
Comperation of Repelent Power of Orange Leaf Extract (*Citrus Aurantifolia*) and Nilam Leaf Extract (*Pogostemon Cablin Benth*) Toward *Aedes Aegypti* Mosquito

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ABSTRACT

In this study, the research problems (1) How is the repulsion power of lime leaf extract (*Citrus aurantifolia*) and patchouli leaf (*Pogostemon cablin benth*) compared to *Aedes aegypti* mosquito? The objectives to be achieved are (1) To find out the comparison of the repulsion power of lime leaf extract (*Citrus aurantifolia*) with patchouli leaf (*Pogostemon cablin benth*) against *Aedes aegypti* mosquitoes (2) To determine the repulsion power of lime leaf extract (*Citrus aurantifolia*) against *Aedes aegypti* mosquitoes (3) Knowing the effectiveness of patchouli leaf extract (*Pogostemon cablin benth*) toward *Aedes aegypti* Mosquito.

INTRODUCTION

In 2019, the number of cases of death caused by Dengue Hemorrhagic Fever (DHF) was 919 deaths. Total Incidence Rate (IR) is 51.53 per 100,000 population, while the Percentage Case Fatality Rate (CFR) is 0.67%. With a total number of cases of Dengue Hemorrhagic Fever (DHF) as many as 138,127 (1).

The main vector of Dengue Hemorrhagic Fever or often referred to as DHF is the female *Aedes aegypti* mosquito (2). This disease is increasing every year. Dengue Hemorrhagic Fever (DHF) is an infectious disease caused by the dengue virus carried by a vector of the *Aedes aegypti* type, in other words, this vector *Aedes albopictus* plays a role in spreading DHF so that this disease continues to increase, especially during the rainy season (3).

Dengue Hemorrhagic Fever (DHF) is a disease with an increasing incidence in tropical and subtropical areas. The disease carried by this mosquito vector is spread in all provinces in Indonesia with the number of cases of Dengue Hemorrhagic Fever (DHF) increasing every year (4). The *Aedes aegypti* mosquito can transmit the virus with an incubation period of 3-10 days on the human body through a bite. Therefore, efforts are needed to prevent the spread of Dengue Hemorrhagic Fever (DHF) (5). One way that can be used to break the chain of transmission of Dengue Hemorrhagic Fever (DHF) is to use mosquito repellents made from natural ingredients.

METHODOLOGY

The type of research used in this research is a simple experimental research type (Posttest Only Control Group Design). There were two groups, each of which was randomly selected in this study. There is a group that is given treatment and another group that is not. The treated group was the experimental group and the untreated group was referred to as the control group.

RESULTS

Table 1. Extra Protection Power of Lime Leaf (*Citrus aurantifolia*)

Observation (hour to)	right arm (Control)	left arm (Treatment)	Protection Power (%)
1	623	32	94,8
2	493	29	94,1
3	489	38	92,2
4	421	26	93,8
5	403	45	88,8
6	430	65	84,8

Table 2. Patchouli Leaf Extract Protective Power (*Pogostemon cablin benth*)

Observations (hours to)	right arm (Control)	left arm (Treatment)	Protection Power (%)
1	179	14	92,1
2	243	23	90,5
3	262	22	91,6
4	298	29	90,2
5	345	35	89,8
6	320	43	86,5

Results of Measurement of Air Temperature in Research Room

Table 3. The following are the results of measurements of room air humidity measured using a tool called thermometer

Concentration of Lime Leaf Extract And Patchouli Leaf Extract	Research Room Air Temperature (°C)					
	Jam Ke					
	I	II	III	IV	V	VI
5%	29,4	29,4	29,5	29,6	29,8	30,1
10%	29,4	29,4	29,5	29,6	29,8	30,1
15%	29,4	29,4	29,5	29,6	29,8	30,1
20%	29,4	29,4	29,5	29,6	29,8	30,1
25%	29,4	29,4	29,5	29,6	29,8	30,1
30%	29,4	29,4	29,5	29,6	29,8	30,1
35%	29,4	29,4	29,5	29,6	29,8	30,1

Air Humidity Measurement Results

Table 4. Extra Protection Power of Lime Leaf (*Citrus aurantifolia*)

Concentration of Lime Leaf Extract and Patchouli Leaf Extract	Research Room Air Humidity (%)					
	O'clock To					
	I	II	III	IV	V	VI
5%	70	72	73	73	72	73
10%	71	71	73	73	72	73
15%	70	71	72	73	72	72
20%	70	71	72	73	72	72
25%	71	73	72	73	72	72
30%	72	73	72	73	72	72
35%	72	73	72	73	72	72

DISCUSSION

This study on the comparison of the repellent power of lime leaf extract (*Citrus aurantifolia*) with patchouli leaf extract (*Pogostemon cablin benth*) aims to compare the level of repulsion between lime leaf extract (*Citrus aurantifolia*) and patchouli leaf extract (*Pogostemon cablin benth*). This research was conducted from May 3, 2021 to June 1, 2021 at the Donggala Health Research and Development Vector Laboratory.

This research was conducted by observing the number of mosquitoes that landed on the hands of the probandus which were smeared with the extract. Each hand was observed for 5 minutes alternately, both the right hand as a control (not smeared with the extract) and the left hand which was smeared with the extract. Observations were made in 6 periods or for 6 hours and every hour the air temperature and humidity of the test room were always measured. This research was started at 9:00 to 14:00.

This study required 7 people as probands because the concentrations in this study were 7 concentrations, namely 5%, 10%, 15%, 20%, 25%, 30% and 35% and repeated 3 times. The mosquitoes used in this study were female *Aedes aegypti* mosquitoes because female mosquitoes suck human blood and become the vector that causes Dengue Hemorrhagic Fever (DHF). Each test cage contained 25 female mosquitoes. This study was conducted at room temperature. Research is one of the factors that can affect the level of mosquito perch so that this can also affect the level of repulsion (Repellent). *Aedes aegyptia* mosquitoes will survive longer at temperatures ranging from 28oC - 32oC. At the time of the study the air temperature in the room was around 29, 4 oC – 30.1 oC so that it meets the requirements for mosquito testing. Lime leaves (*Citrus aurantifolia*) contain chemical compounds that can be used as repellants, namely limonoids, flavonoids and saponins. Flavonoids cause lime leaves to be disliked by mosquitoes which inhibit insect eating. These flavonoids can also cause protein clumping and then the transport of insect nutrients is disrupted so that mosquito growth is inhibited and eventually mosquitoes die.

Patchouli leaves (*Pogostemon cablin benth*) contain saponins, flavonoids and essential oils. The constituent components of essential oils are sesquiterpenes and patchouli alcohol. A chemical that has the potential as an insect repellent is patchouli alcohol.

CONCLUSION

This study concludes that from the study entitled "Comparison of Repellent (Repellent) Lime Leaf Extract (*Citrus aurantifolia*) with Patchouli Leaf Extract (*Pogostemon cablin benth*) Against *Aedes aegypti* Mosquitoes" it can be concluded from the seven concentrations of lime leaf extract and patchouli leaf extract. has effectiveness as a Repellent with different levels of concentration.

When compared between the two ingredients, the extract that is more effective is patchouli leaf extract because it has more variations in effective concentrations, namely four concentrations, while lime leaves only have 3 effective concentrations. In addition, seen from the lowest concentration, namely 5% patchouli leaves have a greater protective power at the sixth hour by 86.5% while lime leaves at the sixth hour are only 84.8%. Likewise, when compared with the highest concentration of 35% concentration, the protective power of patchouli leaves at the sixth hour is 92.6% while the protection power of lime leaves is only 83.2%.

SUGGESTION

The community can consider these two leaf extracts to be an alternative in avoiding the bite of the *Aedes aegypti* mosquito. For Researchers If researchers could conduct further research to find things that might strengthen the repulsion of these two extracts, they could even make these two extracts into a product that can be applied to the wider community. For the government, it can complete the literature on the use of *Aedes aegypti* mosquito bite repellent substances and as a consideration for further research so that it can suppress cases of DHF (Dengue Hemorrhagic Fever).

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