CHAPTER 6

DISCUSSION

6.1 Discussion

Nowadays, many different pest control methods can be chosen based on strategy desired such as by eliminating or repelling them. For many pests, total elimination is almost impossible, but it is possible to control them. (United States Environmental Protection Agency,2005) Therefore, many chemical and non-chemical repellents have been widely used in public to prevent from insect stings, but most of the repellent used today are developed from chemical methods and they have a lot of side effects on human body. Therefore, alternative natural substances are being researched to eradicate these pests.

This research was aimed at investigating the effect of cucumber extract as a repellent for fire ants, *Solenopsis Sp.* Cucumber is commonly known as a valuable source of antioxidant nutrients because of it's vitamin C, beta-carotene, and manganese. In cosmetics, cucumber has an excellent potential for cooling, healing and soothing to an irritated skin. Cucumber extract is often used for skin problems, wrinkles and sunburn. In this research, the potential repellent effect of cucumber towards fire ants, *Solenopsis Sp* is determined.

This research was carried out using three different concentrations of cucumber extract that are 65%, 70% and 75%. The experiment was observed and the number of total fire ants which cross the cucumber extract treated tube at the time interval of 1^{st} hour,2^{nd} hour,3^{rd} hour, 4^{th} hour, 5^{th} hour and 6^{th} hour were noted.

Naphthalene was used as the positive control and the duration of this experiment is 6 hours with 15 ants were used in each container during each repetition.

Since the dependent variable (repellency) is numeric type, and there are 2 independent variables (time and concentrations), Anova Test was used as the appropriate statistical test. This test showed that cucumber gives significant effect on repellency in every hour since all p value was 0.00.

Pos hoc Tukey test showed that there was no significant difference of repellency among concentration 65%, 70% and 75% ($p>0.05$), meanwhile all time of incubation gave significant difference on repellency. Based on those test it can be concluded that the optimum dose of cucumber for repellent is 65% and the best time is the first hour.

Pearson correlation test showed that repellency had significant correlation with concentrations ($p<0.05$), but it does not have significant correlation with time of exposure ($p>0.05$).The repellency is affected by the dose of cucumber rather than time of incubation. The correlation coefficient for concentration is 0.992, this value show us that the strength of correlation between concentration and repellency is very strong. It can be concluded that the repellent can work effectively throughout a long time. However, further research is still needed to determine the long term effect of the potential repellent property of the cucumber extract.

A research was conducted formerly in Kansas State University, America to examine the natural repellent effect of the cucumber towards the American cockroach. They tested 5 compounds for repellency including (E/Z)-2,6-Nonadienal

and (E)-2-nonenal. It was found that well crushed cucumber repelled 90% of cockroaches under the test conditions. The results showed that the 2 compounds, (E/Z)-2,6-Nonadienal and (E)-2-nonenal, are the excellent repellents even at quite low concentrations. (Scriven and Meloan,1984) It can be concluded that cucumber extract has an excellent repellent effect on not only cockroaches but also fire ants based on the two experiments,.

The advantages of using cucumber extract is it has an excellent potential for cooling, healing and soothing to an irritated skin, whether caused by the sun, or the effects of a cutaneous eruption (Griere,1992). Cucumber extract is often used for skin problems, wrinkles, sunburn (Duke,1997) and as an antioxidant. Cucumbers are also used in skin tonics and other beauty aids. The main volatile compounds which are responsible for the repellent of cucumber are (E/Z)-2,6-Nonadienal and (E)-2-nonenal.(Scriven and Meloan,1984) From this experiment, it can be determined that the optimum dose of cucumber for repellent is 65% and the best time is the first hour. However, the different times of exposure do not have significant difference in repellency towards fire ants.

In this experiment, there were several limitations from the researcher because of the limitations of the equipment and references about the active substance which takes part in the mechanism of repellency of cucumber extract. Because of the limitations in this experiment, the exact mechanism of how the cucumber woks as a repellent on fire ants and the exact active substances in the cucumber extract could not be determined. The other limitations were the stability of

the room temperature and room humidity of the place where the experiment being carried out.