

UNIVERSITI TEKNOLOGI MARA

**LARVICIDAL ACTIVITIES OF *Mentha piperita*
(PEPPERMINT) ESSENTIAL OIL AGAINST
*Aedes albopictus***

NUR ALIA BINTI JAMANHURI

Project submitted in fulfilment of the requirements for
the degree of
**Bachelor of Medical Laboratory Technology
(Hons.)**

Faculty of Health Sciences

DECLARATION BY STUDENT

I hereby declare that this thesis entitled “Larvicidal activities of *Mentha piperita* (peppermint) essential oil against *Aedes albopictus*” is my original work and has not submitted previously or currently for any other degree at UiTM or any other institutions.

Student’s signature:

.....

(Nur Alia Binti Jamanhuri)

2015230206

960816-10-5138

Date:

ACKNOWLEDGEMENT

Firstly, all praises to Allah for His graces, mercy, good health, strength and blessing in completing this final year project according given time frame. I have put a great effort to accomplish this project. However, this project would not have been completed without support and help from many individuals. It is my pleasure to acknowledge to all those who were involved and provided possibility for completion my project.

I would like to express my deepest appreciation and gratitude to my dearest final year project supervisor, Dr. Siti Nazrina Camalxaman for the constant support, motivating words and patient guidance and continual supervision throughout the entire research process. I am very grateful to be under her supervision and a big thank you for the willingness to provide feedback at all points in my research project. Moreover, she always inspired me for completing this project and I extremely appreciate all of her cares, concerns, loves, patience and entrust me.

Next, I would like to acknowledge to the Head of Centre of Medical Laboratory Technology, Dr. Nazri Bin Abu, to all lecturers, especially to my co-supervisors, Dr. Nazri Che Dom from Centre of Environment and Safety and Dr. Salfarina Binti Ramli from Department of Pharmaceutical, Pharmacology and Chemistry, Faculty of Pharmacy for providing me the materials, equipment and facilities to conduct this project. Not forgotten to clinical instructor En. Muhammad Nor Fadhli and research assistant, Nur Athen Binti Mohd Hardy from Centre of Environment and Safety and laboratory staff for the guidance and commitments their given in completing this project.

I am hugely indebted to my group members, Nor Sazaliza Ismail, Muhamad Aqil Arif Zaharinuddin and Nik Mohamed Adzfar Mohamed Resli for giving me hand and share their knowledge throughout the research process. I am very grateful to have them as my group members.

I am express my deepest gratitude and special thanks to my beloved family for unflinching support and continuous encouragement in finishing this project. I am very grateful and would like to thank Muhammad Amirull Asyraf for helping me a lot in completing this project. Special thanks to all my friends who always support and cheer me when I am having problem in my research project.

Lastly, for those who have not been mentioned but had given directly and indirectly contribution during this project, I would like to say thank you so much for helping me to finish this final year project.

TABLE OF CONTENTS

TITLE PAGE	i
DECLARATION BY STUDENT	ii
INTELLECTUAL PROPERTIES	iii
APPROVAL BY SUPERVISOR	vi
ACKNOWLEDGEMENT	vii
TABLE OF CONTENTS	viii
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST ABBREVIATIONS	xvi
ABSTRACT	xviii
CHAPTER 1	1
INTRODUCTION	1
1.1 Background of the Study	1
1.2 Problem statement	4
1.3 Research objectives	5
1.4 Scope and limitation of study	5
1.5 Significance of the study	6

ABSTRACT

LARVICIDAL ACTIVITIES OF *Mentha piperita* (PEPPERMINT) ESSENTIAL OIL AGAINST *Aedes albopictus*

Dengue is a mosquito-borne viral-borne disease that is transmitted by female *Aedes* mosquitoes. The excessive use of synthetic insecticides has caused the evolution, development and spread of insecticide resistance in dengue vectors including *Aedes albopictus*. This can be tackled using alternative methods of mosquito control based on botanical products such as *Mentha piperita* (peppermint). The rationale of this study was to determine the efficacy of *Mentha piperita* as an organic larvicide by evaluating the mortality rate and lethal concentration (LC₅₀ and LC₉₀) of its essential oil against *Aedes albopictus*. Mosquitoes were reared in an insectary and larvae at 3rd instar were used. Essential oil was obtained using hydro-distillation method with a Clevenger apparatus and acetone as a solvent. The mortality rate was determined following 24 and 48 hours' exposure to 5 different test concentrations (100, 150, 200, 250 and 300 ppm) alongside 10% (v/v) of acetone (quality control), temephos (positive control) and distilled water (negative control). Data was analyzed using Probit analysis and analysis of variance (ANOVA). The highest mortality rates achieved was 93% when exposed to 250 ppm concentration of essential oil. LC₅₀ and LC₉₀ values were observed at 177.243 ppm and 290.363 ppm respectively. The results showed significant differences from the values obtained ($p = 0.000$). Findings from this study concludes the potential of *Mentha piperita* essential oil as an efficient larvicide agent. Further isolation and purification of phytochemical compounds is warranted to determine the bioactive compounds responsible for its bioactivity.

Keywords: *Mentha piperita*, peppermint, larvicidal assay, *Aedes albopictus*, essential oil