

INTISARI

Cedera gingiva akibat trauma, tindakan operasi, terbakar, atau iritasi asam merupakan kasus yang paling sering ditemukan dalam klinik. Luka gingiva memicu respon tubuh dalam melakukan mekanisme pemulihan melalui proses penyembuhan luka. Salah satu indikator utama proses ini adalah re-epitelisasi yang dapat diukur melalui ketebalan epitel. Daun pepaya California dan kencur (*Kaempferia galanga* L.) diketahui mengandung saponin, alkaloid, enzim papain, terpenoid, dan EPMC yang berperan dalam mempercepat proses penyembuhan luka dan menginisiasi re-epitelisasi. Inovasi *nanospray* sebagai media administrasi obat dinilai mampu menghantarkan zat aktif obat yang lebih optimal dibandingkan sediaan komersil. Penelitian ini bertujuan untuk mengetahui pengaruh *nanospray* kombinasi ekstrak daun pepaya California 25%, kencur 0,5%, dan kitosan 1% terhadap re-epitelisasi luka gingiva tikus *Sprague Dawley*.

Penelitian ini dilakukan dengan metode penelitian kuasi eksperimental laboratoris. *Nanospray* ekstrak dibuat dengan pencampuran emulsi melalui *high energy method*. Sebanyak 45 ekor tikus *Sprague Dawley* jantan usia 2,5-3 bulan dengan berat 250-300 gram dibagi dalam tiga kelompok, yaitu kontrol negatif (aplikasi *nanospray* kitosan), perlakuan (aplikasi *nanospray* ekstrak), dan kontrol positif (aplikasi Aloclair® PLUS spray). Luka gingiva dibentuk menggunakan punch biopsy diameter 2mm dan kedalaman mencapai tulang alveolar. Sampel uji diaplikasikan sebanyak satu kali semprot (0,1µl) sehari selama 14 hari. Pada hari ke-1, 3, 5, 7 dan 14 pasca perlakuan, tiga tikus dari masing-masing kelompok dikorbankan dan jaringan mandibula tikus diambil untuk dibuat preparat histologis dengan pengecatan *Hematoxylin Eosin*. Preparat diamati menggunakan mikroskop cahaya yang terhubung OptiLab® viewer perbesaran 100x. Ketebalan epitel diukur dengan *software* ImageRaster secara tegak lurus dari stratum basal hingga korneum pada tiga titik ketebalan.

Hasil analisis *Two-way* ANOVA menunjukkan adanya pengaruh signifikan ($p < 0,05$) dari kelompok penelitian, hari pengamatan, dan interaksi keduanya dalam meningkatkan ketebalan epitel luka gingiva. Uji *Post-Hoc* LSD juga menunjukkan bahwa ketebalan epitel kelompok perlakuan lebih tinggi secara signifikan ($p < 0,05$) dibandingkan kelompok kontrol positif dan negatif. Kesimpulan dari penelitian ini adalah aplikasi *nanospray* kombinasi ekstrak daun pepaya California 25%, kencur 0,5%, dan kitosan 1% berpengaruh terhadap re-epitelisasi luka gingiva tikus *Sprague Dawley*.

Kata kunci: *nanospray*, daun pepaya California, kencur, kitosan, luka gingiva, re-epitelisasi

ABSTRACT

Gingival injuries caused by trauma, surgery, burns, or acid irritation are common cases encountered in clinics. Gingival wounds trigger the body's response to initiate healing mechanisms through the wound-healing process. One key indicator of this process is re-epithelialization, which can be measured by epithelial thickness. California papaya leaves and kencur (*Kaempferia galanga* L.) are known to contain saponins, alkaloids, papain enzyme, terpenoids, and EPMC, which play a role in accelerating wound healing and initiating re-epithelialization. The innovation of nanospray as a drug delivery medium is considered to provide more optimal delivery of active drug compounds compared to commercial drugs. This study aims to determine the effect of a nanospray combining California papaya leaf extract 25%, kencur extract 0,5%, and chitosan 1% on re-epithelialization of gingival wounds in Sprague Dawley rats.

This research is conducted with quantitative experimental laboratory method. The nanospray extract was prepared by emulsifying the components using a high-energy method. A total of 45 male Sprague Dawley rats aged 2.5-3 months and weighing 250-300 grams were divided into three groups which are the negative control group (application of chitosan nanospray), the treatment group (application of extract nanospray), and the positive control group (application of Aloclair® PLUS spray). Gingival wounds were created using a 2 mm diameter punch biopsy tool with a depth reaching the alveolar bone. Test samples were applied once daily (0.1 µl per spray) for 14 days. On days 1, 3, 5, 7, and 14 post-wounding, three rats from each group were sacrificed and their mandibular tissue was collected for histological preparation with Hematoxylin-Eosin staining. The preparations were observed using an optical microscope connected to an OptiLab® viewer at 100x magnification. Epithelial thickness was measured using ImageRaster software perpendicular to the stratum basale to the stratum corneum at three thickness points.

Results from the Two-way ANOVA analysis showed a significant influence ($p < 0.05$) of research groups, observation days, and their interactions on increasing epithelial thickness in gingival wounds. Post-Hoc LSD analysis also demonstrated that the epithelial thickness in the treatment group was significantly higher ($p < 0.05$) than the positive and negative control groups. The conclusion of this study is that the application of a nanospray combining California papaya leaf extract 25%, kencur extract 0,5%, and chitosan 1% has a significant effect on re-epithelialization of gingival wounds in Sprague Dawley rats.

Keywords: nanospray, California papaya leaf, kencur, chitosan, gingival wounds, re-epithelialization