

ABSTRAK

Restyana, Della, Patra. 2017. **Larvicidal Effect Ekstrak Etanol Kulit Jeruk Nipis (*Citrus aurantifolia*) Melalui Kerusakan *Perispiracular Lobe* Pada Larva *Aedes aegypti* Instar III.** Tugas Akhir, Program Studi Kedokteran, Fakultas Kedokteran Universitas Brawijaya. Pembimbing: (1) Agustina Tri Endharti, S.Si, Ph.D (2) dr.Ratih Paramita Suprpto, M.Biomed.

Demam Berdarah Dengue (DBD) merupakan penyakit yang ditularkan melalui gigitan nyamuk *Aedes aegypti*. Penggunaan insektisida sintetis dalam mengontrol populasi nyamuk menimbulkan resistensi sehingga dibutuhkan insektisida alami. *Perispiracular lobe* merupakan struktur penting yang berfungsi melindungi saluran pernapasan larva yaitu *terminal spiracle*. Kulit jeruk nipis (*Citrus aurantifolia*) mengandung bahan aktif limonoid yang bekerja dengan cara menghambat sintesis hormon ecdisteroid sehingga proses pergantian kulit larva terganggu dan menyebabkan kerusakan epidermis *perispiracular lobe*. Selanjutnya, flavonoid dapat masuk melalui *terminal spiracle* kemudian bekerja sebagai inhibitor pernapasan. Tujuan dari penelitian ini adalah untuk mengetahui aktivitas larvasida ekstrak etanol kulit jeruk nipis (*Citrus aurantifolia*) terhadap kerusakan *perispiracular lobe* dan *lethal concentration* yang dapat mematikan 100% (LC_{100}) larva *Aedes aegypti* instar III. Sampel yang digunakan adalah 500 ekor larva *Aedes aegypti* instar III dibagi menjadi 5 kelompok perlakuan dengan 4 pengulangan. Perlakuan pada penelitian ini yaitu ekstrak etanol kulit jeruk nipis (*Citrus aurantifolia*) dengan konsentrasi 0,25%, 0,5%, 1%, air sumur (kontrol negatif), dan abate 0,01% (kontrol positif). Diamati larva yang mati setiap 12 jam selama 48 jam. Hasil pemeriksaan mikroskop cahaya menunjukkan kerusakan *perispiracular lobe* yang ditandai dengan terbuka, sedangkan pemeriksaan dengan mikroskop elektron menunjukkan adanya kerusakan berupa perubahan struktur pada *perispiracular lobe* pada konsentrasi ekstrak 0,25%, 0,5%, 1%, dan kontrol positif. *Larvicidal activity* ekstrak etanol kulit jeruk nipis konsentrasi 1% dan K+ yaitu 100%. Berdasarkan hasil analisis statistik, terdapat perbedaan yang signifikan antara kelompok perlakuan dan kontrol positif dengan kontrol negatif ($p < 0,05$). Hasil uji probit menunjukkan hasil bahwa ekstrak etanol kulit jeruk nipis memiliki LC_{100} sebesar 1,051% untuk membunuh 100% larva *Aedes aegypti* instar III. Kesimpulan penelitian ini adalah ekstrak etanol kulit jeruk nipis memiliki efek biolarvasida, salah satunya melalui *perispiracular lobe* pada larva *Aedes aegypti* instar III.

Kata kunci: *larvicidal activity*, ekstrak etanol kulit jeruk nipis, *perispiracular lobe*, Demam Berdarah Dengue

ABSTRACT

Restyana, Della, Patra. 2017. ***Larvicidal Effect of Lime Peel (Citrus aurantifolia) Ethanol Extract Through the Perispiracular Lobe Damage on Aedes aegypti 3rd Instar Larvae***. Final Assignment, Medical Program, Faculty of Medicine Brawijaya University. Supervisor: (1) Agustina Tri Endharti, S.Si, Ph.D (2) dr.Ratih Paramita Suprpto, M.Biomed.

Dengue Hemorrhagic Fever (DHF) is a disease transmitted through the bite of the mosquito *Aedes aegypti*. The use of synthetic insecticides to control mosquito populations cause resistance, so it needs a natural insecticide. *Perispiracular lobe* is an important structure that protect respiratory tract of larvae called *terminal spiracle*. Lime peel (*Citrus aurantifolia*) contains active ingredient like limonoids which works by inhibiting the synthesis of ecdysteroid hormone thus the molting process is disrupted and cause damage on epidermis of *perispiracular lobe*. Furthermore, flavonoid enter through the *terminal spiracle* then work as respiratory inhibitor. The purpose of this research was to determine the larvicidal activity of ethanol extract of lime peel (*Citrus aurantifolia*) towards *perispiracular lobe* damage and lethal concentration that can kill 100% (LC₁₀₀) third instar larvae. The samples used were 500 third instar *Aedes aegypti* larvae that divided into 5 treated group with four replications. The larvae were grouped into five, that were lime peel ethanol extract 0,25%, 0,5%, 1%, negative control with water only, and abate 0,01% as positive control. Dead larvae were observed every 12 hours for 48 hours. There were opening of *perispiracular lobe* with light microscopy observation while damage on the *perispiracular lobe* with electron microscope examination on treated group and positive control. *Larvicidal activity* of lime peel ethanol extract with concentration 1% and K+ is 100%. Based on statistical analysis, there were significant differences between positive control and treatment group with negative control ($p < 0.05$). Probit test results showed that lime peel ethanol extract has LC₁₀₀ at 1.051% to kill 100% of third instar *Aedes aegypti* larvae. It is concluded that lime peel ethanol extract has biolarvasida effect, partly through the *perispiracular lobe* at the third instar larvae of *Aedes aegypti*.

Keywords: larvicidal activity, lime peel ethanol extract, *perispiracular lobe*, and dengue hemorrhagic fever