

ABSTRAK

Minyak atsiri biji pala (*Myristica fragrans* Houtt) mengandung senyawa aktif yang berpotensi sebagai antibakteri dan dapat diformulasikan dalam bentuk nanoemulsi. Penelitian bertujuan mengetahui fraksi minyak atsiri biji pala yang paling aktif terhadap *S. aureus*, memformulasikan dan mengkarakterisasi nanoemulsi dari fraksi tersebut, serta menguji aktivitas antibakterinya. Minyak atsiri biji pala didestilasi fraksinasi pada tekanan 10 mmHg dan menghasilkan 3 fraksi. Uji antibakteri dilakukan pada seluruh fraksi. Fraksi terbaik diformulasikan menjadi sediaan nanoemulsi dengan variasi konsentrasi minyak atsiri biji pala (0%, 1%, 3%, 5%, dan 7%), surfaktan tween 80 (20%), serta kosurfaktan propilen glikol (15%). Karakterisasi meliputi uji organoleptik, tipe nanoemulsi, pH, viskositas, persen transmittan, distribusi ukuran partikel, serta stabilitas kinetik dan termodinamik. Nanoemulsi kemudian diuji aktivitas antibakterinya terhadap *S. aureus*. Hasil menunjukkan fraksi 2 sebagai fraksi paling aktif dengan zona hambat 2,42 mm (10.000 ppm) dan 3,88 mm (15.000 ppm). Nanoemulsi FR2 memiliki visual jernih, bertipe *oil in water*, pH 4,5-5,43, viskositas 4,3638-16,4523 mPa.s, dan persen transmittan 95,6-99,8%. Nanoemulsi FR2 minyak atsiri biji pala stabil secara kinetik dan termodinamik. Ukuran partikel <200 nm untuk nanoemulsi 1%, 3%, 5%, dan 7% berturut-turut sebesar 88,4%, 86,5%, 83,9%, dan 46,6%. Zona hambat nanoemulsi dengan konsentrasi tersebut masing-masing 3,47; 6,06; 8,80; dan 9,46 mm.

Kata kunci: Minyak atsiri biji pala, destilasi fraksinasi, antibakteri, nanoemulsi.

ABSTRACT

Nutmeg seed essential oil (*Myristica fragrans* Houtt) contains active compounds that have the potential to be antibacterial and can be formulated in the form of nanoemulsions. The aim of the study was to determine the essential oil fraction of nutmeg seeds that was most active against *S. aureus*, formulate and characterize nanoemulsions of that fraction, and test its antibacterial activity. Nutmeg seed essential oil is distilled fractionally at a pressure of 10 mmHg and produces 3 fractions. Antibacterial tests were performed on all fractions. The best fraction is formulated into nanoemulsion preparations with variations in the concentration of nutmeg seed essential oils (0%, 1%, 3%, 5%, and 7%), tween surfactant 80 (20%), and propylene glycol cosurfactant (15%). Characterization includes organoleptic assays, nanoemulsion type, pH, viscosity, percent of transmitters, particle size distribution, and kinetic and thermodynamic stability. The nanoemulsion was then tested for its antibacterial activity against *S. aureus*. The results showed fraction 2 as the most active fraction with an inhibition zone of 2.42 mm (10,000 ppm) and 3.88 mm (15,000 ppm). FR2 nanoemulsion has a clear visual, *oil-in-water type*, pH 4.5-5.43, viscosity 4.3638-16.4523 mPa.s, and transmitter percentage 95.6-99.8%. The FR2 nanoemulsion of nutmeg seed essential oil is kinetically and thermodynamically stable. The particle size <200 nm for 1%, 3%, 5%, and 7% nanoemulsions was 88.4%, 86.5%, 83.9%, and 46.6%, respectively. The inhibition zone of nanoemulsions with such concentrations is 3.47 each; 6.06; 8.80; and 9.46 mm.

Keywords: Nutmeg seed essential oil, fractionation distillation, antibacterial, nanoemulsion.