

## Effectiveness of *Tagetes* Leaf (*Tagetes erecta* L.) As a Natural Insecticide Against Adult *Culex quinquefasciatus* Mosquitoes

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### ABSTRACT

**Background:** Indonesia is one of country with tropical climate. As a tropical country, some tropical diseases may be found in Indonesia and one of them is Filariasis. Filariasis Disease is transmitted throught adult *Culex quinquefasciatus* mosquitoes. Because the appropriate environment in Indonesia, mosquitoes can easily to live, breed and transmit their disease. One methode to break the chain of transmission from Filariasis disease is using anti-mosquito drugs. However, the chemical anti-mosquito drugs have adverse effects to humans and mosquitoes. So, to prevent the adverse effects we need to used natural anti-mosquito drugs, one of them by using the essential oil of *Tagetes* leaf (*Tagetes erecta* L.).

**Objectivity:** To know the effectiveness of essential oil from *Tagetes* leaf (*Tagetes erecta* L.) with 80% concentration as natural anti-mosquito drug and to compare the time to reach  $KT_{50}$  and  $KT_{90}$  between the essential oil of *Tagetes* leaf with 80% concentration and transflutrin 12,38 g/l againts the mortality of *Culex quinquefasciatus* mosquitoes.

**Methods:** Quasi experimental with post test only group design. Mosquitoes were divided into 4 treatment groups, group I (negative control), group II (essential oil of *Tagetes* leaf with 80% concentration), group III (positive control) and group IV (essential oil diluent). Mosquitoes were observed until knockdown on  $KT_{50}$  and  $KT_{90}$ . The observed result were analyzed using probit analysis.

**Result:** The result showed that from group I (negative control), there were 2 mosquitoes who died after 24-hours. Group II (essential oil of *Tagetes* leaf),  $KT_{50}$  was 103 minutes and  $KT_{90}$  was 251 minutes. Group III (positive control),  $KT_{50}$  was 41 minutes and  $KT_{90}$  was 77 minutes. Group IV (essential oil diluent), there were 13 mosquitoes who died after 24-hours.

**Conclusion:** The essential oil from *Tagetes* leaf (*Tagetes erecta* L.) with 80% concentration can kill *Culex quinquefasciatus* mosquitoes, but the killing power not better than transflutrin 12,38 g/l.

**Keywords:** *Culex quinquefasciatus*, Filariasis, Electric liquid vaporizer, *Tagetes erecta* L., Essential oil, Quasi experimental

## INTISARI

**Latar Belakang:** Indonesia merupakan salah satu negara dengan iklim tropis. Sebagai negara beriklim tropis, beberapa penyakit tropis dapat kita jumpai di Indonesia, salah satunya Filariasis. Penyakit Filariasis ditularkan melalui nyamuk *Culex quinquefasciatus* dewasa. Iklim tropis Indonesia membuat nyamuk dengan mudah hidup dan berkembang biak di lingkungan yang sesuai dan menularkan penyakit. Untuk memutus rantai penularan penyakit Filariasis diperlukan penggunaan obat anti nyamuk. Namun untuk mencegah efek buruk penggunaan obat anti nyamuk kimia maka digunakan obat anti nyamuk alami, salah satunya dengan menggunakan minyak atsiri daun tahi kotok (*Tagetes erecta* L.).

**Tujuan Penelitian:** Untuk mengetahui efektifitas minyak atsiri daun tahi kotok (*Tagetes erecta* L.) dengan konsentrasi 80% sebagai obat anti nyamuk alami, mengetahui waktu mencapai  $KT_{50}$  dan  $KT_{90}$  antara minyak atsiri daun tahi kotok (*Tagetes erecta* L.) konsentrasi 80% dan transflutrin 12,38 g/l terhadap mortalitas nyamuk *Culex quinquefasciatus*.

**Metode penelitian:** *Quasi experimental* dengan *post test only group design*. Nyamuk dibagi menjadi 4 kelompok perlakuan, kelompok I (kontrol negatif), kelompok II (minyak atsiri daun tahi kotok 80%), kelompok III (kontrol positif) dan kelompok IV (pengencer minyak atsiri). Nyamuk diamati sampai mengalami *knockdown* pada  $KT_{50}$  dan  $KT_{90}$ . Hasil pengamatan dianalisis menggunakan analisis probit.

**Hasil Pengamatan:** Kelompok I (kontrol negatif) terdapat 2 ekor nyamuk *Culex quinquefasciatus* yang mati. Kelompok II (minyak atsiri daun tahi kotok 80%),  $KT_{50}$  pada 103 menit dan  $KT_{90}$  pada 251 menit. Kelompok III (kontrol positif),  $KT_{50}$  pada 41 menit dan  $KT_{90}$  pada 77 menit. Kelompok IV (pengencer minyak atsiri) terdapat 13 ekor nyamuk *Culex quinquefasciatus* yang mati.

**Kesimpulan:** Minyak atsiri daun tahi kotok (*Tagetes erecta* L.) konsentrasi 80% dapat membunuh nyamuk *Culex quinquefasciatus*, namun daya bunuhnya tidak lebih baik dibandingkan transflutrin 12,38 g/l.

**Kata Kunci:** *Culex quinquefasciatus*, Filariasis, Obat nyamuk elektrik cair, *Tagetes erecta* L., Minyak atsiri, Kuasi eksperimental