

**REVIEW ON CHEMICAL COMPOSITION OF ESSENTIAL OIL FROM  
PIPERACEAE AS BIO-PESTICIDE**

**NINA ASQALANI BINTI ABDULLAH**

**Final Year Project Report Submitted in  
Partial Fulfilment of the Requirements for the  
Degree of Bachelor of Science (Hons.) Plantation Technology and Management  
in the Faculty of Plantation and Agrotechnology  
Universiti Teknologi MARA**

**JANUARY 2020**

## ACKNOWLEDGEMENTS

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Alhamdulillah and praise to Allah for His mercy, endless blessings and the opportunity that He gave me in order to complete and finished my final year project report. Preparing this report is very important to me in order to complete my Bachelor of Science (Hons.) Plantation Technology and Management program.

I would like to express my gratitude to my supervisor, Dr. Wan Zuraida binti Wan Mohd Zain, who had guided and helped me in completing this report despite her busy schedules.

I also would like to address my gratitude to Miss Nurul Wahida binti Hani, who had helped me by giving me advices as my supervisor was on leave. I also would like to express my sincere thanks to my family members who support me in many aspects especially in terms of financial and morale support.

Finally, I would like to dedicate my special appreciation to everyone who helped me either direct or indirectly in completing my final year project. Thank you

**NINA ASQALANI BINTI ABDULLAH**

## TABLE OF CONTENTS

	<u>Page</u>
<b>ACKNOWLEDGEMENTS</b>	iii
<b>TABLE OF CONTENTS</b>	iv
<b>LIST OF FIGURES</b>	v
<b>LIST OF TABLES</b>	vi
<b>LIST OF ABBREVIATIONS</b>	vii
<b>ABSTRACT</b>	viii
<b>ABSTRAK</b>	ix
<b>1.0 INTRODUCTION</b>	1
1.1 Problem statement	2
1.2 Significance of study	2
1.3 Objective of study	3
<b>2.0 PIPERACEAE</b>	4
2.1 Botany	7
2.2 Application	9
2.2.1 <i>Piper nigrum</i>	10
2.2.2 <i>Piper betle L.</i>	16
2.2.3 <i>Piper sarmentosum Roxb.</i>	17
2.2.4 <i>Piper dilatatum, Piper divaricatum, Piper aff. Hispidum, Piper sanctifelicis</i>	18
2.2.5 <i>Piper guineense</i>	21
<b>3.0 ESSENTIAL OIL</b>	23
3.1 Essential Oils application	24
3.2 Essential Oils Chemical Compound & Structure	25
<b>4.0 BIO-PESTICIDE</b>	29
<b>5.0 CONCLUSION &amp; RECOMMENDATION</b>	31
<b>CITED REFERENCES</b>	33
<b>APPENDIX</b>	39
<b>CURRICULUM VITAE</b>	52

## LIST OF FIGURES

<b><u>Figure</u></b>	<b><u>Caption</u></b>	<b><u>Page</u></b>
2.1.1	<i>Piper nigrum</i> tree	7
2.2.1.1	Chemical substances derived from black pepper	14
2.2.4.1	Chemical composition of the essential oils	20
4.1	Chemical structures found in essential oil	30

## ABSTRACT

Essential oil (EO) extracted from plants had helped to reduce the usage of synthetic pesticides. The chemical components in EO mainly consist of alkaloid which is piperine that is responsible for most of the biological properties of the EO itself. Besides that, monoterpenes and sesquiterpenes are among the major components in EO. Piperaceae has been reported to have many biological properties such as antimicrobial, insecticidal, larvicidal which can be used as bio-pesticide. The percentage of components identified depends on place of origin, climate, plant species, and plant parts used to extract EO. The activities of EO are related to the functional groups for each of the chemical components, the possibility of synergistic interactions between those components, chemical configurations of the components and proportions in which the EO is present. Since the technology has become more advanced, people started to replace the synthetic pesticide with bio-pesticide. The demand for EO has increasing as it has biological properties that can be uses to replace synthetic pesticide.

*Keywords: Chemical component, Essential oil, Piperaceae, Bio-pesticide*