

KAJIAN KOMBINASI MINYAK SERAI WANGI (*Cymbopogon winterianus*) DAN MINYAK LEMON (*Citrus limon*) SEBAGAI OBAT KUMUR PADA PENCEGAHAN GINGIVITIS KEHAMILAN
INTISARI

Latar Belakang. prevalensi gingivitis kehamilan masih tinggi di Indonesia. Gingivitis kehamilan juga dapat berpengaruh pada kehamilan berisiko tinggi. Oleh karena itu diperlukan upaya pencegahan, salah satunya dengan penggunaan obat kumur kombinasi minyak serai wangi (*Cymbopogon winterianus*) dan minyak lemon (*Citrus limon*). Minyak serai wangi dan minyak lemon terbukti mempunyai sifat antibakteri. Tujuan penelitian ini untuk mengkaji karakteristik fisik dan organoleptik formula obat kumur kombinasi minyak serai wangi dan minyak lemon; mengkaji aktivitas antibakteri pada bakteri Gram positif (*S. sanguinis*) dan bakteri Gram negatif (*P. gingivalis*); uji sitotoksitas pada sel HGF; mengkaji efektivitas pada pencegahan gingivitis tikus bunting.

Metode Penelitian. Penelitian eksperimental laboratorik murni dengan 4 tahapan penelitian. Tahap 1, kandungan minyak serai wangi dan minyak lemon pada Formula I (1%:2,77%), II (11%:1%) dan III (4,13%:1%) diukur diameter partikel, nilai transmitan serta *creaming index*. Tahap 2, pengujian antibakteri pada bakteri *S. sanguinis* dan *P. gingivalis* dengan metode dilusi agar. Tahap 3, pengujian MTT assay pada sel HGF. Tahap 4, pengujian *in vivo* aplikasi obat kumur pada tikus bunting yang diinduksi ligasi dengan waktu pengamatan 3 dan 7 hari. Evaluasi histologis dengan menghitung jumlah neutrofil pada preparat HE dan skoring ekspresi IL-1 β pada preparat IHC.

Hasil. Formula I memiliki ukuran partikel paling kecil dan nilai transmitan paling tinggi serta mempunyai nilai organoleptik paling unggul, mempunyai aktivitas antibakteri tertinggi pada jumlah koloni *S. sanguinis* dan *P. gingivalis*. Hasil uji fisik, organoleptik dan antibakteri menunjukkan Formula I paling unggul sehingga dilakukan uji selanjutnya yaitu uji sitotoksitas dan uji *in vivo*. Hasil uji sitotoksitas Formula I mempunyai IC-50 pada konsentrasi 52,67%. Hasil uji *post hoc Mann Whitney U test* skor MGI Formula I konsentrasi 100% berbeda secara signifikan dibandingkan konsentrasi lainnya ($p < 0,05$), hasil uji *post hoc Mann Whitney U test* pada penekanan jumlah neutrofil dan penekanan ekspresi IL-1 β tidak berbeda bermakna dengan kelompok kontrol positif ($p > 0,05$). **Kesimpulan.** Obat kumur kombinasi minyak serai wangi konsentrasi 1 % dan minyak lemon 2,77 % (Formula I) mempunyai karakteristik fisik dan organoleptik yang unggul, mempunyai aktivitas antibakteri, biokompatibilitas yang lebih aman dibandingkan obat kumur Klorheksidin, dan berpotensi untuk mengurangi kerusakan jaringan dengan menekan jumlah neutrofil dan ekspresi IL-1 β pada model tikus bunting yang diinduksi gingivitis.

Kata kunci: obat kumur, minyak serai wangi (*Cymbopogon winterianus*), minyak lemon (*Citrus limon*), antibakteri, gingivitis kehamilan

EVALUATION ON COMBINATION OF CITRONELLA OIL (*Cymbopogon winterianus*) AND LEMON OIL (*Citrus limon*) AS MOUTHWASH PREVENTION ON PREGNANCY GINGIVITIS

ABSTRACT

Background, In Indonesia, prevalence of gingivitis related to pregnancy is high. Gingivitis related to pregnancy could increased risk of adverse pregnancy outcomes, therefore prevention are needed. We proposed to develop mouthwash with a combination of citronella oil (*Cymbopogon winterianus*) and lemon oil (*Citrus limon*). Citronella and lemon oil are proven have antibacterial properties. The objectives of this study are to examine the physical and organoleptic characteristics of the mouthwash formula of a combination of citronella oil and lemon oil, to examine the antibacterial activity on Gram-positive (*S. sanguinis*) and Gram-negative (*P. gingivalis*); to examine cytotoxicity test on HGF cells, and to examine the effects of mouthwash in an experimental pregnant rats model of gingivitis.

Research Methods, pure laboratory experimental research with 4 stages of research. Stage 1, the content of citronella oil and lemon oil in Formula I (1%:2.77%), II (11%:1%) and III (4.13%:1%) were measured for particle diameter, transmittance value and creaming index. Stage 2, antibacterial testing on *S. sanguinis* and *P. gingivalis* bacteria using agar dilution method. Stage 3, MTT assay testing on HGF cells. Stage 4, in vivo testing of mouthwash application on ligation-induced pregnant rats with observation time at 3rd and 7th days. Histological evaluation by counting the number of neutrophils on HE and scoring IL-1 β expression on IHC.

Results, Formula I has the smallest particle size and highest transmittance value and has the most superior organoleptic value, has the highest antibacterial activity on the number of *S. sanguinis* and *P. gingivalis* colonies. The results of physical, organoleptic and antibacterial tests showed that Formula I was the most superior so that the cytotoxicity test and in vivo test were carried out further. The cytotoxicity test results of Formula I had IC-50 at a concentration of 52.67%. The results of the Mann Whitney U test post hoc on the MGI score of Formula I at 100% concentration were significantly different from the other groups ($p < 0.05$), the results of the Mann Whitney U test post hoc on reduce of neutrophil and IL-1 β expression were not significantly different from the positive control group ($p > 0.05$).

Conclusion, The mouthwash with combination of citronella oil at a concentration of 1% and lemon oil at 2.77% (Formula I) has superior physical and organoleptic characteristics, antibacterial activity, biocompatibility safer than chlorhexidine mouthwash, and has the potential to reduce tissue destruction by downregulating neutrophil and expression of IL-1 β in an experimental pregnant rats model of gingivitis.

Keywords: mouthwash, citronella oil (*Cymbopogon winterianus*), lemon oil (*Citrus limon*), antibacterial, gingivitis related to pregnancy