

**PHYTOCHEMICAL SCREENING, TOTAL PHENOLIC
CONTENT AND ANTIOXIDANT ACTIVITY OF
*Muntingia calabura***

NUR SYAFIQAH ATIKAH BINTI NAZHARUDDIN

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

JANUARY 2019

This Final Year Project Reported entitled “**Phytochemical Screening, Total Phenolic Content and Antioxidant Activity of *Muntingia calabura***” was submitted by Nur Syafiqah Atikah bt Nazaharuddin, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences, and was approved by

Dr. Noor Hidayah Pungot
Supervisor
B. Sc. (Hons.) Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
72000 Kuala Pilah
Negeri Sembilan

Nurul Huda Abdul Halim
Project Coordinator
B. Sc. (Hons.) Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
72000 Kuala Pilah
Negeri Sembilan

Mazni Musa
Head of Programme
B. Sc. (Hons.) Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
72000 Kuala Pilah
Negeri Sembilan

Date: _____

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	x
ABSTRAK	xi
CHAPTER 1 INTRODUCTION	
1.1 Background study	1
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 Muntingiaceae Family	7
2.2 <i>Muntingia calabura</i> species	8
2.3 Phytochemical screening of <i>Muntingia calabura</i>	10
2.4 Phytochemical constituents of <i>Muntingia calabura</i>	13
2.5 Biological Activities	14
2.5.1 Antioxidant activity	15
2.5.2 Cytotoxicity activity	17
2.5.3 Antiproliferative activity	17
2.5.4 Antiplatelet aggregation	17
2.5.5 Antibacterial activity	18
2.5.6 Antinociceptive activity	18
2.5.7 Anti-inflammatory activity	18
CHAPTER 3 METHODOLOGY	
3.1 Materials	19
3.1.1 Raw materials	19
3.1.2 Apparatus	19
3.1.3 Chemicals	19
3.1.4 Instrument	20
3.2 Methods	20

3.2.1	Plant collection	20
3.2.2	Plant extraction	20
3.3	Phytochemical Screening	21
3.3.1	Test for alkaloids (Wagner's Test)	21
3.3.2	Test for Steroids and triterpenes (Liebermann Burchard test)	21
3.3.3	Test for tannins (Ferric Chloride Test)	21
3.3.4	Test for reducing sugars (Fehling's Test)	22
3.3.5	Test for phenols (Ferric Chloride Test)	22
3.3.6	Test for saponins (Froth Test)	22
3.3.7	Test for flavonoids (Alkaline Reagent Test)	22
3.4	Determination of total phenolic content	23
3.4.1	Gallic acid preparation and its estimation	23
3.4.2	Sample preparation and its estimation	24
3.5	Antioxidant assay	24

CHAPTER 4 RESULTS AND DISCUSSION

4.1	Sample preparation of <i>Muntingia calabura</i> leaves	26
4.2	Extraction efficiency of <i>Muntingia calabura</i> leaves	26
4.3	Phytochemical screening of <i>Muntingia calabura</i> leaves	27
4.4	Total phenolic content of <i>Muntingia calabura</i> leaves	33
4.5	DPPH radical scavenging activity of <i>Muntingia calabura</i> leaves	35

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS

5.1	Conclusion	38
5.2	Recommendation	39

CITED REFERENCES	40
-------------------------	-----------

APPENDICES	45
-------------------	-----------

CURRICULUM VITAE	46
-------------------------	-----------

ABSTRACT

PHYTOCHEMICAL SCREENING, TOTAL PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY OF *Muntingia calabura*

The purpose of this study to identify and compare the phytochemical screening, total phenolic contents and antioxidant activity *Muntingia calabura* leaves using three different polarities of solvents (methanol, ethyl acetate and *n*-hexane) and give percent yield 8.96% (methanol), 6.42% (ethyl acetate) and 5.31% (*n*-hexane). The phytochemical screening was conducted using the established standard procedure. The methanolic extract revealed the presence of flavonoids, phenols, steroids, triterpenes, tannins, reducing sugars and saponins. The total phenolic content and the antioxidant activity of the extracts were determined using Folin-Ciocalteu method and DPPH radical scavenging assay, respectively. The total phenolic content for the methanol, ethyl acetate and *n*-hexane extracts were 8.20, 4.42 and 2.80 mg GAE/g, respectively. High total phenolic content was revealed in methanolic extract. The DPPH radical scavenging assay test showed that all the solvent extracts has an antioxidant activity. The methanol extract has the highest antioxidant activity compared to ethyl acetate and *n*-hexane extracts. In conclusion, the methanol extract has given the significant IC₅₀ 167.70 µg/mL when compare with positive control (ascorbic acid).