UNIVERSITI TEKNOLOGI MARA

LARVICIDAL ACTIVITIES OF *Citrus hystrix* (KAFFIR LIME) LEAF EXTRACT AGAINST *Aedes albopictus*

NIK MOHAMED ADZFAR BIN MOHAMED RESLI

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

Faculty of Health Sciences

July 2019

DECLARATION BY STUDENT

I, hereby, declare that the work in this thesis was carried out in the accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

Student's signature:

……..

(Nik Mohamed Adzfar Bin Mohamed Resli)

2014240856

950123-11-5115

Date: ……..

ACKNOWLEDGEMENTS

بِسْمِ اللهِ الرَّحْمٰنِ الرَّحِيْمِ

Alhamdulillah, thank you to Allah S.W.T the Almighty, He who gave me the blessing, guidance, strength, idea and capability to complete the research and, salawat and salaam to the beloved prophet Muhammad S.A.W.

First and foremost, I would like to express my deepest gratitude to my supervisor, Dr. Siti Nazrina Camalxaman for her guidance, advice, help, knowledge and encouragement towards the completion of this study despite of her busy working schedule. I also would like to give my biggest appreciation to Dr. Nazri Che Dom and Dr. Salfarina Ramli as my co-supervisor for all their useful comments and suggestions for improvement throughout this research. The extent of my gratitude is to the lecturers and staffs from Centre of Medical Laboratory Technology Department and Centre of Environmental Health and Safety who are always there to assist and support me in completing the research.

My gratefulness is to the staff from Centre of Environmental Health and Safety for granting me permission to carry out this research in the Vector Control Research Centre and Disease insectarium. Last but not least, I would like to express my gratitude to my parents, Mr. Mohamed Resli Bin Ismail and Mrs. Noraini binti Ismail, and my family members for the prayer, support and encouragement for me to complete this research.

Finally, I would like to thanks all my beloved group mates; Nur Alia Binti Jamanhuri, Muhammad Aqil Arif Bin Zaharinuddin, and Nor Sazaliza Binti Ismail for the help, comments, suggestions, assistance and supports throughout this research. And to those who have been contributing to the completion of this project directly and indirectly, may Allah bless and reward them with good achievement.

TABLE OF CONTENTS

ABSTRACT

Aedes mosquitoes are widespread, and mosquito control efforts are essential to prevent outbreaks of many arboviruses such as dengue, zika and chikungunya. At present, chemical insecticides are often utilised for this purpose, which can cause long term environmental effects and the evolution of resistance if not controlled. This study was conducted to determine the efficacy of *Citrus hystrix* (kaffir lime) leaf extract act as a natural alternative larvicide to substitute the use of chemicals. The method of extraction used was maceration digestion. It is a modified form of maceration which involves drying, crushing, soaking with gentle heat and removal of solvent to obtain a pure crude extract. A total 25 larvae were used to test against five (5) different concentrations (50, 40, 30, 20 and 10 ppm) of *Citrus hystrix* for 24 - 48 hrs and evaluated in terms of mortality rates. Experimental tests were conducted in triplicate and analysed using probit analysis and analysis of variance (ANOVA). Three types of control were used in tandem namely positive (11 mg abate), negative (distilled water) and quality control (10% (v/v) solvent) to ensure the reliability of the test results. Findings revealed 100% effectiveness at 50 ppm. LC_{50} and LC_{90} were determined at 20.87 ppm and 35.27 ppm, respectively. Results indicate that *Citrus hystrix* leaf extracts have great potential to replace the use of chemicals as a larvicidal agent as it only requires a low concentration to kill more than 90% of the larvae. The concentration needed is much lower compared to other plants for the same purpose. Further studies are required to elucidate the bioactive compound responsible for the larval death.

Keyword: *Aedes albopictus*, *Citrus hystrix*, kaffir lime, larvicide, maceration