

ABSTRAK

Latar Belakang. Nyamuk adalah vektor penyakit serius, mendorong pencarian penolak alami yang aman. Minyak atsiri daun kayu manis (*Cinnamomum burmannii*) berpotensi sebagai repelan. Formulasi emulgel dipilih karena mudah diaplikasikan dan meningkatkan penetrasi zat aktif. Namun, stabilitas emulgel bergantung pada optimasi eksipien seperti Hydroxypropyl Methylcellulose (HPMC) dan Triethanolamine (TEA).

Metode. Penelitian eksperimental ini mengoptimalkan konsentrasi HPMC (1,5-2,5%) dan TEA (2-3%) menggunakan *Simplex Lattice Design* (SLD) dengan parameter meliputi pH, viskositas, daya sebar dan daya lekat. Formula optimum ditentukan berdasarkan nilai *desirability*. Evaluasi formula optimum meliputi pH, viskositas, daya sebar, daya lekat, stabilitas (sentrifugasi), hedonik dan aktivitas anti nyamuk (*Aedes aegypti*). Verifikasi formula optimum dilakukan menggunakan uji *one sample t-test*.

Hasil. Hasil optimasi menunjukkan formula optimal dengan komposisi HPMC 2,5% dan TEA 2% dengan nilai *desirability* 0,954. Evaluasi formula optimum emulgel menunjukkan karakteristik yang baik: pH ($6,45 \pm 0,087$), viskositas (3010 ± 128 cPs), daya sebar ($4,906 \pm 0,243$ cm), daya lekat ($19,46 \pm 0,527$ detik), stabilitas kurang baik terhadap sentrifugasi dan disukai panelis (warna, tekstur). Emulgel minyak atsiri daun kayu manis 5% efektif sebagai penolak nyamuk dengan rata-rata daya proteksi 83%. Hasil verifikasi formula optimum menunjukkan bahwa tidak terdapat perbedaan antara nilai aktual dan nilai prediksi.

Kesimpulan. Kombinasi minyak atsiri daun kayu manis 5% dan konsentrasi optimal HPMC 2,5% dan TEA 2% menghasilkan emulgel penolak nyamuk minyak atsiri daun kayu manis yang stabil dan efektif.

Kata Kunci: Emulgel, Minyak Atsiri Kayu Manis, HPMC, TEA, Repelan Nyamuk, Optimasi.

ABSTRACT

Background. Mosquitoes are serious disease vectors, driving the search for safe, natural repellents. Cinnamon leaf essential oil (*Cinnamomum burmannii*) shows potential as a repellent. An emulgel formulation was chosen due to its easy application and enhanced active ingredient penetration. However, emulgel stability depends on optimizing excipients like Hydroxypropyl Methylcellulose (HPMC) and Triethanolamine (TEA).

Methods. This experimental study optimized the concentrations of HPMC (1.5-2.5%) and TEA (2-3%) using Simplex Lattice Design (SLD). Parameters included pH, viscosity, spreadability, and adhesiveness. The optimal formula was determined based on the desirability value. Evaluation of the optimal formula included pH, viscosity, spreadability, adhesiveness, stability (centrifugation), hedonic assessment, and anti-mosquito activity (against *Aedes aegypti*). Verification of the optimal formula was performed using a one-sample t-test.

Results. Optimization results showed an optimal formula with a composition of 2.5% HPMC and 2% TEA, yielding a desirability value of 0.954. Evaluation of the optimal emulgel formula showed good characteristics: pH (6.45 ± 0.087), viscosity (3010 ± 128 cPs), spreadability (4.906 ± 0.243 cm), adhesiveness (19.46 ± 0.527 seconds). It was poor stability against centrifugation and preferred by panelists (regarding color and texture). The 5% cinnamon leaf essential oil emulgel was effective as a mosquito repellent with an average protection rate of 83%. Verification of the optimal formula showed no significant difference between the actual and predicted values.

Conclusion. The combination of 5% cinnamon leaf essential oil and the optimal concentrations of 2.5% HPMC and 2% TEA resulted in a stable and effective cinnamon leaf essential oil mosquito repellent emulgel.

Keywords: Emulgel, Cinnamon Leaf Essential Oil, HPMC, TEA, Mosquito Repellent, Optimization.