

## INTISARI

Penelitian tentang optimasi proses pencampuran pada pembuatan repelan gel *citronella oil* dengan carbopol<sup>®</sup> 940 3%b/v sebagai *gelling agent* dan propilen glikol sebagai humektan bertujuan untuk menentukan lama pencampuran dan kecepatan *mixer* yang optimum dalam proses pembuatan gel repelan serta mengetahui pengaruh proses pencampuran terhadap sifat fisis, kestabilan dan efektivitas (daya repelan) gel repelan *citronella oil*.

Penelitian ini merupakan rancangan eksperimental murni dengan variabel eksperimental ganda (*factorial design*). Subyek uji pada penelitian ini adalah formula optimum gel repelan *citronella oil* dengan carbopol<sup>®</sup> 940 3%b/v sebagai *gelling agent* dan propilen glikol sebagai humektan dengan perbandingan sistem gel : *citronella oil* adalah 93 : 10. Proses pencampuran yang diteliti adalah lama pencampuran dan kecepatan putar *mixer*. Untuk optimasi, digunakan metode *factorial design* dua faktor dan dua level, 2<sup>2</sup>, dengan kombinasi formula (1), (a), (b), dan (ab). Optimasi dilakukan terhadap parameter sifat fisis gel yang meliputi daya sebar, viskositas, dan modus nilai tengah interval ukuran tetesan minyak; parameter stabilitas fisis gel yaitu pergeseran viskositas setelah penyimpanan satu bulan; serta efektivitas uji daya repelan terhadap sejumlah nyamuk *Aedes aegypti* betina yang menempel pada kulit kelinci albino yang telah diolesi dengan formula gel repelan *citronella oil* selama 6 jam.

Hasil penelitian menunjukkan bahwa proses pencampuran (lama pencampuran dan kecepatan putar *mixer*) tidak memberikan pengaruh pada sifat fisis, stabilitas, dan efektivitas sediaan gel repelan *citronella oil*. Optimasi gel repelan *citronella oil* meliputi sifat fisis berupa daya sebar  $\leq 5$ cm, viskositas 15,5 sampai 20dPa.s, dan modus nilai tengah interval ukuran tetesan minyak  $< 10\mu\text{m}$ ; stabilitas sediaan yang dinyatakan dengan persen pergeseran viskositas  $< 10\%$ ; serta efektivitas sediaan gel repelan yang dinyatakan sebagai persen repelensi  $\geq 95\%$ .

Penggambaran profil respon melalui *contour plot super imposed* yang mencakup seluruh respon yang diharapkan, menghasilkan suatu area kondisi optimum untuk proses pencampuran dalam pembuatan sediaan gel repelan *citronella oil* terbatas pada faktor (lama pencampuran dan kecepatan putar *mixer*) dan level yang diteliti.

Kata kunci : *Citronella oil*, Carbopol<sup>®</sup> 940 3%b/v, Propilen Glikol, Lama pencampuran, Kecepatan putar *mixer*, Gel, *Factorial Design*

## ABSTRACT

The research about optimization mixing process in making repellent gel citronella oil with carbopol 940<sup>®</sup> 3%b/v as gelling agent and propylene glycol as humectant aim to determine mixing time and optimized speed of the mixer in making repellent gel of citronella oil. It is also to observed the effect of mixing process towards physical properties, stability, and effectivity (repellent ability) repellent gel of citronella oil.

This research category was real experimental with double experimental variable (factorial design). The subject research was optimum formula of citronella oil repellent gel with carbopol<sup>®</sup> 940 3%b/v as gelling agent and propylene glycol as humectant; with composition of system gel : citronella oil was 93 : 10. The research studies were time of mixing and speed of revolution of mixer. That time and speed of revolution were optimization by factorial design application, two factor and two level, 2<sup>2</sup>, with combination of (1), (a), (b), and (ab) formulas. Optimization process was done for parameter of gel physical properties i.e. the spreading capability, viscosity, and center value modus of size particle interval; parameter of gel physic stability i.e. alteration of viscosity after they had kept for 1 month; and effectivity repellent ability to protect skins of albino rabbit which had spread by formulas from *Aedes aegypti* female mosquitoes for 6 hours.

The research's result shows that mixing process (time of mixing and speed of revolution) do not give effect towards physical properties, stability, and effectivity repellent gel of citronella oil. Optimization repellent gel of citronella oil include physical properties i.e. spreading capability  $\leq 5\text{cm}$ , viscosity 15,5 up to 20dPa.s, and center value modus of size particle interval  $< 10\mu\text{m}$ ; stability of repellent gel which is evidence as percent alteration of viscosity  $< 10\%$ ; and effectivity of repellent gel which is evidence as percent repellency  $\geq 95\%$ .

Sketch of response profile trough contour plot super imposed which include all of responses, results an area of optimum condition for mixing process in making repellent gel of citronella oil limited on this research factors (time of mixing and speed of revolution of mixer) and levels.

Key words : Citronella oil, Carbopol<sup>®</sup> 940 3%b/v, Propylene glycol, Time of mixing, Speed of revolution, Gel, Factorial Design