

## INTISARI

Luka gingiva menimbulkan inflamasi yang ditandai dengan migrasi neutrofil karena sitokin TNF- $\alpha$ . Pandan wangi, cengkih, dan kitosan diketahui mampu menghambat sitokin inflamasi sehingga dapat mencegah migrasi neutrofil. Penelitian ini bertujuan untuk mengetahui pengaruh nanospray kombinasi ekstrak daun pandan wangi, minyak atsiri bunga cengkih, dan kitosan terhadap jumlah neutrofil pada luka gingiva tikus *Sprague Dawley* dan kemampuan ikatan bahan aktif terhadap sitokin inflamasi.

Penelitian secara *in vivo* mengamati jumlah neutrofil pada luka gingiva tikus *Sprague Dawley* pada kelompok perlakuan nanospray kombinasi 12,5% ekstrak daun pandan wangi, 5% minyak atsiri bunga cengkih, dan kitosan, aloclair spray sebagai kontrol positif, dan aquadest sebagai kontrol negatif yang diamati pada hari ke-1, 3, 5, 7, dan 9. Data dianalisis menggunakan *Two-Way ANOVA* pada tingkat signifikansi 95%. Penelitian secara *in silico* metode *molecular docking* mengamati jenis dan energi afinitas ikatan antara molekul bahan aktif setiap bahan uji terhadap TNF- $\alpha$ .

Hasil penelitian *in vivo* menunjukkan adanya pengaruh hari, kelompok, dan interaksi hari dengan kelompok terhadap jumlah neutrofil pada luka gingiva tikus *Sprague Dawley* ( $p < 0,05$ ). Uji *post hoc* menunjukkan bahwa kelompok perlakuan memiliki perbedaan yang signifikan terhadap kelompok kontrol positif dan negatif ( $p < 0,05$ ). Penelitian *in silico* menunjukkan kitosan mampu berikatan dengan TNF- $\alpha$  dengan energi afinitas paling rendah. Kesimpulan penelitian ini adalah nanospray kombinasi 12,5% ekstrak daun pandan wangi, 5% minyak atsiri bunga cengkih, dan kitosan berpengaruh terhadap jumlah neutrofil pada luka gingiva dan kitosan mampu berikatan dengan TNF- $\alpha$ .

**Kata kunci:** pandan wangi, cengkih, kitosan, neutrofil, TNF-alpha

### ***ABSTRACT***

Gingival wounds cause inflammation that is characterized by migration of neutrophils because of TNF- $\alpha$ . Pandan wangi, cloves, and chitosan can inhibit inflammatory cytokines to prevent neutrophil's migration to tissues. This study aims to determine the effect of nanospray combination of pandan wangi leaf extract, clove flower essential oil, and chitosan on the number of neutrophils in gingival wounds of Sprague Dawley and binding potential of active ingredients against inflammatory cytokines.

An in vivo study was conducted to observe the amount of neutrophil's infiltration in Sprague Dawley gingival wound of treatment group with nanospray combination of pandan wangi leaf extract 12.5%, clove flower essential oil 5%, and chitosan, aloclair spray as positive control, and aquadest as negative control, observed on day-1, 3, 5, 7, and 9. Data was analyzed with Two-Way ANOVA at 95% significancy. An in silico study uses molecular docking method to determine the type and affinity energy of the bonding between active ingredients on each group against TNF- $\alpha$ .

The in vivo result shows significant difference ( $p < 0.05$ ) in group, days, and interaction. Post hoc test result shows that treatment group has significant difference against positive and negative control groups ( $p < 0.05$ ). The in silico result shows that chitosan had the lowest affinity energy to bind against TNF- $\alpha$ . The conclusion of this study is that nanospray combination of pandan wangi leaf extract 12.5%, clove flower essential oil 5%, and chitosan has an effect on reducing the number of neutrophils in gingival wounds and chitosan was able to bind against TNF- $\alpha$ .

**Keywords:** pandan wangi, clove, chitosan, neutrophil, TNF-alpha