

## INTISARI

Material hidrogel banyak dikembangkan sebagai *patch* luka karena kemampuannya menyerap cairan dan menjaga kelembapan. Gelatin–nanokitosan merupakan polimer alami yang bersifat hidrofilik dan dapat dimodifikasi dengan berbagai bahan tambahan. Penelitian ini bertujuan mengetahui pengaruh pH serta penambahan sinamaldehyd,  $\text{CaCO}_3$ , dan *Freeze-Dried Platelet Rich Plasma* (FD-PRP) terhadap kapasitas *swelling patch*.

Penelitian dilakukan menggunakan sembilan kelompok perlakuan dengan variasi komposisi bahan dan kondisi pH. Uji *swelling* dilakukan dengan merendam *patch* dalam *phosphate-buffered saline* (PBS) pada pH 6,0; 7,0; dan 8,0, kemudian diinkubasi pada suhu  $37^\circ\text{C}$  hingga mencapai *swelling* maksimal. Nilai *swelling* dihitung berdasarkan perubahan massa. Analisis statistik menggunakan *Two-Way ANOVA* untuk mengetahui pengaruh pH, jenis sampel, dan interaksi keduanya. Uji *Post Hoc* LSD dilakukan untuk melihat perbedaan nyata antar kelompok perlakuan.

Hasil penelitian menunjukkan bahwa pH tidak berpengaruh signifikan terhadap kapasitas *swelling* ( $p = 0,159$ ), sedangkan jenis sampel berpengaruh signifikan ( $p < 0,05$ ). Interaksi antar faktor tidak signifikan ( $p = 0,977$ ). Dapat disimpulkan bahwa formulasi gelatin–nanokitosan dengan  $\text{CaCO}_3$ , sinamaldehyd, dan FD-PRP menunjukkan stabilitas *swelling* yang baik pada berbagai kondisi pH, sehingga berpotensi dikembangkan lebih lanjut sebagai material *patch* luka yang biokompatibel.

**Kata kunci:** gelatin-nanokitosan, kalsium karbonat, sinamaldehyd, *freeze-dried* PRP, *swelling*.

### ***ABSTRACT***

Hydrogel-based materials have been widely developed as wound patches due to their ability to absorb fluid and maintain moisture. Gelatin–nanochitosan, a naturally derived polymer combination, is characterized by hydrophilicity and can be modified with various additional components. This study was conducted to see the effects of pH and the incorporation of cinnamaldehyde, CaCO<sub>3</sub>, and freeze-dried PRP on the swelling capacity of the patches.

Nine treatment groups with variations in composition and pH were employed. Swelling testing was carried out by immersing the patches in PBS at pH 6.0, 7.0, and 8.0 at 37°C until maximum swelling was reached. Swelling values were determined based on mass changes, and data were analyzed using Two-Way ANOVA followed by LSD Post Hoc testing.

The results showed that pH had no significant effect on swelling capacity ( $p = 0.159$ ), whereas sample type showed a significant effect ( $p < 0.05$ ). The interaction between factors was not significant ( $p = 0.977$ ). These findings indicate that gelatin–nanochitosan patches containing CaCO<sub>3</sub>, cinnamaldehyde, and freeze-dried PRP maintain stable swelling performance across pH variations and have potential for further development as biocompatible wound dressings.

**Keywords:** gelatin-nanochitosan, calcium carbonate, cinnamaldehyde, freeze-dried PRP, swelling