EFFICACY TEST OF INSECTICIDES WITH THE ACTIVE INGREDIENTS EMAMECTIN BENZOATE, CHLORFENAPYR, INDOXACARB, AND THEIR MIXTURES IN CONTROLLING ARMYWORMS *Spodoptera frugiperda* J. E. Smith ON MAIZE

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ABSTRACT

Spodoptera frugiperda is an important pest can cause a decrease in productivity and even crop failure. Generally, farmers control *S. frugiperda* using chemical insecticides, Emamectin Benzoate, Chlorfenapyr, and Indoxacarb are active ingredients of insecticides that are commercially available and widely used by farmers. This study aims to determine the best insecticide active ingredients in controlling *S. frugiperda*, lethal time, efficacy test, leaves area consumed, and morphological changed. The study used a single-factor Complete Random Design method consisting of 6 treatments and 1 control with three replications. The treatment includes Control, P1 = Emamectin benzoate, P2 = Chlorfenapyr, P3 = Indoxacarb, P4 = Emamectin benzoate + Chlorfenapyr, P5 Emamectin Benzoate + Indoxacarb, P6 = Chlorfenapyr + Indoxacarb. The observation data was analyzed using Analysis of Variance (ANOVA) at a 5% significance level. Differences between control and treatment were analyzed using Orthogonal Contrast tests at a 5% significance level. The parameters observed included mortality rate, lethal time, leaves area efficacy test, and morphological changes in larvae exposed to insecticides. In the group of the dual active ingredient insecticides Chlorfenapyr + Indoxacarb sulted in the highest mortality rate and efficacy percentage. In the group of single active ingredients insecticide Emamectine Benzoate and Chlorfenapyr showed the best mortality rates and efficacy percentages. Both of single and combine active insecticide treatments has similar lethal time and leaves areas parameters. The morphology of the larvae has changes in the form of a size decrease, hardening of texture, and blackish brown colour changes after insecticide application.

Keywords: *Spodoptera frugiperda*, Emamectin benzoate, Chlorfenapyr, Indoxacarb