ABSTRACT

EFFECTIVENESS TEST OF 96% ETHANOL EXTRACT OF MEXICAN SUNFLOWER (*Tithonia Diversifolia*) LEAVES IN SPRAY BIOINSECTICIDE FORMULATION AGAINST ADULT *Aedes Aegypti* MOSQUITOES

By

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Background: Dengue Hemorrhagic Fever (DHF) remains a major health issue in Indonesia. The repeated use of synthetic insecticides contributes to resistance and environmental contamination, highlighting the need for safer alternatives. Mexican sunflower (*Tithonia Diversifolia*) contains insecticidal bioactive compounds, However, studies assessing its effectiveness against adult *Aedes Aegypti* in spray formulation remain limited.
Methods: This experimental study employed a Post Test Only with Control Group design. Five extract concentrations (5%, 10%, 15%, 20%, and 25%), a negative control (aquades), and a positive control (cypermethrin) were tested. Each group consisted of 25 adult *Aedes Aegypti* mosquitoes with four replications. Mortality was observed after 24 hours. Data were analyzed using the Kruskal Wallis test, Mann Whitney post-hoc test, and probit analysis to determine LC_{50}, LC_{90}, LT_{50}, and LT_{90} values.
Results: Significant differences in mortality were observed among treatment groups. Mortality increased with higher extract concentrations, with 20% achieving 89%, which meets the WHO effectiveness threshold (80–95%) and showed no significant difference compared to cypermethrin. The 25% concentration produced 95% mortality and reflected a continuation of the dose–response pattern. Probit analysis yielded an LC_{50} of 2.77%, LC_{90} of 5.37%, LT_{50} of 3.339 hours, and LT_{90} of 12.410 hours.
Conclusion: The 96% ethanol extract of Mexican sunflower (*Tithonia Diversifolia*) leaves in spray formulation is effective against adult *Aedes Aegypti*. A concentration of 20% is sufficient to meet effectiveness criteria and demonstrates potential as an environmentally friendly bioinsecticide alternative to synthetic insecticides.

Keywords: *Aedes Aegypti*, *Tithonia Diversifolia*, Mexican sunflower, bioinsecticide, spray formulation.

ABSTRAK

UJI EFEKTIVITAS EKSTRAK ETANOL 96% DAUN KEMBANG BULAN (*Tithonia Diversifolia*) DALAM SEDIAAN SPRAY BIOINSEKTISIDA TERHADAP MORTALITAS NYAMUK *Aedes Aegypti*

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Latar Belakang: Demam Berdarah Dengue (DBD) masih menjadi masalah kesehatan di Indonesia. Penggunaan insektisida kimia secara berulang menyebabkan resistensi dan meningkatkan risiko pencemaran lingkungan, sehingga diperlukan alternatif yang lebih aman. Daun kembang bulan (*Tithonia Diversifolia*) mengandung senyawa bioaktif yang berpotensi sebagai bioinsektisida, namun penelitian mengenai efektivitasnya terhadap nyamuk *Aedes Aegypti* dewasa dalam sediaan spray masih terbatas.
Metode: Penelitian ini menggunakan desain Post Test Only with Control Group, terdiri dari lima konsentrasi ekstrak (5%, 10%, 15%, 20%, dan 25%), kontrol negatif (aquades), dan kontrol positif (sipermetrin). Setiap kelompok berisi 25 nyamuk *Aedes Aegypti* dewasa dan diulang empat kali. Mortalitas dicatat setelah 24 jam pengamatan. Data dianalisis menggunakan uji *Kruskal Wallis*, uji *Mann Whitney*, serta analisis probit untuk menentukan nilai LC_{50}, LC_{90}, LT_{50}, dan LT_{90}.
Hasil: Terdapat perbedaan mortalitas yang signifikan antar kelompok perlakuan. Mortalitas meningkat seiring peningkatan konsentrasi ekstrak, dan konsentrasi 20% mencapai mortalitas 89% yang memenuhi kriteria efektivitas WHO (80–95%) serta tidak berbeda signifikan dengan sipermetrin. Konsentrasi 25% menunjukkan mortalitas 95% sebagai bagian dari pola peningkatan dosis–respons. Analisis probit menghasilkan LC_{50} sebesar 2,77%, LC_{90} sebesar 5,37%, LT_{50} sebesar 3,339 jam, dan LT_{90} sebesar 12,410 jam.
Kesimpulan: Ekstrak etanol 96% daun kembang bulan (*Tithonia Diversifolia*) dalam sediaan spray efektif sebagai bioinsektisida terhadap nyamuk *Aedes Aegypti* dewasa. Konsentrasi 20% telah memadai untuk memenuhi kriteria efektivitas dan berpotensi dikembangkan sebagai insektisida nabati yang lebih ramah lingkungan.

Kata Kunci: *Aedes Aegypti*, *Tithonia Diversifolia*, bioinsektisida, spray.