UNIVERSITI PUTRA MALAYSIA

TOXICITY OF SELECTED INSECTICIDES ON EPILACHNA INDICA (COLEOPTERA: COCCINELLIDAE: EPILACHNINAE)

MOHD IBNUR SYAWAL BIN ZAKARIA

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By

MOHD IBNUR SYAWAL BIN ZAKARIA

A project report submitted to the Faculty of Agriculture, Universiti Putra Malaysia, in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agriculture Science

Faculty of Agriculture

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CERTIFICATION FORM

This project report entitled Toxicity of Selected Insecticides on *Epilachna indica* (Coleoptera: Coccinellidae: Epilachninae) is prepared by Mohd Ibnur Syawal Bin Zakaria and submitted to the Faculty of Agriculture, Universiti Putra Malaysia in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

Student's name: Student's signature:

MOHD IBNUR SYAWAL BIN ZAKARIA .....

Certified by:

.....

(PROF. DR. DZOLKHIFLI BIN OMAR)

Project Supervisor,

Department of Plant Protection,

Faculty of Agriculture,

University Putra Malaysia.

Date: .....

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TABLE OF CONTENTS

ABSTRACT

Epilachna indica (Coleoptera: Coccinellidae: Epilachninae) is a twelve spotted lady bird beetle and a serious pest of vegetables. The phytophagous ladybird beetle attacks various vegetable families such as Solanaceae, Cucurbitaceae and Fabaceae. A study was conducted to evaluate the toxicity of selected insecticides against the larvae of *Epilachna indica*. Very few information is available on the toxicity of commonly use insecticides in vegetables against this insect. The types of conventional insecticide used in this research were deltamethrin, cypermethrin, spinosad and fipronil. The bioassays was conducted using the leaf of *Luffa acutangula* dipped in difference concentrations of insecticide (100 ppm, 50 ppm, 25 ppm, and control) and exposed on the insect. The minimum of five replicates was used and mortality was recorded after 24, 48 and 72 hours. The data was analyzed using probit and ANOVA with means separation by Tukey. The most toxic insecticide identified and the order of toxicity was deltamethrin more toxic than cypermethrin, spinosad and fipronil. The LC_{50} of deltamethrin and cypermethrin after 72 hours was 5.53 ppm and 6.45 ppm respectively.

ABSTRAK

Epilachna indica (Coleoptera: Coccinellidae: Epilachninae) ialah kumbang kura-kura yang mempunyai dua belas bintik dibelakangnya dan perosak yang serius bagi pelbagai keluarga sayur-sayuran seperti Solanaceae, Cucurbitaceae dan Fabaceae. Kajian dilakukan untuk melihat ketoksikan racun serangga yang terpilih terhadap larva Epilachna indica. Sangat sedikit maklumat boleh didapati mengenai ketoksikan racun serangga yang biasa digunakan dalam sayur-sayuran terhadap serangga ini. Pelbagai jenis racun serangga konvensional digunakan dalam kajian ini iaitu deltamethrin, cypermethrin, spinosad dan fipronil. Bioassei dijalankan menggunakan daun Luffa acutangula yang dicelup ke dalam kepekatan racun serangga yang berbeza (100 ppm, 50 ppm, 25 ppm, dan kawalan) dan didedahkan pada serangga.. Minimum lima replikasi digunakan untuk menganalisis dan kematian larva direkodkan selepas 24, 48 dan 72 jam. Data dianalisis menggunakan probit dan ANOVA serta pemisahan 'mean' adalah tertakluk kepada Tukey. Racun serangga yang paling toksik dikenal pasti dan urutan ketoksikan adalah deltamethrin lebih toksik daripada cypermethrin, spinosad dan fipronil. LC50 untuk deltamethrin dan cypermethrin selepas 72 jam masing-masing adalah 5.53 ppm dan 6.45 ppm.

LIST OF TABLE

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Coccinellidae is the biggest with more than 6000 species distributed around the world and monetarily most essential cucujoid family (Slipinski & Tomaszewska, 2010). Although commonly known as aphid predators, the diet of coccinellids is very diverse and include various instars of bugs, scale insects, psyllids, whiteflies, beetle and moth larvae, spider mites and ants. This type of beetle is very useful as beneficial insects which feed on the pest of crop. But some group eat pollen, fungi and plant tissue and are pest especially in the tropics (Giorgi *et al.*, 2009). The Epilachninae is the subfamily of Coccinellidae where the beetles are phytophagous habit which has similar mouthparts in both adults and larvae. One species of pest to the crops is *Epilachna indica.* The species can cause damage to crop family of Solanaceae, Cucurbitaceae and Fabaceae such as eggplant, tomato, melon, potato, legumes, pumpkin and cucumber (Asafuddaulah, 2012)

The vegetable crop is important in main crop productions. The damage and injury make by larvae and adult feeding can cause yield loss quantity and quality. Thus pest management is important to control the *E. indica* insect pest to optimize the production of the crops. They are several ways to control the pest such as physical and mechanical control, cultural control, biological control and chemical cultural. The chemical control is the last choice because it can affect the environment.

Nevertheless it is the easy, reliable and fast to archive result of controlling insect pest.

The insecticides that are commonly used in field control of insect pest include organophosphate, pyrethroid, malathion, amitraz, imidacloprid, penylparazole and many others. Each pesticide has its own active ingredients (a.i.) that can kill or inhibit the development of pest. The different of insecticide has its own market price and effectiveness, all of these are influenced by many factors such as percentage of active ingredients, the concentration applied, time of application and others. Thus, this experiment was conducted to evaluate the toxicity of selected insecticide such as cypermethrin, deltamethrin, spinosad and fipronil against *Epilachna indica.*

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