

ABSTRAK

UJI EFEKTIVITAS EKSTRAK ETANOL BUAH LADA HITAM (*Piper nigrum*) TERHADAP MORTALITAS DAN PERUBAHAN MORFOLOGI MIDGUT LARVA *Aedes aegypti*

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Nyamuk *Aedes aegypti* merupakan vektor penyebab Demam Berdarah Dengue (DBD). Pengendalian vektor DBD biasanya bergantung pada larvasida sintetik. Tetapi hal ini berisiko menyebabkan resistensi serangga dan meninggalkan residu polutan kimiawi. Sehingga dibutuhkan larvasida alami yang ramah lingkungan dan tidak menyebabkan resistensi. Buah lada hitam (*Piper nigrum*) diduga mengandung metabolit sekunder yang berpotensi sebagai biolarvasida *Aedes aegypti*. Tujuan penelitian ini adalah menguji efektivitas ekstrak etanol buah lada hitam terhadap mortalitas larva *Aedes aegypti* dan mengetahui pengaruh paparan ekstrak terhadap perubahan *midgut* larva. Penelitian menggunakan metode rancangan acak lengkap dengan lima kelompok percobaan dan empat pengulangan sebagai berikut: K (Aquades + 0% ekstrak), P1 (0,25% ekstrak), P2 (0,50% ekstrak), P3 (0,75% ekstrak), P4 (1% ekstrak). Data dianalisis dengan *One-way ANOVA* dan efektivitas ekstrak dilanjutkan ke uji *Post hoc LSD* sehingga diperoleh konsentrasi efektif. Perubahan morfologi *midgut* larva diamati secara deksriptif dan ditampilkan dalam bentuk tabel dan gambar. Hasil penelitian menunjukkan setelah paparan 24 jam efektivitas ekstrak tertinggi pada konsentrasi 1% sebesar 93% mortalitas dan efektivitas terendah pada konsentrasi 0,25% sebesar 43% mortalitas. Ekstrak etanol buah lada hitam (*Piper nigrum*) mempengaruhi perubahan morfologi *midgut* larva *Aedes aegypti* ditandai dengan kerusakan membran perifer, adanya penipisan mikrovili, pembengkakan sel epitel dan vakuolasi sel, serta kerusakan membran basalis.

Kata kunci: *Piper nigrum*, biolarvasida, mortalitas, *midgut*
Aedes aegypti.

ABSTRACT

EFFECTIVITY TEST OF BLACK PEPPER (*Piper nigrum*) ETHANOL EXTRACT ON *Aedes aegypti* LARVAL MORTALITY AND ITS MIDGUT MORPHOLOGICAL CHANGES

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Aedes aegypti is the vector of Dengue Hemorrhagic Fever (DHF). Dengue vector management usually depends on synthetic larvicides. However, it can lead to insect resistance and leave chemical pollutant residues. Therefore natural larvicides are needed for their environmentally friendly and do not induce insect resistance. Black pepper (*Piper nigrum*) fruit is expected to contain secondary metabolites beneficial as larvicides to *Aedes aegypti*. This study aims to test the effectivity of the ethanol extract of black pepper fruit on the mortality of *Aedes aegypti* larvae and determine the effect of extract exposure on larval midgut morphological changes. The study used a completely randomized design with five experimental groups and four repetitions as follows: K (aquades + 0% extract), P1 (0.25% extract), P2 (0.50% extract), P3 (0.75% extract), P4 (1% extract). The data were analyzed using One-way ANOVA and continued with the Post hoc LSD test to obtain an effective concentration. Changes in the morphology of larval midgut were observed descriptively and presented in the form of tables and figures. The results showed that after 24 hours of exposure, the highest effectiveness of the extract at a concentration of 1% was 93% mortality and the lowest effectiveness was at a concentration of 0.25% at 43% mortality. The ethanol extract of black pepper (*Piper nigrum*) fruit affected midgut morphological changes of *Aedes aegypti* larvae characterized by peripheral membrane damage, microvilli thinning, epithelial cell swelling and vacuolation, and basement membrane damage.

Keywords: *Piper nigrum*, biolarvicide, mortality, midgut of *Aedes aegypti*.