

**STUDY ON CHEMICAL CONSTITUENTS OF *Piper sarmentosum*  
STEMS**

**INTAN MUNIRAH BINTI AMRAN**

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

**JULY 2017**

This Final year Project Report entitled “**Study on Chemical Constituents of *Piper sarmentosum* Stems**” was submitted by Intan Munirah Binti Amran, 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. Ropisah Binti Me  
Supervisor  
B. Sc. (Hons) Chemistry  
Faculty of Applied Sciences  
Universiti Teknologi MARA  
72000 Kuala Pilah  
Negeri Sembilan

---

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

---

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

Date : \_\_\_\_\_

## TABLE OF CONTENTS

	<b>Page</b>
<b>ACKNOWLEDGEMENTS</b>	iii
<b>TABLE OF CONTENTS</b>	iv
<b>LIST OF TABLES</b>	vi
<b>LIST OF FIGURES</b>	vii
<b>LIST OF ABBREVIATION</b>	ix
<b>ABSTRACT</b>	x
<b>ABSTRAK</b>	xi
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background of Study	1
1.2 Problem Statement	4
1.3 Significance of Study	5
1.4 Objectives of Study	7
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Herbal Medicine	8
2.2 <i>Piper</i> Species	9
2.2.1 Uses and Benefits of <i>Piper</i> Species	11
2.2.2 Chemical Component of <i>Piper</i> Species	13
2.3 <i>Piper sarmentosum</i>	16
2.3.1 Uses and Benefits of <i>Piper sarmentosum</i>	17
2.3.2 Chemical Components of <i>Piper sarmentosum</i>	18
<b>CHAPTER 3 METHODOLOGY</b>	
3.1 Materials	22
3.1.1 Raw Materials	22
3.1.2 Chemicals	22
3.1.3 Apparatus	22
3.2 Extraction of Powdered <i>Piper sarmentosum</i> Stems	22
3.3 Thin Layer Chromatography (TLC) Analysis	24
3.4 Isolation of Chemical Constituents	25
3.5 Characterization of Isolated Chemical Constituents	25
3.5.1 Ultraviolet-Visible Spectroscopy (UV-Vis)	26
3.5.2 Fourier Transform Infrared Spectroscopy (FTIR)	27
3.5.3 Gas Chromatography-Mass Spectrometry (GC-MS)	28

<b>CHAPTER 4 RESULTS AND DISCUSSIONS</b>	
4.1 Extraction of Stems of <i>Piper sarmentosum</i>	29
4.2 Thin Layer Chromatography Analysis	32
4.3 Isolation of Chemical Constituents	36
4.4 Characterization of Isolated Chemical Constituents	38
4.4.1 Ultraviolet-Visible Spectroscopy (UV-Vis) Analysis	38
4.4.2 Fourier Transform Infrared Spectroscopy (FTIR) Analysis	39
4.4.3 Gas Chromatography-Mass Spectroscopy (GC-MS) Analysis	42
<b>CHAPTER 5 CONCLUSION AND RECOMMENDATIONS</b>	
5.1 Conclusion	45
5.2 Recommendations	46
<b>CITED REFERENCES</b>	48
<b>APPENDICES</b>	51
<b><i>CURRICULUM VITAE</i></b>	55

## ABSTRACT

### STUDY ON CHEMICAL CONSTITUENTS OF *Piper sarmentosum* STEMS

*Piper sarmentosum* or commonly called 'kaduk' in Malaysia is belong to Piperaceae family. It is well known as the traditional medicinal herbs because it contains a variety of active chemical constituents. This study describes the extraction, isolation and characterization of the chemical constituents from stems of *P. sarmentosum*. The stems of *P. sarmentosum* were collected at village area around Perak, Malaysia. The stems of *P. sarmentosum* were extracted by hexane solvent followed by chloroform solvent and ethanol solvent. Each extracts were concentrated and yielded 2.49% of hexane crude extract, 1.84% of chloroform crude extract and 4.03% ethanol crude extract. The qualitative analysis of these extracts was done by using Thin Layer Chromatography (TLC) technique in order to observe the separation of the chemical compounds in the extracts. Ethanol crude extract was chosen to undergo the isolation process by using Column Chromatography (CC) technique as it showed the best separation of the chemical compounds. The chemical constituents isolated from ethanol crude extract were characterized using Ultraviolet-Visible (UV-Vis) Spectroscopy, Fourier Transform Infrared (FTIR) Spectroscopy and Gas Chromatography-Mass Spectrometry (GC-MS). Based on spectroscopy analysis, the isolated chemical constituents from ethanol extract of *P. sarmentosum* stems were probably identified as 3-(4-methoxyphenyl) propionic acid and chaplupyrrolidone.