

# Extract of Temu Kunci Plant (*Boesenbergia Pandurata Roxb*) as Biolarvasida to Larvae of *Culex* and *Aedes Aegypti*

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## Abstract

The presence of saponins and flavonoids in Temu Kunci plant allows potential as a Temu Kunci plant biolarvasida. The purpose of this study was to analyze the effectiveness of Temu Kunci plant (*Boesenbergia Pandurata Roxb*) extracts as biolarvasida to larvae of *Culex* and *Aedes aegypti*. This research is true experiments. The research object is the *Culex* mosquito larvae and third instar *Aedes aegypti* were included in the container with Temu Kunci plant concentration of 0 ppm, 250 ppm, 500 ppm, 750 ppm and 1,000 ppm were observed within 24 hours, 48 hours and 72 hours. Analysis of the effectiveness of larvicides Temu Kunci plant extract determined by Lethal Concentration 50 (LC50), that the concentration of Temu Kunci plant extract can kill larvae of *Culex* and *Aedes aegypti* 50% using 1-way Anava test. The result of this study show that there are at least 1 (one) pair extract concentrations Temu Kunci plant in inhibiting the growth the larvae of *Culex* and *Aedes aegypti* after exposure extract Temu Kunci plant for 24 hours, 48 hours and 72 hours difference ( $p < \alpha = 0.05$ ). The extract Temu Kunci plant (*Boesenbergia Pandurata Roxb*) 500 ppm can kill 50% of the larvae of *Culex* and *Aedes aegypti* good for 48 hours. It can be concluded that the extract Temu Kunci plant effective as biolarvasida with a concentration of 500 ppm against larvae of *Culex* and *Aedes aegypti*. So it needs to be disseminated that plants Temu Kunci plant (*Boesenbergia pandurata Roxb*) can be used as inhibitor the growth of *Culex* and *Aedes aegypti*'s larvae.

**Keywords:** Temu Kunci plant, biolarvasida, *Culex*, *Aedes aegypti*.

## 1. INTRODUCTION

Indonesia as a tropical regions country that is the deployment area and endemic areas leading to high morbidity caused by mosquito bites include *Culex*, *Aedes*, *Anopheles* and others (Health Office Ministry 2005). The report of East Java Provincial Health Office has discovered a disease caused by a mosquito bite are 341 people with filariasis (until 2012) and 1,054 people suffer from dengue fever (as of January 2015) with 25 patients was died.

Some mosquito control has been carried out in East Java Provincial Health Office either in chemistry, physics, biology, and mechanics. Control is commonly performed with chemicals (insecticides) because the system works more effectively and more quickly noticeable compared to the way biological control. Chemical control can give negative impacts include environmental pollution, death predator, resistance in vectors, so it is necessary to be control using the natural larvicides for example larvicides plant that does not have side effects on the environment and humans. Indonesia is an agricultural country that is rich in plants, but the plants are not fully utilized in daily life - today, one of the plants Temu Kunci plant. Temu Kunci plant (*Boesenbergia Pandurata Roxb*) is an annual shrub old. Clay is the Temu Kunci plant habitat, but basically the Temu Kunci plant can grow in any place of origin, not flooded and not in a hot area. Temu Kunci plant (*Boesenbergia Pandurata Roxb*) contains among others: essential oils consisting of camphor, Sineol, Methyl cinnamic, Hidromersin, Damar, Pati, saponins, flavonoids, Pinostrolerin, Alipinentin (Winzaldi, 2007).

The previous research report that cayenne pepper, mundu leaves, vinca leaves, clove seeds, papaya seeds, and god crown leaves as larvicides showed its effectiveness in killing mosquito larvae at various concentrations. Because there were saponins and flavonoids in these various biolarvasida (Wakhyulianto, 2005; Haditomo 2010; Shovia, 2014; Rohananto, 2013; Utomo, 2010; Iskandar, 2006). The Temu Kunci plant may have presence of saponins and flavonoids so it was potential to be biolarvasida. So it the aim of this study was to analyze the effectiveness of plant extracts Temu Kunci plant (*boesenbergia pandurata Roxb*) as biolarvasida to larvae of *Culex* and *Aedes aegypti*.

## 2. RESEARCH METHODS

This research is true experiment by the independent variabel were *Culex* mosquito larvae and third instar *Aedes aegypti* in the container with Temu Kunci plant concentration of 0 ppm, 250 ppm, 500 ppm, 750 ppm and 1,000 ppm and observed within 24 hours, 48 hours and 72 hours. Prior this study, the water conditions for the placement of objects formerly controlled by checking the temperature and humidity of the environment, as well as the pH of water. The procedure begins with making the liquor main of extract Temu Kunci plant with a concentration of 1,000 ppm in to 250 ml volume. Then followed by dilution into a solution with a concentration of 250 ppm, 500 ppm, 750 ppm, and 1,000 ppm. Afterwards larvae entered into the respective concentrations as much as 20 larvae. Only then observed the changes that occurred during the 24 hours, 48 hours and 72 hours.

Analysis the effectiveness of larvicides extract Temu Kunci plant determined by Lethal Concentration

50 (LC50), that the concentration of Temu Kunci plant extract can kill larvae of *Culex* and *Aedes aegypti* 50% using 1-way Anava test.

### 3. RESULTS AND DISCUSSION

The study showed that the higher concentrations of the Temu Kunci plant extract, give the greater mean percentage of *Culex* and *Aedes aegypti* larvae dead. The longer of larva exposed to extract Temu Kunci plant, it cause the greater dead percentage of *Culex* and *Aedes aegypti* larvae. The saponins and flavonoids contained extracts Temu Kunci plant potential as biolarvasida which can inhibit the growth of both larvae of *Culex* and *Aedes aegypti*.

The results of this study reinforced by Rohananto (2013) in a study entitled "Effectiveness of Leaf Extract Tread Dara (*Catharanthus roseus*) As *Culex quinquefasciatus* mosquito larvicides", the ethanol extract of leaves sambang plug (*Aerva sanguinolenta*) given to the larvae of *Culex quinquefasciatus* with a concentration of 1000 ppm after 24 hours exposure cause the death of 96.7%, while the extract of vinca cause larval mortality by 15%. Meanwhile Logaswamy and Remia (2009) reported the extract of vinca is still vulnerable to fourth instar *Ae. Aegypti* larvae with the death 77 % at a concentration of 250 ppm after 24 hours exposure. The vinca plant have content of saponin were 75 % flavonoids (5.7 - dihidroksiflavin). It shows every species has a different sensitivity to a compound in plants, besides the possibility of the plant has saponins with different activities on mortality of larvae.

Figure 1 Mortality rate of *Culex* larvae

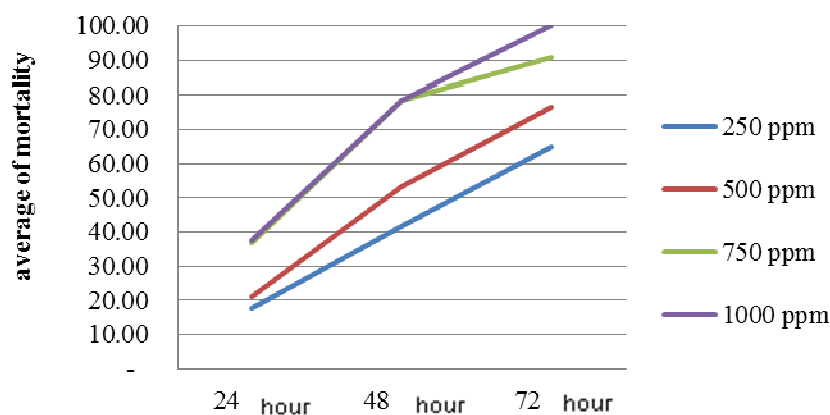
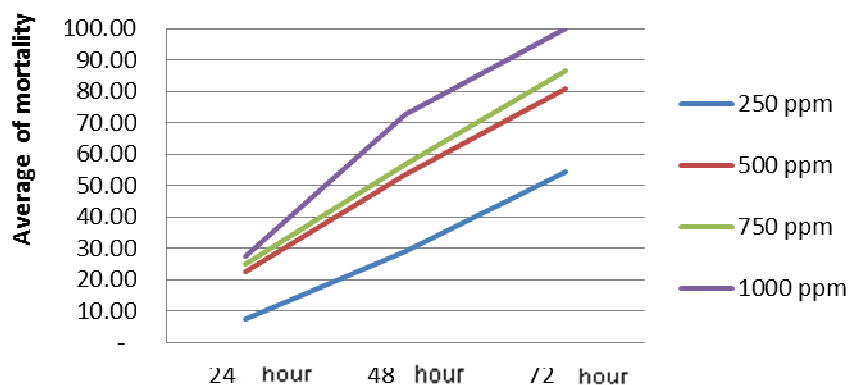


Figure 2 Mortality rate of *Aedes Aegypti* Larvae



The average difference in mortality larvae of *Culex* and *Aedes aegypti* for 24, 48 and 72 hours with a concentration of 250 ppm, 500 ppm, 750 ppm and 1000 ppm using 1-way Anava test show the results table 1. By using statistical tests showed that 1-way Anava there are at least 1 (one) pair extract concentrations Temu Kunci

plant in inhibiting the growth of *Culex* and *Aedes aegypti* larvae, extract of Temu Kunci plant after being exposed for 24 hours, 48 hours and 72 hours difference ( $p < \alpha = 0.05$ ).

Table 1. The average difference in mortality of *Culex* and *Aedes aegypti* larvae For 24, 48 and 72 hours with a concentration of 250 ppm, 500 ppm, 750 ppm and 1000 ppm

No	Time	P Value	
		<i>culex</i>	<i>Aedes</i>
1	24 hours	0.002	0.003
2	48 hours	0.005	0.004
3	72 hours	0.000	0.000

Lethal Concentration 50 (LC50) is statistically derived concentration that can be suspected causing the death of 50 % population organisms in a series at experimental conditions have been determined (Decree of the Minister of Agriculture, 2001). Determining Lethal concentrations (LC50) is the Temu Kunci plant extract concentration required to kill 50 % the larvae of *Culex* and *Aedes aegypti*. It was found that the concentration of Temu Kunci plant extract (*Boesenbergia pandurata* Roxb) 500 ppm can kill 50 % larvae of *Culex* and *Aedes aegypti* for 48 hours. It can be concluded that the extract of Temu Kunci plant effective as biolarvasida with a concentration of 500 ppm against the *Culex* and *Aedes aegypti* larvae..

#### 4. CONCLUSION

Extract Temu Kunci plant effective as biolarvasida with a concentration at 500 ppm against larvae of *Culex* and *Aedes aegypti* for 48 hours.

#### 5. SUGGESTION

Needs to be disseminated to the public or the practitioners that Temu Kunci plant (*Boesenbergia pandurata* Roxb) can be used as an alternative to inhibit the growth of *Culex* and *Aedes aegypti* larvae.

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