statement	5
1.3 Significance of the study	6
1.4 Objectives of the study	6
CHAPTER 2 LITERATURE REVIEW	
2.1 Medicinal plant	7
2.2 Classification of phytochemical	8
2.3 Ethnomedicinal and pharmacological review for <i>Muntingia calabura</i>	9
2.4 Nutritional value for <i>Muntingia calabura</i>	12
CHAPTER 3 METHODOLOGY	
3.1 Materials	15
3.1.1 Raw materials	15
3.1.2 Chemicals and reagents	15
3.1.3 Apparatus	15
3.2 Methods	16
3.2.1 Preparation of plant extracts	16
3.2.2 Extraction of samples	17
3.2.3 Gas chromatography mass spectrum (GC-MS) analysis	17
3.2.4 Fourier-transform infrared (FTIR) Spectrophotometer	17
CHAPTER 4 RESULTS AND DISCUSSION	
4.1 GC-MS analysis for n-hexane extract of <i>Muntingia calabura</i> leaves	18

4.1.1	GC-MS analysis of n-hexane extract of boiled <i>Muntingia calabura</i> leaves	18
4.1.2	GC-MS analysis of n-hexane extract of soaked <i>Muntingia calabura</i> leaves	19
4.1.3	GC-MS analysis of methanol extract of boiled <i>Muntingia calabura</i> leaves	20
4.1.4	GC-MS analysis of methanol extract of soaked <i>Muntingia calabura</i> leaves	21
4.1.5	GC-MS analysis of petroleum ether extract of boiled <i>Muntingia calabura</i> leaves	22
4.1.6	GC-MS analysis of petroleum ether extract of soaked <i>Muntingia calabura</i> leaves	23
4.2	FTIR analysis for cold and hot liquid sample extract in different solvent of <i>Muntingia calabura</i> leaves	25
4.2.1	FTIR analysis of n-hexane extract of soaked and boiled <i>Muntingia calabura</i> leaves	25
4.2.2	FTIR analysis of methanol extract of soaked and boiled <i>Muntingia calabura</i> leaves	26
4.2.3	FTIR analysis of petroleum ether extract of soaked and boiled <i>Muntingia calabura</i> leaves	27
CHAPTER 5 CONCLUSION AND RECOMMENDATIONS		
3.1	Summary	28
3.2	Recommendations	29
CITED REFERENCES		30
CURRICULUM VITAE		33

LIST OF TABLES

Table	Caption	Pages
1.1	Taxonomy of <i>Muntingia calabura</i>	3
1.2	The vernacular names of <i>Muntingia calabura</i>	3
4.1	Phytochemical compounds in n-hexane extract of boiled <i>Muntingia calabura</i> leaves.	18
4.2	Phytochemical compounds in n-hexane extract of soaked <i>Muntingia calabura</i> leaves	19
4.3	Phytochemical compounds in methanol extract of boiled <i>Muntingia calabura</i> leaves.	20
4.4	Phytochemical compounds in methanol extract of soaked <i>Muntingia calabura</i> leaves	21
4.5	Phytochemical compounds in petroleum ether extract of boiled <i>Muntingia calabura</i> leaves	22

ABSTRACT

Human societies have been in close contact with their surroundings since the beginning of their formation and used the ingredients of the environment to obtain food and medicine. *Muntingia calabura* is one of the commonly used traditional medicines in Southeast Asia to treat fever, cold and headache due to the presence of bioactive compounds found on various parts of plant with potent biological activities such as antioxidant, anticancer, antibacterial, anti-inflammatory and more. The objective of this study is to determine the chemical composition in the leaves of *Muntingia calabura*. The present study involved the simple extraction methods by using soaked and boiled liquid sample. There were some compounds successfully isolated from the n-hexane, methanol and petroleum ether extract. The structures of the compounds were characterized by modern spectroscopic techniques such as FTIR and GC-MS and were compared with published data. GC-MS analysis of *Muntingia calabura* revealed the existence of compound that has antimicrobial activity, antibacterial activity and antitumor activity, which also exhibit antioxidant and can prevent cancer. The compound includes oleic acid, 14-Octadecenoic acid and Butylated hydroxytoluene. The Fourier Transform Infrared (FTIR) analysis shows the most prominent peaks at $\sim 2927\text{cm}^{-1}$, $\sim 2953\text{ cm}^{-1}$ and $\sim 3306\text{ cm}^{-1}$ which are represent carboxylic acid (stretching), alkanes (stretching) and hydrogen-bonded alcohols (phenol).