

INTISARI

Luka, khususnya luka diabetik, merupakan luka yang rentan mengalami infeksi sehingga proses penyembuhannya menjadi lambat. *Staphylococcus aureus* merupakan bakteri yang paling sering menginfeksi luka dan sering resisten terhadap antibiotik sehingga penanganannya menjadi semakin sulit. Perawatan luka yang umum digunakan saat ini adalah *hydrocolloid dressing*, tetapi *dressing* ini tidak efektif dalam perawatan luka diabetik karena tidak memiliki zat antibakteri. Alternatif perawatan luka diabetik yang lebih efektif adalah *patch hydrogel* nanokitosan karena bersifat biokompatibel dan dapat melepaskan zat aktif antibakteri. Aktivitas antibakteri *patch* tersebut masih perlu ditingkatkan dengan menambahkan agen antibakteri dan penyembuh luka. Penelitian ini bertujuan untuk mengetahui pengaruh penambahan *cinnamaldehyde*, kalsium karbonat (CaCO_3), dan *Freeze-dried Platelet Rich Plasma* (FD-PRP) pada *patch* luka *hydrogel* nanokitosan terhadap zona hambat pertumbuhan *Staphylococcus aureus*.

Pengujian aktivitas antibakteri menggunakan metode *disc diffusion* dengan mengukur diameter zona hambat di sekitar *paper disc* dengan menggunakan jangka sorong. Terdapat tiga kelompok uji, yaitu kontrol negatif *base membrane* gelatin nanokitosan, kelompok perlakuan *patch hydrogel* nanokitosan dengan *cinnamaldehyde*, CaCO_3 , dan FD-PRP, dan kontrol positif *hydrocolloid dressing* Dermafix®. Masing-masing kelompok uji tersebut dipotong dengan diameter 6 mm lalu diletakkan di atas *paper disc*. Pengujian dilakukan pengulangan sebanyak lima kali.

Data yang diperoleh dianalisis dengan *One-way ANOVA*. Hasil penelitian menunjukkan bahwa terdapat perbedaan rata-rata diameter zona hambat *Staphylococcus aureus* yang signifikan antara kelompok kontrol dan perlakuan ($p=0,038$). Kesimpulan penelitian ini adalah penambahan *cinnamaldehyde*, CaCO_3 , dan FD-PRP pada *patch* luka *hydrogel* nanokitosan memiliki pengaruh terhadap zona hambat pertumbuhan *Staphylococcus aureus*.

Kata kunci : *patch hydrogel* nanokitosan, *cinnamaldehyde*, kalsium karbonat, *Freeze-dried Platelet Rich Plasma*, *Staphylococcus aureus*.

ABSTRACT

Wounds, particularly diabetic wounds, are highly susceptible to infection, which can significantly delay the healing process. *Staphylococcus aureus* is one of the most frequently isolated pathogens in wound infections and is often resistant to multiple antibiotics, presenting a considerable challenge in clinical management. Hydrocolloid dressings are commonly used as wound care, but they are ineffective in treating diabetic wounds due to the absence of antibacterial agents. A more effective alternative for diabetic wound management is nanochitosan hydrogel patches, as they are biocompatible and capable of delivering antibacterial active substances. Nevertheless, the antibacterial activity of nanochitosan hydrogel patches still needs to be improved by adding additional antimicrobial and wound-healing agents. This study aimed to determine the effect of adding cinnamaldehyde, calcium carbonate (CaCO₃), and Freeze-dried Platelet Rich Plasma (FD-PRP) to nanochitosan hydrogel wound patches on the inhibition zone of *Staphylococcus aureus*.

The antibacterial activity was tested using the disc diffusion method by measuring the diameter of the inhibition zone around the paper disc with a sliding caliper. There were three groups: a negative control consisting of the gelatin nanochitosan base membrane, a treatment group consisting of the nanochitosan hydrogel patch containing cinnamaldehyde, CaCO₃, and FD-PRP, and a positive control consisting of Dermafix® hydrocolloid dressing. Each test group was cut into a 6 mm diameter piece and placed on top of the paper disc. The test was repeated five times.

The data obtained were analyzed using one-way ANOVA. The results showed a significant difference in the average inhibition zone diameter between the control and treatment groups ($p=0.038$). In conclusion, the addition of cinnamaldehyde, CaCO₃, and FD-PRP to nanochitosan hydrogel wound patches has a significant effect on the inhibition zone of *Staphylococcus aureus*.

Keywords : nanochitosan hydrogel patch, cinnamaldehyde, calcium carbonate, Freeze-dried Platelet Rich Plasma, *Staphylococcus aureus*