

## INTISARI

Luka merupakan kerusakan jaringan tubuh yang dapat disebabkan oleh trauma, kecelakaan, atau cedera dari luar. Luka pada penderita diabetes cenderung sulit sembuh dan mudah terinfeksi bakteri seperti *Pseudomonas aeruginosa* yang dikenal resisten terhadap berbagai antibiotik, sehingga dibutuhkan alternatif terapi topikal yang efektif. Kombinasi bahan alami seperti *cinnamaldehyde* yang bersifat antibakteri, nanokitosan sebagai agen antimikroba dan pembawa zat aktif, kalsium karbonat yang berperan dalam proses hemostasis, serta *freeze-dried platelet-rich plasma* (FD-PRP) yang mengandung faktor pertumbuhan, berpotensi dikembangkan dalam bentuk *patch* hidrogel. Penelitian ini bertujuan untuk mengetahui pengaruh *patch* luka hidrogel nanokitosan dengan kalsium karbonat, *cinnamaldehyde*, dan *freeze-dried platelet-rich plasma* terhadap zona hambat pertumbuhan *Pseudomonas aeruginosa*.

Penelitian ini terdiri dari tiga kelompok uji, yaitu kontrol negatif berupa *base* membran (gelatin + nanokitosan), kelompok perlakuan berupa *patch* hidrogel nanokitosan dengan kalsium karbonat, *cinnamaldehyde*, dan FD-PRP, dan kontrol positif *hydrocolloid dressing* Dermafix®. Uji antibakteri terhadap *Pseudomonas aeruginosa* dilakukan menggunakan metode difusi cakram pada media MHA dan diukur menggunakan jangka sorong digital.

Hasil penelitian menunjukkan rerata zona hambat kelompok perlakuan ( $8,7 \pm 0,99$  mm) lebih besar dibandingkan kontrol negatif ( $7,4 \pm 0,90$  mm) dan mendekati kontrol positif ( $8,92 \pm 0,79$  mm). Analisis *One Way ANOVA* menunjukkan perbedaan signifikan antar kelompok ( $p = 0,046$ ). Kesimpulan penelitian ini adalah *patch* luka hidrogel nanokitosan dengan kalsium karbonat, *cinnamaldehyde*, dan FD-PRP berpengaruh terhadap zona hambat pertumbuhan *Pseudomonas aeruginosa*.

**Kata kunci:** *Pseudomonas aeruginosa*, *patch* luka hidrogel nanokitosan, *cinnamaldehyde*, kalsium karbonat, *freeze-dried platelet-rich plasma*.

## ***ABSTRACT***

Wounds are damage to body tissue that can be caused by trauma, accidents, or external injuries. Wounds in diabetics tend to be difficult to heal and easily infected by bacteria such as *Pseudomonas aeruginosa*, which is known to be resistant to various antibiotics, so effective alternative topical therapies are needed. The combination of natural ingredients such as cinnamaldehyde which has antibacterial properties, nanochitosan as an antimicrobial agent and carrier of active substances, calcium carbonate which plays a role in the hemostasis process, and freeze-dried platelet-rich plasma (FD-PRP) which contains growth factors, has the potential to be developed in the form of a hydrogel patch. This study aims to determine the effect of a nanochitosan hydrogel wound patch with calcium carbonate, cinnamaldehyde, and freeze-dried platelet-rich plasma on the growth inhibition zone of *Pseudomonas aeruginosa*.

This study consisted of three test groups, namely a negative control in the form of a base membrane (gelatin + nanochitosan), a treatment group in the form of a nanochitosan hydrogel patch with calcium carbonate, cinnamaldehyde, and FD-PRP, and a positive control hydrocolloid dressing Dermafix®. Antibacterial test against *Pseudomonas aeruginosa* was conducted using disc diffusion method on MHA media and measured using digital calipers.

The results showed that the average inhibition zone of the treatment group ( $8.7 \pm 0.99$  mm) was larger than the negative control ( $7.4 \pm 0.90$  mm) and close to the positive control ( $8.92 \pm 0.79$  mm). One Way ANOVA analysis showed a significant difference between groups ( $p = 0.046$ ). The conclusion of this study is that nanochitosan hydrogel wound patches with calcium carbonate, cinnamaldehyde, and FD-PRP have an effect on the inhibition zone of *Pseudomonas aeruginosa* growth.

**Keywords:** *Pseudomonas aeruginosa*, nanochitosan hydrogel wound patch, cinnamaldehyde, calcium carbonate, freeze-dried platelet-rich plasma.