ABSTRACT

RELEASE TEST AND ANTIBACTERIAL ACTIVITY OF *TEA TREE OIL LIPID CARRIER (*NLC*) NANOSTRUCTURES* (*melalauca ALTERNIFOLIA*) USING *SURFACE RESPONSE METHOD*

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Treatment of acne with a doctor's prescription or over-the-counter drugs without a doctor's prescription, improper use causes side effects such as short-term irritation or long-term resistance. To avoid side effects, natural ingredients are prepared to cure acne, namely the formulation of *Tea Tree oil* into a *Nanostrustured Lipid Carrier* preparation with a combination of solid lipids (*Glyceryl monostrearate*) and liquid lipids (*Callendula Oil*). This study aims to determine the effect of solid, liquid lipids and surfactants in the NLC *Tea Tree oil* formulation and Anti-bacterial Activity in the NLC *Tea Tree oil* formula. The results showed that the release test of NLC Tea Tree oil used a franz diffusion cell with a cellophane membrane, dichloromethane-methanol solvent, temperature 37◦, speed 600 rpm. In the release test, the results of the release profile, release kinetics and rate of release (Flux), flux results have a range of F1 (0.3648 g/cm2), F2 (0.368 g/cm2), F3 (0.5294 g/cm2), F4 (0.5627 g/cm2), F5 (0.8124 g/cm2), F6 (0.3316 g/cm2), F7 (0.6422 g/cm2), F8 (0.4659 g/cm2). Based on the calculation model of the release kinetics, the Higuchi model is obtained, which is a release model where the amount of substance released depends on time. The diameter of the inhibition zone of the NLC TTO formulation ranged from 2.8 ± 1.5 to 10.8 ± 3.5 and the diameter of the inhibition zone on clindamycin gel ranged from 15.8 ± 1.8 to 20.35 ± 2.7, the positive control yielded the diameter of inhibition in the strong category and the NLC TTO formulation produced the medium diameter of inhibition.

Keywords : *Tea Tree oil*, *Nanostructured Lipid Carrier,* drug release, higuchi, antibacterial

ABSTRAK

UJI PELEPASAN DAN AKTIVITAS ANTIBAKTERI *NANOSTRUCTURES LIPID CARRIER* (NLC) *TEA TREE OIL* (*MELALAUCA ALTERNIFOLIA*) MENGGUNAKAN METODE *RESPON SURFACE*

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Pengobatan jerawat dengan resep dokter atau obat bebas tanpa resep dokter penggunaan yang tidak tepat menimbulkan efek samping seperti iritasi jangka pendek atau resistensi jangka panjang, untuk menghindari efek samping maka dibuat sediaan bahan alam untuk menyembuhkan jerawat yaitu formulasi dari *Tea Tree oil* menjadi sediaan *Nanostrustured Lipid Carrier* dengan kombinasi lipid padat (*Glyseril monostrearate*) dan lipid cair (*Callendula Oil*). Penelitian ini bertujuan untuk mengetahui pengaruh lipid padat, cair serta sufaktan formulasi NLC *Tea Tree oil* dan Aktivitas Anti bakteri pada formula NLC *Tea Tree oil*. Hasil penelitian menunjukkan sediaan NLC *Tea Tree oil* pada uji pelepasan menggunakan sel difusi *franz* dengan membran selofan, pelarut diklorometan-metanol dengan tempratur 37◦, kecepatan 600 rpm. Pada pengujian pelepasan didapatkan hasil profil pelepasan, kinetika pelepasan dan laju pelepasan (*Flux*), hasil *flux* memiliki rentang F1 (0,3648 g/cm^2), F2 (0,368 g/cm^2), F3 (0,5294 g/cm^2), F4 (0,5627 g/cm^2), F5 (0,8124 g/cm^2), F6 (0,3316 g/cm^2), F7 (0,6422 g/cm^2), F8 (0,4659 g/cm^2). Berdasarkan model perhitungan kinetika pelepasan, didapatkan model *higuchi,* merupakan model pelepasan dimana jumlah zat yang terlepas bergantung terhadap waktu. Hasil diameter zona hambat furmulasi NLC TTO memiliki rentang dari 2,8 ± 1,5 sampai 10,8 ± 3,5 dan diameter zona hambat pada klindamisin gel memilikib rentang 15,8 ± 1,8 sampai 20,35 ± 2,7, kontrol positif menghasilkan diameter daya hambat kategori kuat dan formulasi NLC TTO menghasilkan diameter daya hambat sedang.

Kata kunci : *Tea Tree oil*, *Nanostructured Lipid Carrier*, pelepasan obat, *higuchi*, antibakteri