UNIVERSITI PUTRA MALAYSIA

PRELIMINARY STUDY OF THE ANTIFUNGAL ACTIVITY OF FERMENTED PLANT EXTRACT AGAINST *Metarhizium anisopliae, Beauveria bassiana* AND *Isaria fumosorosea*

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A project report submitted to 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

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CERTIFICATION

This project report entitled **"Preliminary study of the antifungal activity of fermented plant extracts against *Metarhizium anisopliae*, *Beauveria bassiana* and *Isaria fumosorosea*"** is prepared by Wan Nur Imaan Safiya binti Wan Zulkifli (175108) and submitted to the Faculty of Agriculture in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

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LIST OF ABBREVIATION

FPE	Fermented Plant Extract
MK	*Murraya koenigii*
EE	*Etlingera elatior*
CC	*Cymbopogon citratus*
CL	*Citrullus lanatus*
MIX	*Mixed fruit peels*
MA	*Metarhizium anisopliae*
BB	*Beauveria bassiana*
IF	*Isaria fumosorosea*

ABSTRACT

Widespread use of chemical pesticides such as fungicides represents a potential risk to human and the environment. Therefore, the search for alternative strategies in pest control is timely to overcome this problem. One of the most important control is biological control using entomopathogenic fungi. In order to preserve entomopathogenic fungi in nature, control measures should be developed and one of the way is to use fermented plant extracts such as from curry leaves, kantan, serai wangi and watermelon. This preliminary study was carried out to evaluate the effect of fermented plant extracts (FPE) against entomopathogenic fungi. Five different FPE and three types of entomopathogenic fungi were used in the study. Results were obtained after five days incubation. Data collected were subjected to Analysis of Variance (ANOVA) and Tukey's HSD test were used for test of mean separation. There was no significant differences in diameter of inhibition zone and percentage inhibition of diameter growth (PIDG) from all five types of FPEs. The results from the preliminary study showed that all types of FPE were not good enough in suppressing growth of entomopathogenic fungi.

ABSTRAK

Penggunaan meluas racun perosak kimia seperti racun kulat menyebabkan kemungkinan risiko kepada manusia dan alam sekitar. Oleh itu, usaha mencari strategi alternatif dalam kawalan perosak adalah tepat pada masanya untuk mengatasi masalah ini. Salah satu kawalan yang paling penting adalah kawalan biologi menggunakan kulat entomopathogenic. Dalam usaha untuk memelihara kulat entomopathogenic dalam alam semula jadi, langkah-langkah kawalan perlu dibangunkan dan salah satu cara adalah dengan menggunakan ekstrak tumbuhan yang ditapai seperti daun kari, kantan, serai wangi dan kulit tembikai. Kajian awal telah dijalankan untuk menilai kesan ekstrak tumbuhan ditapai (FPE) terhadap kulat entomopathogenic. Lima jenis FPE dan tiga jenis kulat entomopathogenic telah digunakan dalam kajian ini. Keputusan telah diperolehi selepas lima hari projek dijalankan. Melalui analisis varians (ANOVA), hasil perbandingan menggunakan Tukey, didapati tidak ada perbezaan yang signifikan dalam diameter zon perencatan dan peratusan perencatan pertumbuhan diameter (PIDG) dari lima jenis FPEs. Hasil kajian awal menunjukkan bahawa semua jenis FPE tidak cukup baik dalam menghalang pertumbuhan kulat entomopathogenic.

CHAPTER 1

INTRODUCTION

Application of chemicals pesticides results in many harmful effects for environment such as pest resistance, resurgence of pests, emerging of secondary pests as number of predators and parasitoids and also the presence of chemical residues on agricultural products. Hence, these problems have brought to great demand for more selective and biocontrol methods as an alternative. Sajap *et al.* (2007) stated that one of the promising methods of insect controls is biological control. Biological control, particularly by entomopathogenic fungi, is important to reduce population of pests in Integrated Pest Management (IPM) programs. Entomopathogenic fungi such as *Metarhizium anisopliae, Isaria fumosorosea* and *Beauveria bassiana* are the part of nature that have a prospective to manage the pests without disturbing nature and are not harmful to life (Vey *et al*., 2001).

Entomopathogenic fungi, the common pathogen of soil-associating coleopterans such as the flea beetle, are promising agents for biological control and are gaining increasing attention worldwide as mycoinsecticides. As an example, the use of fungus as a biological control agent against flea beetle was first reported by Butt *et al.* (1992) when *M. anisopliae* isolate V90 was found to be pathogenic to the cabbage stem flea beetle, *Psylliodes chrysochephala*. Miranpuri and Kachatourians (1995) also reported the pathogenicity of *B. bassiana* against the cabbage flea beetle, *Phyllotreta cruciferae*.

Similarly, *M. anisopliae* isolate with high pathogenicity against *P. cochleariade* demonstrated little or no pathogenicity for *P. chrysocephala* (Butt *et al.,* 1992).

Compatibility of entomopathogens with other techniques of crop protection must be known as well in order to preserve entomopathogenic fungi that either occur naturally or are introduced for insect control. As an example, use of another type of insecticide instead of chemical such as botanical or plant-based.

It has been reported earlier that several plant extracts or bioenzyme such as watermelon peel (*Citrullus vulgaris*), curry leaves (*Murraya koenigii* L.), kantan leaves (*Etlingera elatior* Jack.), and lemongrass (*Cymbopogon citratus* L.) possess antifungal activity against plant pathogens. Thus, combination of entomopathogenic fungi with bioenzyme may provide more sustainable strategy to control pests. Therefore, it could be beneficial to determine the compatibility of bioenzyme with entomopathogenic fungi in order to maximize their combined efficacy. The study was carried out to evaluate the impact of bioenzyme against entomopathogenic fungi.

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