

INTISARI

Minyak masoyi dari kulit batang *Massoia aromatica* Becc. (Lauraceae) yang mengandung komponen utama masoyi lakton terbukti menghambat pertumbuhan sel *planktonic* dan biofilm *Candida albicans*. Minyak atsiri tersebut juga diketahui mampu meningkatkan aktivitas fagositosis makrofag peritoneal mencit. Minyak masoyi ini telah dikembangkan dalam bentuk nanoemulsi agar mudah larut air dan stabil. Penelitian ini bertujuan mengetahui daya antibiofilm *C. albicans* nanoemulsi minyak masoyi, pengaruhnya terhadap fagositosis makrofag, dan potensi sitotoksitasnya terhadap sel vero secara *in vitro*.

Keberadaan minyak masoyi dalam nanoemulsi minyak masoyi diperiksa secara kuantitatif menggunakan KLT-Densitometri. Kestabilan bentuk nano dalam sampel diamati dengan mengukur transmitannya dibanding blanko akuades. Uji penghambatan biofilm *C. albicans* dilakukan pada mikrotiter 96 sumuran. Hambatan biofilm ditentukan dengan metode kristal violet pada 24 jam dan 48 jam. Baik lateks maupun *C. albicans* digunakan dalam uji fagositosis makrofag. Uji sitotoksitasnya dilakukan menggunakan sel vero dengan metode MTT.

Nanoemulsi minyak masoyi memiliki transmitan yang tidak berbeda dengan blanko setelah penyimpanan lebih dari tiga bulan sehingga sampel dinilai stabil. Kadar masoyi lakton yang terkandung dalam sampel nanoemulsi minyak masoyi berdasarkan KLT-densitometri sebesar $3,4\% \pm 0,3\%$ b/v. Daya hambat nanoemulsi minyak masoyi terhadap biofilm *C. albicans* tidak berbeda bermakna dibanding minyak masoyi. Sifat antibiofilmnya menurun dengan meningkatnya umur biofilm. Persen hambatan biofilm fase 24 jam nanoemulsi minyak masoyi dan minyak masoyi pada kadar 750 $\mu\text{g/mL}$, 1.500 $\mu\text{g/mL}$, 2.250 $\mu\text{g/mL}$ berturut-turut $64,2\% \pm 3,4\%$; $68,9\% \pm 0,9\%$; $69,7\% \pm 0,5\%$ dan $54,1 \pm 2,4\%$; $63,0\% \pm 2,2\%$; $66,3\% \pm 0,7\%$. Persen hambatan biofilm fase 48 jam nanoemulsi minyak masoyi dan minyak masoyi pada kadar 750 $\mu\text{g/mL}$, 1.500 $\mu\text{g/mL}$, 2.250 $\mu\text{g/mL}$ berturut-turut $42,0\% \pm 1,1\%$; $48,0\% \pm 0,5\%$; $45,5\% \pm 1,5\%$ dan $19,5\% \pm 2,3\%$; $28,6\% \pm 9,5\%$; $42,5\% \pm 1,5\%$. Aktivitas fagositosis nanoemulsi minyak masoyi terhadap lateks dan *C. albicans* tidak berbeda bermakna dibanding minyak masoyi. IC_{50} nanoemulsi minyak masoyi dan minyak masoyi terhadap sel vero yaitu berturut-turut 35,9 $\mu\text{g/mL}$ dan 107,5 $\mu\text{g/mL}$.

Kata kunci: *Massoia aromatica*, *Candida albicans*, antibiofilm, indeks fagositosis, sitotoksitas

ABSTRACT

Massoia oil from the bark of *Massoia aromatica* Becc. (Lauraceae) contains massoia lactone as the major component. It has been proven to inhibit the growth of planktonic cells and *Candida albicans* biofilm. The essential oil was also reported to increase phagocytic activity of murine peritoneal macrophages. Massoia oil has been developed into nanoemulsion to improve its solubility in water and its stability. This study was aimed to find out the effect of massoia oil nanoemulsion as antibiofilm towards *C. albicans*, the effect on macrophage phagocytosis, and the potential cytotoxicity against vero cells *in vitro*.

The presence of massoia oil in the masoyi oil nanoemulsion was examined quantitatively by TLC-Densitometry. The stability of nano form in the sample was observed by measuring its transmittance compared to blank. *C. albicans* biofilm inhibition test was performed on 96 wells microtiter. Biofilm inhibition was determined by using crystal violet after 24 h and 48 h incubation. Both latex and *Candida albicans* were used in the macrophage phagocytosis assay. Cytotoxicity test towards vero cells was observed by using MTT method.

The massoia oil nanoemulsion transmittance was not significantly different with the blank after more than 3 month so then it is concluded as stable. Based on TLC-Densitometry, massoia lactone content was detected on the sample of massoia oil nanoemulsion at $3.4\% \pm 0.3\%$ w/v. *Candida albicans* biofilm inhibition of massoia oil nanoemulsion was not significantly different with the masoyi oil. The antibiofilm activity decreased with increasing maturity of the biofilm. The inhibition percentages of biofilm 24 h of massoia oil nanoemulsion and massoia oil at concentration 750 $\mu\text{g/mL}$; 1,500 $\mu\text{g/mL}$; 2,250 $\mu\text{g/mL}$ were found as follows, $64.2\% \pm 3.4\%$; $68.9\% \pm 0.9\%$; $69.7\% \pm 0.5\%$ and $54.1 \pm 2.4\%$; $63.0\% \pm 2.2\%$; $66.3\% \pm 0.7\%$ respectively. The inhibition percentages of biofilm 48 h of massoia oil nanoemulsion and massoia oil at concentration 750 $\mu\text{g/mL}$; 1,500 $\mu\text{g/mL}$; 2,250 $\mu\text{g/mL}$ were $42.0\% \pm 1.1\%$; $48.0\% \pm 0.5\%$; $45.5\% \pm 1.5\%$ and $19.5\% \pm 2.3\%$; $28.6\% \pm 9.5\%$; $42.5\% \pm 1.5\%$ respectively. Masoyi oil nanoemulsion phagocytic activity against latex and *Candida albicans* was not significantly different with the masoyi oil. The IC_{50} of massoia oil nanoemulsion and massoia oil towards vero cells were 35.9 $\mu\text{g/mL}$ and 107.5 $\mu\text{g/mL}$ respectively.

Keywords: *Massoia aromatica*, *Candida albicans*, antibiofilm, phagocytic index, cytotoxicity