



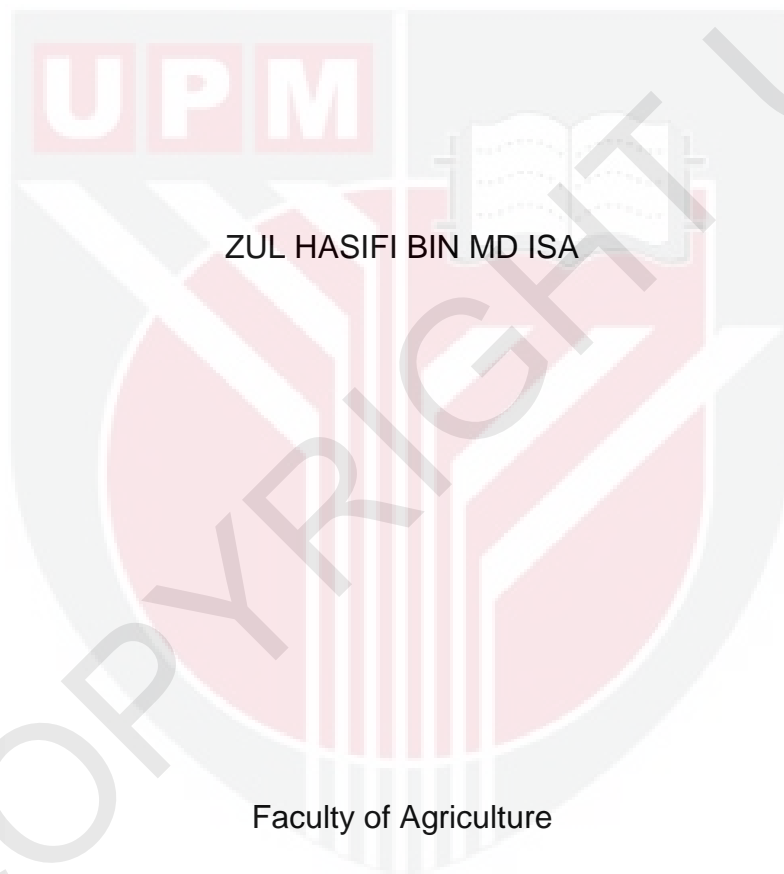
**UNIVERSITI PUTRA MALAYSIA**

**MARIGOLD (*TAGETES ERECTA*) EXTRACT AS POTENTIAL  
BOTANICAL PESTICIDE AGAINST PEST OF GREEN AMARANTH  
(*AMARANTHUS TRICOLOR*) VEGETABLE CROP**

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**FP 2017 67**

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By

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(Final Year Project) for the award of the degree of Bachelor of Agricultural  
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Faculty of Agriculture

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2016/2017

CERTIFICATION FORM

This project paper entitled Marigold (*Tagetes erecta*) extract as potential botanical pesticide against pest of green amaranth (*Amaranthus tricolor*) vegetable crop, is prepared by Zul Hasifi bin Md Isa and submitted to Faculty of Agriculture in fulfilment of the requirement of PRT 4999 (Final Year Project) for the award of degree of the Bachelor of Agricultural Science.

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## ABSTRACT

Green amaranth (*Amaranthus tricolor*) is considered to be the most popular vegetable in Malaysia but some of it is exposed to the excessive amount of chemical pesticide to improve the quality and yield. The most harmful pest which can reduce the quality of these vegetables is an armyworm (*Spodoptera litura*). This pest feeds on the leaves which later can reduce the quality. The current method used to control this pest is by using chemical pesticide cypermethrin. The introduction of botanical pesticide to these vegetables may reduce the amount of toxicity which is harmful for human consumption and increase the quality and yield of these vegetables. There are many kinds of botanical pesticide that are available to control the insect pest population and some of it may be more effective than the others. The marigold (*Tagetes erecta*) extract is one type of known botanical insecticides. The objective is to test the effectiveness of Marigold as botanical pesticide in controlling armyworm and to determine the precise dosage of marigold extract to control army worm in amaranth plants. The project was carried out by setting potted plants of amaranth in polyethylene bags in the field. Each potted plant was assigned randomly a treatment dosage based on five treatments. The first treatment is the control where water was used as the spray. The treatment of marigold paste extract were 50g, 150g, and 200g were dissolved in 500mL of water and was used to spray on green amaranth. Treatments will be applied weekly. Plant growth and development of amaranth will be monitored weekly. The expected result would probably be the potential use of marigold paste extract as botanical pesticide in controlling pest on green amaranth. Comparison of results among treatment dosage might give the right dosage of marigold paste extract as botanical pesticide.



## ABSTRAK

Bayam hijau (*Amaranthus tricolor*) adalah dianggap sebagai sayur-sayuran yang paling popular di Malaysia tetapi masih ada segelintir yang terdedah kepada racun perosak kimia dalam jumlah yang berlebihan untuk meningkatkan kualiti dan hasil. Perosak paling berbahaya yang boleh mengurangkan kualiti sayur-sayuran ini adalah ulat ratus (*Spodoptera litura*). Perosak ini memakan daun yang akan mengurangkan kualiti dan hasil. Kaedah semasa digunakan untuk mengawal perosak ini adalah dengan menggunakan racun perosak bahan kimia cypermethrin. Penggunaan racun perosak botani untuk sayur-sayuran boleh mengurangkan jumlah keracunan yang berbahaya untuk manusia di samping meningkatkan kualiti dan hasil sayur-sayuran. Terdapat banyak jenis racun perosak botani yang terdapat di pasaran untuk mengawal populasi serangga perosak dan mungkin ada yang lebih berkesan daripada yang lain. Ekstrak pokok marigold (*Tagetes erecta*) adalah salah satu jenis racun serangga botani yang dikenali. Matlamat projek ini adalah untuk menguji potensi Marigold sebagai racun perosak botani yang dapat mengawal serangga perosak dan untuk mengetahui ekstrak dos marigold yang tepat untuk serangga perosak dalam pokok bayam hijau. Projek ini akan dilaksanakan dengan menanam pokok bayam hijau ke dalam beg polietilena di lapangan ladang. Setiap pokok akan diberikan dos secara rawak berdasarkan lima rawatan. Rawatan pertama adalah dimalarkan di mana air akan digunakan sebagai semburan. Tiga dos yang berbeza ekstrak pes marigold iaitu 50g, 150g, 200g akan dilarutkan ke dalam 500mL air dan akan digunakan sebagai semburan pada bayam hijau. Rawatan akan digunakan setiap minggu. Pertumbuhan tumbesaran pokok bayam hijau akan dipantau setiap tiga hari. Keputusan yang diharapkan adalah kemungkinan boleh menggunakan ekstrak pes marigold sebagai

racun perosak botani dalam mengawal serangga perosak pada bayam hijau. Keputusan antara dos rawatan yang berbeza mungkin dapat memberikan dos yang tepat ekstrak pes marigold sebagai racun perosak botani yang berkesan.



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## CHAPTER 1

### INTRODUCTION

Botanical pesticide is very effective in the agricultural pest control without causing serious harm to ecological chain or worsening environmental pollution (Leng, 2011). The usage of botanical pesticide can ensure the safety of the environment which is worsen in the last decades. The effectiveness of botanical pesticide however is different in type of pest affected. Botanical pesticide is mainly derived from plant which exhibit phytochemical that can repel or kill certain pest. There are lot of research of plant that being identified that some plant has these phytochemicals. Many kinds of botanical pesticide that are available to control the insect pest population and some of it may be more effective than the others. Botanical pesticide falls into two major categories, botanical and microbial. Botanical pesticides are naturally occurring plant substances that are used for managing pest, while microbial pesticides contain microorganism or their derivatives with deleterious effects on insect pest.

*Tagetes erecta* are also known as African marigold are one of the plants that have phytochemical properties. This marigold flower is typically grown as ornamental plant in certain place because of beautiful inflorescence. This plant also can be intercropped with other plant to suppress nematode. The key mode by which marigolds suppress plant-parasitic nematodes is through a biochemical interaction known as allelopathy. Allelopathy is a phenomenon where a plant releases compounds that are toxic to other plants, microorganisms, or other organisms, such

as nematodes (Hui Wang, 2007). Thus, plant with problem of nematode infestation can be intercropped with marigold.

*Spodoptera litura* known as armyworm is a major polyphagous pest, infects more than 180 plant species which includes various economically important crops such as cotton, groundnut, chilly, tobacco, castor, bean and pulses etc. (Dhir et al., 1992; Armes et al. 1997; Niranjankumar and Regupathy, 2001). This pest eats leaf of the plant which eventually can cause economic injury in many types of crops. Without usage of pesticide the crop will have serious damage and the plant will finally die. The current method used to control this pest is by using chemical pesticide cypermethrin. Cypermethrin is a broad-spectrum insecticide, which means it kills beneficial insects as well as the targeted insects. Also, resistance to cypermethrin has developed quickly in insects that exposed frequently and can render it ineffective.

*Amaranthus tricolor* or green amaranth are one of the most planted in this country. The planted area is 4,386 ha and the value of production is RM 69,236.00 in the year 2014 based on Department of Agriculture, Malaysia. Which means this crop was proven to have significant amount of value for this country. This crop need an improvement in its yield and quality due to the pest attack that can reduce their yield and quality. The crop harvesting time only take about 4 to 5 weeks after seed being germinated.

The experiment conducted to access the comparison of different dosage of marigold plant at different concentration to control pest on green amaranth. Different concentration may give different effectiveness to pest on green amaranth crop. The recommended dosage was determined based on this experiment. The use of botanical pesticide affects the leaf area and plant height subjected to different dosage of marigold extract of *Tagetes erecta*

The general objective of this study is to determine the effect of marigold plant extract against pest on green amaranth plant host

1. To test the efficiency of Marigold as botanical pesticide in controlling pest *A. tricolor*
2. To determine the precise dosage of *T. erecta* extract to affecting plant height and leaf area of *A. tricolor*.



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