

UNIVERSITI TEKNOLOGI MARA

**EFFICACIES AND ANTIFEEDANT
ANALYSIS OF SELECTED
INSECTICIDES AGAINST *Sitophilus
oryzae* (COLEOPTERA:
CURCULIONIDAE)**

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ABSTRACT

The rice weevil, *Sitophilus oryzae* (Coleoptera; Curculionidae) is broadly spread all around the world. This stored pests can cause losses to grain in storage after harvesting process due to inaccurate application of insecticides used. The laboratory bioassay were conducted at the toxicology laboratory of University Putra Malaysia in order to evaluate the toxicity and the antifeedant activity of five insecticides which is Cypermethrin, Malathion, Prevathon, Rotenone and also Spinosad against the adult of *S.oryzae* by using the filter paper impregnation method and also food impregnation method. Thus, feeding deterrent index also were evaluated. In this experiment, *S. oryzae* from UPM's stock culture were reared for appropriate 45 days in order to have a new generation of adult emerge. For each insecticides, six different concentration were undergo serial dilution with eight replication were done in order to get the solution that were tested in this experiment. Hence, 10 adult of *S.oryzae* were used for each method and were evaluated for 1, 3, 5 and 7 days. Among all the insecticides, were found to be effectives in toxicity via filter paper impregnation method based on the LC₅₀ values was Rotenone with 0.003% while the other was 0.04%, 0.017%, 0.106% and 1.109% were indicated Spinosad, Malathion, Cypermethrin and Prevathon. The less effective was Prevathon. For the second method via food impregnation method showed that the effective insecticides was Spinosad with LC₅₀ values 0.001%. The lowest was Prevathon with LC₅₀ values 5.776%. In addition, the other insecticides showed LC₅₀ values was 0.003%, 0.05% and 0.875% which indicated Malathion, Cypermethrin and Rotenone. For the antifeedant activity via feeding deterrent index (FDI), it showed that, the lowest FDI was Spinosad with 0.535% while the highest was Rotenone with 1.756%. The other showed 0.63%, 0.869% and 0.949% indicated Malathion, Cypermethrin and Prevathon respectively. In this experiment, through the filter paper and food impregnation method showed that Spinosad with 0.04% and 0.001% is the effective insecticide to control this insect pest. The Feeding Deterrent Index (FDI) for Spinosad also gives the highest result. Hence, from this study, it can conclude that the most effective insecticides against adult of *S.oryzae* was Spinosad because able to control the insect at the prepared concentration in both method and also for FDI. However, the dosage of the insecticides can be increase in further study.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Majority people in the world regard rice as the second most widely grown cereal crop. In developing countries, most of the nation are counting on the rice for food calories and protein (IRRI, 2004). Hence, this rice (*Oryzae sativa* Linn.) is the most important crop and staple foods around the world's population. In Asia, world's rice is produced and consumed more than 90% every year (Spencer et al., 2009). For example, Thailand is one of the major rice exporter countries of the world, which is 70% of export good and values over 114,077 million baht a year (Agro-economic, 2007). The rice plant is vulnerable to many types of pests, from the seeds to the stored grains. The rice losses occur when milled grains are attacked by stored product insects and the most important one is the rice weevil (*Sitophilus oryzae* L.) (Coleoptera: Curculionidae). Damaging rice by the *S. oryzae* has seriously affected the availability of food for a large number of people worldwide (Adedire and Lajide, 2003). Without protection, the pests rapidly grow, develop, and damage the stored rice grains. The quality of rice grains is so poor that they do not meet the requirement for normal consumption, exportation, and industrial purposes (Campbell, 2008).

According to (Sarker et al., 2006), qualitative and quantitative decline of stored agricultural and animal origin products resulted from invasions of around 70 moths' species, 355 species of mites as well as more than 600 species of beetle pests. Research by (Haque et al., 2000) implies that this damage might reduce about 20-30% in tropical zone and 5 to 10% in the temperate zone. Other than that, study by (Lee et al., 2001) has found that matured weevil beetles eggs' can be discovered in rice kernels whereby they eventually feed on the rice (Lucas and Riudavets, 2002). To manage the pests during storing of rice, the usage of methyl phosphine (PH₃) and bromide (MeBr) may lead to several problems (Negahban et al., 2006). Consequently, new strategies on how to manage the pests should be develop in crop industries. For instance, based on (Huang and Ho, 1998) an extract from higher plants can produced a lot of natural pesticides. These type of products will give a lower toxicity to mammals as well as keep