

CHAPTER 6

DISCUSSION

6.1 Discussion

This research was conducted in order to test the potential effect of red pepper (*Capsicum annum*) as an insecticide towards fire ants (*Solenopsis sp.*) by using spraying method. Red pepper, a natural material, was used in this study because it can be found easily in most parts of the world and it is affordable.

In this experiment, 15 fire ants were placed in each of five containers and one of the three different concentrations (10%, 15%, 20%) of red pepper extract, Malathion 0.28% (positive control) or water (negative control) were sprayed into each container. Each experiment was observed for every 1st hour, 2nd hour, 3rd hour, 4th hour, 5th hour, 6th hour and 24th hour. The experiments were repeated four times.

One way anova test for each hour had been performed to analyzed the insecticidal potential effect of the extract. Based on One way anova test results, it showed that Red Pepper extract gave significant effect on insecticide potency in every hour (all p value = 0.000; $p < 0.05$).

Post Hoc Tukey test was also done and based on the results, there was significant difference of insecticidal potency in all doses compared with negative control. There was no significant difference of insecticidal potency in red pepper extract concentration of 10% compared to 15% ($p = 0,614$), meanwhile there was no concentration group that have the same effect as positive control ($p < 0,05$). The conclusion of Post Hoc test for time variables was that there was no significant difference of insecticidal potency between 3rd, 4th, and 5th hour

($p > 0,05$) and also between 1st and 2nd hour ($p = 0.105$). However, there was significant difference between 2nd hour and 4th hour ($p = 0.007$).

The result of Pearson correlation test showed p value = 0.000 for concentration against insecticidal potency and $p = 0.000$ for time against insecticidal potency. It meant that insecticidal potency had significant correlation with concentrations and time of incubation. The insecticide potency was affected by both doses of Red Pepper and time of incubation. The correlation coefficient (r value) for concentration was 0.783 so this value showed us that the strength of correlation between concentration and insecticidal potency was strong. While correlation coefficient (r value) for time was 0.371 which meant that the strength of correlation between time and insecticidal potency was weak.

The Linier Regression test was also done for this experiment and based on the R square value, 75.1% of insecticidal potency was influenced by extract concentrations and time, while 14.9% of insecticidal potency was affected by external factors.

Based on the results of all of the tests mentioned above, red pepper extract has an insecticidal effect towards fire ants. However, if it is compared to the insecticidal potency of the widely used insecticide, Malathion (0.28%), the effect of the red pepper extract is still weak.

Capsicum annuum comprises an effective amount of capsaicin or other capsaicinoids. These compounds are responsible for the strong pungency of the pepper. Capsaicin produces a burning sensation to any tissue that it comes into contact with. Capsaicin's toxicity towards insects is through metabolic disruption, membrane damage, and nervous system dysfunction. Capsaicin has also been shown to repel insects as well as kill them.

The weakness of this study was that during the experiment, the external factors such as sunlight, temperature and humidity were not controlled. Another restriction of this research was that observation at every hour was done only until 6th hour and after that, the next observation was done at 24th hour. In addition, physical wellbeing and other health problems of fire-ants could have influence on insecticidal potency of red pepper extract.

