Journal of Physics: Conference Series

PAPER • **OPEN ACCESS**

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To cite this article: H Marisa *et al* 2018 *J. Phys.: Conf. Ser.* **1116** 052041

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The Effectivity of Jambu Akasia (*Bellucia Pentamera* Naudin) fruit extract for killing the *Aedes aegypti* L. Larvae

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Abstract. A research about effectivity of *B pentamera* fruits extract on mortality of *Ae.aegypti* larvae had been conducted during November 2017–January 2018 at P2B2 Research Center Baturaja and Biology Laboratory Faculty of Mathematics and Natural Sciences, Universitas Sriwijaya. The aims of this study were to gain the effectivity and LC_{50} value of extract on larvae mortality. Completely Randomized Design was used as experimental design. Seven treatments were tested (Abate 0.0001 %; Negative control; 1%; 1.5%; 2%; 2.5% and 3% methanolic extract). Extraction of fruit material with methanol as maceration process followed with vacuum rotary evaporator concentration. One-way ANOVA was used as data analysis and LC_{50} obtained from Probit Analysis. The study found that concentration of methanolic fruit extract at 2.5% killed 52% larvae during 24 hr experiment and 63% during 48 hr. LC_{50} values of fruits extract were 3.34% for 24 hours experiment and 3.32% for 48 hours .Thin Layer Chromatoghraphy methods was used for bioautography test of fruit extract, and three spots were found and identified as terpenoid, tannin and flavonoid compounds, based on colour appearance. In conclusion, fruit extraxt of *B. pentamera* is considered effective in killing *Ae aegypti* larvae yet a potential larvicide for future study.

1. Introduction

It has been known that *B pentamera* leaves extract could kill 17.5% larvae of *Ae.aegypti* during 24 hours and 37.5% during 48 hr of exposure [1]. The study was based on the fact that leaves extract could inhibit the growth of some bacterial strains [2]. Furthermore, fruits of *B.pentamera* have long been used as anti-helminthic therapy [3], yet promoting the possibility of further potential to be tested as potential larvicides, especially against *Ae.aegypti* larvae. To prove this assumption, while based on previous report, research on finding the effectivity of methanolic fruit extract on *Ae. aegypti* larvae has been conducted at Laboratory of Biology, Faculty of Mathematics and Natural Sciences, Universitas Sriwijaya and P2B2 Research Center, Baturaja, South Sumatra.

2. Material and Methods

Fruits of *B. pentamera* were sampled from Tanjung Batu villages, Ogan Ilir, South Sumatra. Completely Randomized Design was used in data analysis and as experimental design. Seven treatments were tested (Abate 0.0001 %; negative control; 1%; 1.5%; 2%; 2.5% and 3% fruit extract concentration with methanol as solvent). Extraction with methanol as maceration process solvent was further concentrated by using vacuum rotary-evaporator equipment. One-way ANOVA was used as data analysis and LC_{50} value was obtained from Probit analysis.

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3. Results and Discussion

Mortality effect of fruits extract of *B. pentamera* on *Ae.aegypti* is shown in table below. The results showed that the increase of concentration of fruits extract from 0.0 to 3.0 influences the mortality significantly, but addition of the highest concentration until 3.0% did not show any significant mortality. The phenomena of hormesis was observed from this experiment. Previous authors reported the same case in *Pistia stratiotes* affected by petroleum liquid waste which made the number of *Pistia* profile of toxicity responded as hormesis too [4].

Table 1. Effect of *B pentamera* fruits extract on *Ae.aegypti* larvae mortality during 24 and 48

Concentration (%)	24 hours		48 hours	
	Mortality percentage	Mean values	Mortality percentage	Mean values
0.0	0	0.00 a	0	0.00 a
1.0	0	0.00 a	1	0.25 a
1.5	2	0.50 a	2	0.50 a
2.0	19	4.75 a	26	6.50 b
2.5	52	5.50 b	63	15.75 c
3.0	22	13.00 a	26	6.50 b
Abate 0.0001	96	24.00 c	99	24.75 d

Note; mean values notation at $\alpha = 5$ %

Tabel 2 about LC_{50} below, show that the value of fruits extract at 24 hours treatment was 3.34 and 48 hours treatment was 3.02%. The results explained that LC_{50} of fruits extract is obtained at lower potency than Abate 0.0001% as positive control. Previous study reported that fruits of *B. pentamera* contained vitamin C and could kill some viruses, but the ability of those compounds is not yet enough to kill *Ae. aegypti* in small concentration [5].

Table 2. LC_{50} *B pentamera* fruits extract on larvae mortality of *Ae. aegypti*

Duration of experiment	LC_{50}
24 hours	3.34
48 hours	3.02

The picture below shows the qualitative result of thin layer chromatoghraphy test of methanolic extract. Based on the color appearance, several compounds were detected such as flavonoid, tannin and terpenoid [6].



Figure 1 Color appearance in Thin Layer Chromatography;
1. Terpenoid (blue) 2. Tannin (brown) 3. Flavonoid (yellow)

4. Conclusion

Methanolic extract from fruits of *B. pentamera* possessed potential larvicidal activity by killing 52% at 2.5 concentration during 24 hr and 63% during 48 hr. Probit analysis of found that LC_{50} value of 3.34 for 24 hr and 3.02 for 48 hr experiment. Hormesis phenomenon was observed by an increase of mortality along addition of concentration and decrease later at 2.5 concentration. It is proposed to analyze LC_{50} by quadratic regression as well.

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