# THE EFFECT OF Annona Muricata EXTRACT TO THE DEATH OF Aedes aegypti LARVAE

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# THE EFFECT OF *Annona Muricata* EXTRACT TO THE DEATH OF *Aedes aegypti* LARVAE

The control of DHF vector is still emphasized on the usage of chemical insecticides, which repeatedly can cause vector resistance, death of other animals which is non target and pollution. Therefore, it must be looked for other way to control DHF vector that is by using natural insecticide, one of them is by using plant.

This research is intented to do a test whether A. Muricata extract can cause death of *Anopheles aconitus* larvae.

This research method is using experimental plan with "*Post test only group design*"The result shows that there are death of *Ae. aegypti* larva after giving of A.galanga Sw extract.

The lowest concentration (0,01%) cause death of *Ae. aegypti* larva 8,35% and the highest concentration (0,4%) all *Ae. aegypti* larva are dead. Result of Anava test expressed that there are differences of the averase of larva death at various extract concentrations level of soursop root extract (*A. muricata L.*). The LSD *(Least Significant Different)* test indicate that not all couple average of value death of *Ae. aegypti* larvae are different significantly.

This study conclude that is the soursop root extract (*A. muricata L.*) can kill *Ae. aegypti* larva. The concentration that is able to kill *Ae. aegypti* larva at (LC50) is 0,15% and (LC90) is 0,27%. There is a significant difference of the averase of larva's *Ae. aegypti* death at various extract concentration of soursop root extract (*A. muricata L.*).

Key Words : *Ae.aegypti*, soursop (*Annona muricata*) root extract, *Lethal Concentration* 50 ($LC_{50}$) , *Lethal Concentration* 90($LC_{90}$)
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## PENDAHULUAN

Various kinds of insecticides have been used in vector control efforts as effective, its application is relatively easy and the results are known quickly. In addition to chemical insecticides is relatively expensive when used repeatedly can lead to resistance vector, the death of other non-target animals, and environmental pollution. It is therefore necessary to find another way to control the vector of DHF is by using biological insecticides

Soursop plants have been known to contain active compounds which annonain, tannins, alkaloids which can be used as a biological insecticide.[5)] Parts of plants that contain these compounds are still unripe fruit, seeds, leaves and roots.

According Purwohusodo (1997), soursop leaves and seeds that produce distilled liquid toxic levels of 10%. Liquid soursop leaves with lethal concentrations of 5.50% to 50% of the third instar larvae of Aedes and Culex mosquitoes within 48 hours. At a concentration of 6.48% to 50% lethal larvae within 24 hours. While liquid soursop seeds with a concentration of 6.50% to 50% lethal larvae of Ae. aegypti within 48 hours [8)]

Rislansyah research results (2000) showed that the soursop leaf extract at a concentration of 0.026% effective in killing larvae of Ae. aegypti by 50% and the 0.077% concentration to kill larvae of Ae. aegypti by 90%. While the results of Ruth research (2004) showed that the crude extract of soursop fruit with 0.20% concentration to kill larvae of Ae. aegypti by 50% and by 0.27% concentration to kill larvae of Ae. aegypti by 90%.

This study aims to know soursop extract (A. muricata L.) can cause death Ae. Aegypti larvae by determining the value of Lethal Concentration 50 ($LC_{50}$) and Lethal Concentration 90 ($LC_{90}$).

## METODE PENELITIAN

The population used in this study was Ae. aegypti larvae at the BPVRP Laboratory, Salatiga. While the study sample was the larvae of Ae. aegypti third larval instar with considerations on the mosquito organs of the body is already a fully-formed and relatively stable against environmental influences. The number of larvae per treatment as many as 20 larvae, the number of repeat 3 times. The sampling technique was done by random sampling.

Preparation of A.muricata extract

Preparation of A.muricata extract was using by percolation method with 70% ethanol. soursop roots extracted by soaking 10 simplicia part and then put in a closed

vessel for at least 3 hours. Then the mob moved little by little into the percolator while each time pressed carefully

Determine of A. muricata extract concentration was using a stock solution concentration of 0.4% by mixing 1 ml of 70% ethanol with 100 ml of distilled water. Then a solution of diluted material taken in accordance with the required concentration.

**b. Bioassay test**

Larvae of Ae. Aegypti as much as 20 tail were included in each soursop root extract concentration (0.01%, 0.03%, 0.05%, 0.07%, 0.09%, 0.1%, 0.2%, 0.3% and 0.4%, 1 control) with repeat 3 times. pH of the media, media temperature and humidity at the beginning and end of the experiment recorded, and observed after 24 hours. After 24 hours, the number of deaths larvae of Ae. aegypti recorded and calculated at each concentration. If the number of larvae in the control group mortality of less than 5% was ignored, but if more than 20% should be repeated. If larval mortality in the control group between 5-20%, then to calculate the percent mortality of larvae at each concentration correction by using Abbott formula, namely :

$$\frac{\text{\% mortality of treatment - \% mortality of control}}{\text{100\% - \% mortality of control}} \text{ X } 100$$

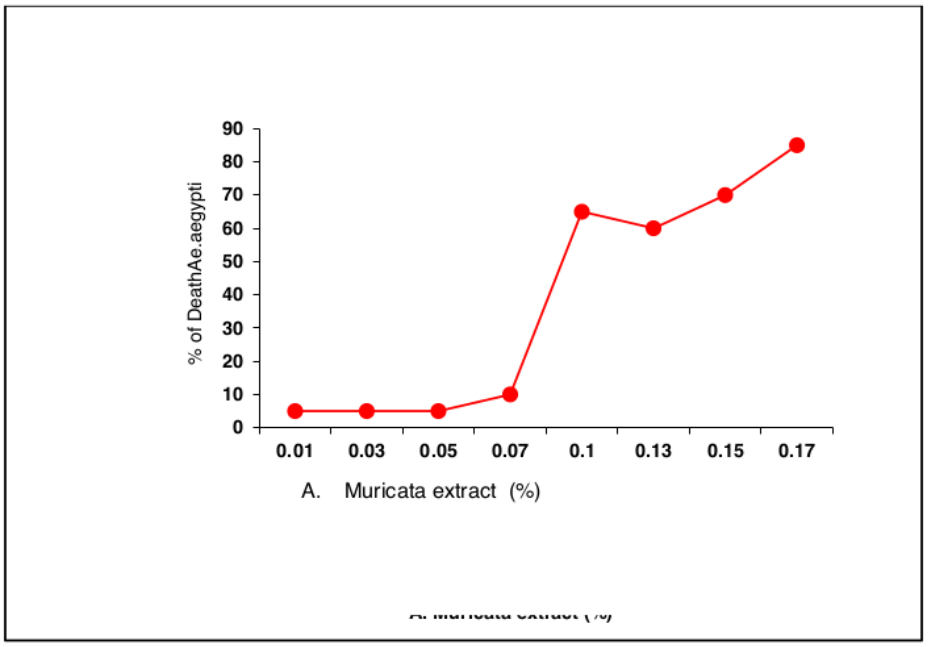
The results of the calculation of the death of the larvae of Ae. aegypti were analyzed using probit analysis to determine the $LC_{50}$ and $LC_{90}$ values. To determine the difference in death rate followed by ANOVA test with a confidence level of 0.05 . If you show any significant difference then followed by least significant defference test (LSD).

**HASIL DAN PEMBAHASAN**

Environmental conditions such as pH, humidity and temperature can affect larval life. pH of the media in this study ranged from pH 6.5 to 7.2, while the medium temperature range from 26.5 ºC to 27ºC, humidity range 70% - 75%. In this case the pH of the media is still in the range of 6-8 suitable for larval development which is 6.3 to 7.2, as well as the temperature and humidity of the media is still in the range of optimum temperature suitable for larval development at 25-27ºC and humidity range of 60-80% or

moisture optimum for larval development. So the magnitude of the pH of the media, media temperature and humidity when the research does not interfere with the development of larvae of Ae. aegypti . It can be concluded that the death of the larvae of Ae. aegypti is not caused by environmental factors such as pH of the media, media temperature and humidity.

The results showed that the lowest concentration of root extract of soursop cause mortality of 0.01% larval Ae. aegypti by 5%, while the highest concentration of 0.17% caused the death of the larvae of Ae. aegypti by 85%. The percentage mortality of larvae of Ae. aegypti after administration of root extract of soursop (A. muricata) during the 24-hour observation in the preliminary test are presented in Figure 1.




Gambar 1. Grafik persentase kematian larva *Ae. aegypti* setelah pemberian ekstrak akar sirsak *(Annona muricata)* selama pengamatan 24 jam.

Probit analysis results showed that the root extract of soursop LC50 value is of 0.15% and soursop root extract is LC90 of 0.27% means to kill larvae An.aconitus much as 90% within 24 hours it takes root extract concentration of 0.27 soursop %. Results of probit analysis in full can be seen in Table 1

Tabel 1. Nilai *Lethal Concentration* 50% ($LC_{50}$) dan 90% ($LC_{90}$) larva *Ae. aegypti* setelah pemberian ekstrak akar sirsak *(Annona muricata)* selama pengamatan 24 jam pada uji lanjutan.

| Kematian larva (%) | Konsentrasi ekstrak akar sirsak (%) | Interval kepercayaan | Range (%) |
|---|---|---|---|
| 50 | 0,15 | 0,95 | 0,12<LC< 0,17 |
| 90 | 0,27 | 0,95 | 0,23<LC< 0,33 |

The Death of Ae. Aegypti larvae probably caused by the active compounds from the roots of soursop (A. muricata L.) is annonain compounds, tannins, alkaloid. Annonain compound is the active ingredient that effective as a biological insecticide because it works as a contact insecticide that entry into the body through insect eksoskelet the intermediate tarsus at intermission. In addition, the compounds may also annonain as a stomach poison by going into the insect body through the mouth which resulted in the death of the larvae. Alkaloids have the same structure as the saponins that have properties such as saponins which can lower the surface tension of mucosal lining of the digestive tract so that the larval digestive tract wall become corrosive.

Results of analysis of variance (ANOVA) there are differences in the average number of deaths larvae of Ae. aegypti at different levels of concentration of root extract of soursop (Annona muricata) is significantly ($p < 0,05$).

Based on the results of LSD test for A. Muricata concentration of 0.01%, 0.03%, 0.05%, 0.07%, 0.09%, 0.1%, 0.2% and 0.4% concentrations showed a concentration pairs significantly different to the death of the larvae of Ae. aegypti. This means that any concentration of root extract of soursop (A. muricata) has tested the power to kill or different toxic effects on the larvae of Ae. aegypti. In addition it might be due to the influence of the larvae themselves because at the time of sampling, namely the possibility of the third instar larvae age of the third instar larvae are not the same and is approaching the fourth instar. Possible toxic effects of late third instar larvae are more resistant to chemicals than the early third instar larvae.

In this research, observation for 24 hours it is based on the criteria of efficacy , the mortality rates should reach at least 90 % within 24 hours. The results of this test indicate that the concentration of 0.3 % to be effective as a biological insecticide because the concentration is the concentration lethal to larvae 93.35 % in 24 hours.

According to the research Rislansyah ( 2000) of soursop leaf extract on larval Ae . aegypti obtained LC50 and LC90 of 0.027 % at 0.077 % .While the crude extract of soursop fruit by Ruth (2004 ) obtained LC50 was 0.20% , LC90 was 0.27%. At the root of soursop obtained LC50 of 0.15 % and 0.27% at the LC90 .

It can be concluded that the soursop leaf extract is more effective because it is used as a biological insecticide concentration of extract required less compared to other parts of the plant that is the raw fruit soursop and roots .This may be due to the active compound of soursop leaves is higher than fruits and roots.

## KESIMPULAN DAN SARAN

1. Annona muricata extract can kill the larvae of Ae. aegypti, the lowest concentration of 0.01% caused the death of the larvae of Ae. aegypti at 8.35% and 0.4% at the highest concentration caused of all the dead larvae (100%), with LC50 and LC90 values of 0.15% and 0.27% LC90.
2. There are differences in the average number of deaths larvae of Ae. aegypti at different levels of concentration of root extract of soursop (A. muricata L) was significantly ( $p < 0,05$).
3. Further research needs to be conducted on soursop plants (A.muricata L.) with different geographical conditions can cause death of mosquito larvae or another.

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