



## Comparison of Sugar Fermentation and Shrimp Immersion Water Effectiveness as Attractant on Mosquito Trap

Authors

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### ABSTRACT

**Introduction:** *Mosquito traps can be equipped with attractants as a lure of the presence of insects.*

**Objective:** *This study aims to obtain the type of attractant that can catch mosquitoes with the highest number of the mosquito being trapped.*

**Methods:** *This type of research is purely experimental design with a control group. The Mann Whitney test was used to find out the average effectiveness of fermented sugar and shrimp immersion water when used as attractants.*

**Result:** *The results of the study indicated the significant difference in the number of Aedes Aegypti mosquitoes attracted by the fermentation of sugar and shrimp immersion water.*

**Conclusion:** *Mosquito traps with shrimp immersion attractants can be socialized to the community as a better vector control than sugar fermentation because it is simple, safe and environmentally friendly.*

**Keywords:** *mosquito trap, fermentation of sugar, shrimp immersion water.*

### INTRODUCTION

Dengue vector control can be done physically, chemically, biologically, as well as integrated control. Fogging and abatization control is one of chemical control. Fogging is spraying with malathion insecticide material when the dengue fever spreads out. The vector control program with fumigation is considered to be less successful because this method requires an enormous cost and leads to resistance due to incorrect doses (Sayono, 2008).

On the other hand, abatization is abate sowing of 1% temefos material into water reservoir with target *Aedes aegypti* larva. The use of abate for

30 years did allow the development of resistance (Thamrin, et .al, 2007).

The impact of chemical insecticide controls promotes the need for safe and environmentally friendly mosquito control alternatives. One of them is physical/mechanical control by using mosquito trap. It has been circulating a mosquito trap tool on the market, but the price is relatively high so that the application in the community is less useful.

Mosquito traps can be equipped with attractants. Attractants as a lure of the presence of insects that can be used as a trap (Thamrin et. al, 2007).

The attractants of fermented sugars and shrimp immersion secrete chemical compounds in the form of CO<sub>2</sub>, bioethanol, octanol, ammonia, lactic acid, and fatty acids. Based on the background above, it is necessary to test the comparison of several types of attractants so that the kind of attractant that can capture mosquitoes with the highest number of the mosquito trapped formulated into research. This way, it is expected that the result of this research can be applied by the community so that it becomes a contribution to the Government and Local Health Service in minimizing the incidence of Dengue Hemorrhagic Fever (DBD) which is happening in Pontianak City, Indonesia recently.

**METHOD**

This type of research is strictly experimental design with a control group. The Mann Whitney test was utilized to determine the average powerfulness of fermented sugar and shrimp immersion water when used as attractants.

**RESULTS**

Distribution of amount and the average number of mosquitoes caught in mosquito traps containing attractants of sugar fermentation, shrimp immersion, and rainwater for three days control observations are shown in Table 1.

**Table 1** Three days observation results

Repetition	Testing time						T <sub>1</sub>	Total T <sub>2</sub>	T <sub>0</sub>
	First day		Second day		Third day				
	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>			
1	3	3	5	8	7	5	15	16	0
2	2	3	4	3	4	4	10	13	0
3	2	5	6	7	5	7	13	19	0
4	0	1	4	3	3	5	7	9	0
5	0	4	2	6	5	6	7	16	0
6	1	3	3	9	5	5	9	17	0
7	4	5	4	6	7	10	15	21	0
8	2	4	3	5	5	8	10	17	0
9	1	5	5	7	3	5	9	14	0
Average	1.7	3.7	4	6	4.9	6.1	10.6	15.8	0

Note: T<sub>1</sub> = Treatment 1 (Sugar Fermentation), T<sub>2</sub> = Treatment 2 (Shrimp Immersion), T<sub>0</sub> = Control (rainwater without attractant)

Table 1 showed the highest average number of mosquitoes caught for three days with nine repetitions was mosquito trap containing shrimp immersion attractant which is 15.8 with the highest average occurring on the third day, 6.1 and first day has the lowest average, 3.7.

The mean number of mosquitoes caught for three days of observation with different attractant is shown in Table 2.

**Table 2** Mean rank of attractant

Attractant types	N	Mean Rank
Number of mosquitoes caught		
Sugar Fermentation	27	47.39
Shrimp Immersion	27	60.61
Control	27	15.00
Total	81	

Table 2 showed the mean rank on the three treatments: the fermentation of sugar was 47.39, the shrimp immersion was 60.61, and the control was 15.

Mann Whitney test of sugar fermentation sedimentation with shrimp immersion to determine the significant differences between the two attractants is shown in the following table.

**Table 3**, Mann Whitney test result

	Number of Mosquito Trapped
Mann-Whitney U	199.500
Wilcoxon W	577.500
Z	-2.896
Asymp. Sig. (2-tailed)	.004

The analysis using Mann Whitney test obtained p-value = 0.004 (p <0.05) meaning there were

significant differences in the number of *Aedes aegypti* mosquitoes caught between the mosquito traps. So based on the results, it is concluded that the alternate hypothesis ( $H_a$ ) is accepted and ( $H_o$ ) is rejected which means that there is a significant difference of *Aedes aegypti* mosquitoes caught between mosquito traps given fermented sugar with shrimp immersion water attractant.

## DISCUSSION

The difference of the number of captured mosquitoes can be seen from the common observation for three days where the attractant of the shrimp immersion water produces the most trapped *Aedes aegypti* mosquitoes in each observation period of 3.7, 6 and 6.1. In the other hand, the sugar fermentation attractant has an average of 1.7, 4 and 4.9 indicating that shrimp immersion attracts more mosquito presence than sugar fermentation.

In the mosquito trap containing rain water (control), there is no presence of *Aedes aegypti* mosquitoes. This condition is due to the rain without an attractant does not attract the presence of mosquitoes to enter and be caught in it. Rain water only serves as a breeding ground for mosquitoes to store their eggs. Both traps containing attractant influence the mosquito's attraction to not to get into the rain water. A mosquito trap containing attractant is much more attractive to the presence of insects than a mosquito trap that acts as a control (rainwater). This occurrence is because rain water without attractants does not contain CO<sub>2</sub> and ammonia that affect the mosquito's smelling nerves. Besides, time factor and location of storage trap also significantly influence the number of the mosquito being caught. A brief 3-day study led to no mosquitoes laying eggs and being stuck in rainwater as a control.

Installation of the three adjacent mosquito traps also resulted in no mosquitoes trapped inside the control. The interest of mosquitoes is only in the trap of attractant.

Mosquito trap contains 10% shrimp immersion watermelon producing Ammonia and CO<sub>2</sub> which can attract the *Aedes aegypti* mosquito's nerve. Shrimp immersion water is able to catch mosquitoes with more quantities due to the containing residual or metabolic waste such as feces, and chemical compounds either in the form of gas or liquid which are preferred by the *Aedes aegypti* mosquitoes. In addition to shrimp secreted, CO<sub>2</sub> is also produced by the fermentation of sugar but may have different quantities and qualities that cause an unusual attraction to the *Aedes aegypti* mosquitoes. Also, sugar fermentation attractants do not contain ammonia. Fermented sugar secretes several chemical compounds such as ethanol, lactic acid, bioethanol, CO<sub>2</sub>, and hydrogen. Also, fermentation produces other compounds such as butyric acid and acetone. The presence of a substance, compound or other attractive material contained in a shrimp immersion water not present in the fermentation of sugars makes the first attractant is more favorable to mosquitoes.

The results of this study are following the research conducted by Sayono (2008) that the average weekly *Aedes* mosquito trapped in Lethal Ovitrap containing shrimp water immersion is more compared to the ones containing water immersion of straw and rain water.

## CONCLUSION

There is a significant difference in the number of *Aedes aegypti* caught between mosquito trap given fermentation of sugar and shrimp immersion attractant where shrimp immersion attractant is proved to be more efficient. However, further research is needed on the effectiveness of mosquito traps with shrimp immersion attractant to mosquito species other than *Aedes aegypti*. Also, an in-depth study of the content of the sugar fermentation attractiveness is necessary to explore another possibility. People can apply their mosquito trap with shrimp immersion attractant as one method of controlling the vector of *Aedes aegypti* because it is made

from natural materials that are safe for humans and the environment.

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