

INTISARI

Minyak atsiri dari daun sirih merah (*Piper crocatum* Ruiz & Pav.) diketahui mengandung berbagai komponen kimia yang memiliki aktivitas sebagai antibakteri. Penelitian ini bertujuan untuk mendapatkan formula terbaik minyak atsiri yang diformulasi menjadi sediaan nanoemulsi dan emulsi serta mengetahui pengaruh formulasi bentuk sediaan emulsi dan nanoemulsi pada aktivitas antibakteri minyak atsiri daun sirih merah terhadap bakteri *Escherichia coli*.

Minyak atsiri daun sirih merah diisolasi menggunakan destilasi uap dan air. Emulsi dan nanoemulsi diuji aktivitas antibakterinya dengan menggunakan metode mikrodilusi pada konsentrasi 1,25% b/b. Analisis data dilakukan dengan membandingkan persentase daya hambat minyak atsiri, nanoemulsi, dan emulsi terhadap bakteri uji. Analisis data dilakukan menggunakan One Way ANOVA pada taraf kepercayaan 95%.

Formula nanoemulsi optimum dapat dibuat dengan komposisi parafin 0,125 gram, minyak atsiri daun sirih merah 0,125 gram, akuades 3,5 gram, serta Tween 80 dan PEG 400 dengan perbandingan 1:2 dalam 5 gram formula. Formula emulsi optimum dapat dibuat dengan komposisi parafin 0,875 gram, minyak atsiri daun sirih merah 0,125 gram, akuades 3,5 gram, serta Tween 80 dan Span 80 dengan perbandingan 0,25:0,75 dalam 5 gram formula. Hasil penelitian menunjukkan bahwa pada kadar 1,25% b/b minyak atsiri yang diformulasi menjadi sediaan emulsi memberikan persen hambatan sebesar $17,45 \pm 5,92\%$, sedangkan dalam bentuk nanoemulsi memberikan persen hambatan $49,58 \pm 3,27\%$. Sehingga minyak atsiri yang diformulasi dalam bentuk sediaan nanoemulsi memiliki aktivitas antibakteri lebih baik daripada bentuk emulsinya.

Kata kunci: Daun sirih merah, emulsi, nanoemulsi, antibakteri

ABSTRACT

Essential oil from red betel leaf (*Piper crocatum* Ruiz & Pav.) is known to have various chemical components that can act as antibacterial agent. The purpose of this research is to get the best formula out of red betel leaf essential oil that formulated into nanoemulsions and emulsions, and also to know the effect of emulsion and nanoemulsion formulation on antibacterial activity of red betel leaf essential oil against *Escherichia coli* bacteria.

The essential oil of red betel leaf is isolated by steam and water distillation. Both emulsion and nanoemulsion were tested for their antibacterial activity using microdilution method at 1,25% w/w concentration. Data analysis was done by comparing the percentage of inhibitory power of red betel leaf essential oil, nanoemulsion, and emulsion to the test bacteria. Data analysis was performed using One Way ANOVA at 95% confidence level.

The optimum nanoemulsion formula can be prepared with 0,125 grams of paraffin, 0,125 grams of red betel leaf essential oil, 3,5 grams of aquadest, and Tween 80 and PEG 400 with a ratio of 1:2 in 5 grams of formula. The optimum emulsion formula can be prepared with 0,875 grams of paraffin, 0,125 grams of red betel leaf essential oil, 3,5 grams of aquadest, and Tween 80 and Span 80 with a ratio of 0,25:0,75 in 5 grams of formula. The results of this research showed that at 1,25% w/w the formulated essential oil gave $17,45 \pm 5,92\%$ of growth inhibition in emulsion form, whereas in nanoemulsion form it gave $49,58 \pm 3,27\%$ of growth inhibition. Thus showing that essential oil that was formulated in nanoemulsion form have better antibacterial activity compared to its emulsion form.

Keywords: Red betel leaf, emulsion, nanoemulsion, antibacterial agent