

ABSTRAK

Minyak atsiri daun pala merupakan salah satu minyak atsiri yang memberi aktivitas biologis sebagai antibakteri. Efisien dan efektifitas minyak atsiri daun pala dapat ditingkatkan melalui teknologi nanoemulsi. Nanoemulsi memiliki kapasitas kelarutan lebih tinggi dari larutan miselar sederhana, lebih stabil dibandingkan emulsi dan dispersi. Tujuan dari penelitian ini adalah untuk mengetahui formulasi dan karakterisasi nanoemulsi minyak atsiri daun pala serta aktivitasnya terhadap uji antibakteri *Propionibacterium acnes*. Pembuatan nanoemulsi menggunakan metode energi rendah menggunakan tween 80 sebagai surfaktan dan propilen glikol sebagai kosurfaktan dengan tiga variasi konsentrasi minyak yaitu 1, 3, dan 5%, selain itu juga dibuat formulasi emulsi dan minyak yang diencerkan dengan konsentrasi minyak yang sama dengan nanoemulsi. Karakterisasi nanoemulsi meliputi uji organoleptis, uji pH, uji sentrifugasi, uji *freeze-thaw cycle*, uji tipe nanoemulsi, uji viskositas, uji persen transmitan pengukuran distribusi ukuran partikel. Hasil pengujian organoleptis, sentrifugasi, dan *freeze-thaw cycle* nanoemulsi menunjukkan penampakan jernih dan stabil, sedangkan pada emulsi masih terdapat sediaan yang keruh dan kurang stabil. Hasil pengujian pH, tipe nanoemulsi, viskositas, persentase transmitan, dan distribusi ukuran partikel menunjukkan hasil yang baik dan sesuai dengan referensi. Emulsi memiliki pH, tipe emulsi, dan viskositas yang baik, namun emulsi dengan konsentrasi minyak atsiri daun pala 5% tidak dapat digolongkan sebagai emulsi yang baik karena memiliki persentase transmitan yang jauh dari 90% dan memiliki penampakan yang keruh. Hasil zona hambat antibakteri *P. acne* nanoemulsi 1, 3, 5% berturut-turut yaitu $13,035 \pm 0,475$; $13,530 \pm 0,490$; $14,805 \pm 0,265$ mm. Hasil zona hambat yang diperoleh menunjukkan aktivitas antibakteri yang kuat.

Kata Kunci : Antibakteri, emulsi, nanoemulsi, minyak atsiri daun pala (*Myristica fragrans* Houtt).

ABSTRACT

Nutmeg leaf oil is one of the essential oils that provides biological activity as an antibacterial. Efficiency and effectiveness of nutmeg leaf essential oil can be increased through nanoemulsion technology. Nanoemulsions have a higher solubility capacity than simple micellar solutions, and are more stable than emulsions and dispersions. The purpose of this study was to determine the formulation and characterization of nutmeg leaf essential oil nanoemulsion and its activity against *Propionibacterium acnes* antibacterial test. The nanoemulsion was prepared using a low energy method using tween 80 as a surfactant and propylene glycol as a cosurfactant with three variations of oil concentration, namely 1, 3, and 5%, in addition to that, emulsion and oil formulations were also diluted with the same oil concentration as nanoemulsion. Nanoemulsion characterization includes organoleptic test, pH test, centrifugation test, freeze-thaw cycle test, nanoemulsion type test, viscosity test, percent transmittance test measuring particle size distribution. The results of organoleptic, centrifugation, and freeze-thaw cycle nanoemulsion tests showed a clear and stable appearance, while the emulsion still contained cloudy and less stable preparations. The test results for pH, nanoemulsion type, viscosity, transmittance percentage, and particle size distribution showed good results and were in accordance with the references. The emulsion has a good pH, emulsion type, and viscosity, but an emulsion with a concentration of 5% nutmeg leaf oil cannot be classified as a good emulsion because it has a transmittance percentage far from 90% and has a cloudy appearance. The results of the antibacterial inhibition zone of *P. acnes* nanoemulsion 1.3.5% were 13.035 ± 0.475 ; 13.530 ± 0.490 ; 14.805 ± 0.265 mm. The inhibition zone results obtained showed strong antibacterial activity.

Keywords : Antibacterial, emulsion, nanoemulsion, nutmeg leaf essential oil (*Myristica fragrans* Houtt).