

Ovitrap Modification with Cypermethrin Insecticide and Bagasse Attractants as *Aedes Aegypti* Mosquito Trap

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Abstract: Vector control to decrease the accident of DHF have been done but the results still not maximal. By these study, we can use another way to control *Aedes aegypti* population. Bagasse contain organic matter which is fermented will produce amonium and CO₂ which influence the olfactory nerve of *Aedes aegypti*. The type of this study was true experimental post test only control group design. Object of this study was ovitrap which is already modified by using insecticide and bagasse as attractant to attract and kill *Aedes aegypti* mosquito. The results of this study showed that the number of dead mosquito in net are increasing as the cypermethrin concentration increase during 24 hours, 48 hours, and 72 hours of observation using concentration 2.5%: 56, 5%: 78,7.5%:94 and 10%:124. From the results we can conclude that there was a difference of the number of dead mosquitos in net using different cypermethrin and bagasse attractants concentration ($p>a$). The best concentration of cypermethrin to be used was 10% for 3 days. We recommend to use 5% and 2,5% concentration. The longer the exposure (24 hours, 48 hours and 72 hours) the more the number of dead mosquitoes. Further study can be developed by extend the observation period until 7 days and also increase the size of ovitrap to increase their efficiency and effectivity.

Keywords: Ovitrap, Cypermethrin, Bagasse, *Aedes aegypti*

1. Introduction

Dengue Haemorrhagic Fever (DHF) disease first discover in Surabaya on 1968 with 58 cases, the case fatality rate (CFR) was 41.5%. In Indonesia, DHF diseases tend to increase and expanded to all provinces [1]. Based on East Java Health Office, in 2015 there were 20.707 cases of DHF with 284 of mortality. In 2016 there were 20.639 cases and the number of mortality was 298, the CFR was 1.4%.

The medicine which can be used as Dengue anti virus have not been found yet. Preventive method is the best option one of them is by controlling *Aedes aegypti* population. Some larvacide and insecticide have been used to control DHF vector. But the used of chemical material have risk of resistance [2].

Some experiments prove that the used of attractant to control DHF vector is effective. Kurniati said that the use of fermented sugar as attractant with 0%, 5%, 15%, 25%, and 35% showed there was difference number of mosquito that are trapped, the most effective concentration was 35% [3]. Rahayu, et all said that the use of chili is effective to trap mosquito using 15% of concentration [4]. Mechanical method as trapping also have been used to control mosquito. Trapping is a tool to trap mosquito using attractant in order to decrease mosquito population. Attractant is a substance to attract insect (include mosquito). These substance can be NH₃, CO₂, lactat acid, and actenol. Attractant substances is organic materials or a result of metabolic processes of living things [5].

This research will modified ovitrap shape using bagasse as attractant and cypermenthrin to the screen. The right concentration is needed to make this trap can work effectively to decrease *Aedes aegypti* mosquutio which can be applied in society.

2. Research Methods

This experiment using *true experimental-post test only control group* design (Sugiyono, 2015: 7576):

Xn -----► O1
Xo -----► O2

Object in this experiment was ovitrap which was made of plastic jar (volume 1 liter) and already modified. Cypermethrin were used as insecticide with concentration 0%, 2.5%, 5%, 7.5%, and 10%, and bagasse were used as attractant. The jars then were put inside mosquitos cages.

There were 50 mosquito in each cage, this experiment use 4 cages. The cage's size was 50x50x50 cm. Each concetration of cypermethrin have 3 replication.

The procedure of this study:

- 1) Dissolve cypermethrin in 1 liter of water with 2,5%, 5%,7,5%,10%. Control made with 0% of cypermethrin.
- 2) Make hole in the top of the jars using cutter. Soak the screen in the cypermenthrin solution then drying. Put the screen on the jars hole.
- 3) To make attractant solution, soak 100 grams of bagasse in 10 liters of water for 7 days to produce CO₂, NH₃, lactat acid, fatty acid and octenol. Put attractant solution in the jars and close the jars with the cover which contain cypermethrin.
- 4) Put the jars in mosquito cages which already contain 50 mosquitos in each cages.
- 5) Count and make a record of dead mosquito in ovitrap for 24, 48, and 72 hours.
- 6) Temprature will be controlled in 26.4 - 28°C.

Data about the number of mosquito which catch in ovitrap would be analyzed using kolmogorov smirnov test then one way anova or kruskal wallis test with a = 0,05.

Volume 7 Issue 7, July 2018

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3. Result and Discussion

Table 1 : Temperature and humidity condition during experiment

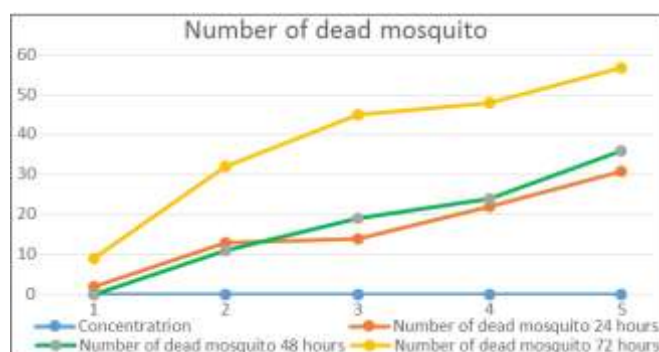
Replication	Temperature (°C)	Humidity (%)
A.1	27.4	63
A.2	27.1	70
A.3	28	77
B.1	27	59
B.2	27.3	58
B.3	26.4	51
C.1	27	59
C.2	27.3	58
C.3	26.4	51

The temperature condition during experiment 26 – 28 °C and humidity among 50 – 80%. There is conditions appropriate to mosquito habit on society.

Table 2: The number of dead mosquito in Each Concentration for 24, 48, and 72 hours

Concentration	Number of dead mosquito		
	24 hours	48 hours	72 hours
Control	2	0	9
2,5%	13	11	32
5%	14	19	45
7,5%	22	24	48
10%	31	36	57

The results showed that the number of dead mosquito increase along with cypermethrin concentration increasing. Anova test showed $p < \alpha$ ($p = 0,0$) which means there were difference number of dead mosquito in each concentration. The modification of ovitrap using cypermethrin and bagasse give a good results. This can be seen from the number of dead mosquito inside and outside the ovitrap screen. Bagasse can attract the mosquito because it contains CO_2 and NH_3 which affect mosquito nerve system [5]. But bagasse can not kill the mosquito that's why cypermethrin were used in this experiments because the main purpose is to decrease mosquito population.



4. Conclusion

- 1) Total number of dead mosquito in ovitrap are increasing along with the concentration of cypermethrin increased in 24, 48, and 72 hours. In concentration 2,5% there were 56 dead mosquitos, 5% were 78 dead mosquitos, 7,5% were 94 mosquitos, and 10% were 124 mosquitos.
- 2) There were significant difference of the number of dead mosquitos in each concentration ($p < \alpha$). The best

concentration were 10% for 72 hours.

- 3) There were significant difference of the number of dead mosquitos in each period of exposure ($p < \alpha$). The more duration of exposure, the number of dead mosquitos are increased.

References

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