

INTISARI

FABRIKASI DAN KARAKTERISASI NANOFIBER PVAc (*Polyvinil Acetate*) TERMODIFIKASI BUNGA TELANG (*Clitoria ternatea*) SEBAGAI SMART WOUND DRESSING

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Nanofiber PVAc termodifikasi bunga telang (CT) berhasil difabrikasi menggunakan metode *electrospinning* dengan konsentrasi CT sebesar 5%, 10%, dan 15%. Bunga telang mengandung bahan aktif yang memiliki aktivitas antibakteri terhadap bakteri gram positif dan gram negatif. Selain itu kandungan antosianin pada CT dapat digunakan untuk mendeteksi perubahan pH yang mengindikasikan adanya infeksi luka. Karakterisasi FTIR menunjukkan terdapat serapan baru di nanofiber PVAc/CT10% dan PVAc/CT15% pada panjang gelombang 3290 cm^{-1} , 2912 cm^{-1} , dan 1635 cm^{-1} . Puncak-puncak tersebut secara berturut-turut menunjukkan keberadaan O-H *stretching*, C-H *stretching*, dan C=C *stretching* yang mengindikasikan keberadaan CT di nanofiber tersebut. Penambahan CT mengurangi diameter nanofiber PVAc dari $(708 \pm 5)\text{ nm}$ menjadi $(488 \pm 9)\text{ nm}$, $(379 \pm 1)\text{ nm}$, dan $(418 \pm 3)\text{ nm}$ berturut-turut pada konsentrasi 5%, 10%, dan 15%. Hasil pengujian kuat tarik dan sudut kontak menunjukkan penambahan CT dapat meningkatkan elastisitas dan hidrofilitas nanofiber. Hasil pengujian kolorimetri pH mengonfirmasi perubahan warna signifikan nanofiber pada tingkat pH berbeda akibat antosianin dari CT dengan nilai kuantifikasi perubahan warna $\Delta E > 5$. Pengujian antibakteri menunjukkan adanya aktivitas antibakteri pada nanofiber setelah ditambahkan CT. Berdasarkan hasil tersebut, nanofiber PVAc/CT berpotensi besar digunakan sebagai *smart wound dressing* yang dapat mendeteksi infeksi luka berdasarkan perubahan warna akibat peningkatan nilai pH yang disebabkan oleh infeksi.

Kata kunci: nanofiber, bunga telang, antibakteri, sensor pH kolorimetri, pembalut luka

ABSTRACT

FABRICATION AND CHARACTERIZATION OF BUTTERFLY PEA (*Clitoria ternatea*) FLOWER MODIFIED PVAc (Polyvinil Acetate) NANOFIBERS AS A SMART WOUND DRESSING

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A modified nanofiber of Polyvinyl Acetate (PVAc) using butterfly pea flower extract (CT) has been successfully fabricated using the electrospinning method at concentrations of 5%, 10%, and 15% CT. The butterfly pea flower extract contains active components with antibacterial activity against both gram-positive and gram-negative bacteria. Additionally, the anthocyanin content in CT can be utilized to detect pH changes, indicating the presence of wound infections. FTIR characterization revealed new absorptions in the nanofibers PVAc/CT10% and PVAc/CT15% at wavelengths of 3290 cm⁻¹, 2912 cm⁻¹, and 1635 cm⁻¹. These peaks respectively indicate the presence of O-H stretching, C-H stretching, and C=C stretching, confirming the incorporation of CT into the nanofibers. The addition of CT reduced the diameter of PVAc nanofibers from (708 ± 5) nm to (488 ± 9) nm, (379 ± 1) nm, and (418 ± 3) nm, respectively, at concentrations of 5%, 10%, and 15%. Tensile strength and contact angle testing demonstrated that the addition of CT improved the elasticity and hydrophilicity of the nanofibers. The pH colorimetry tests confirmed significant color changes in the nanofibers at different pH levels due to the presence of anthocyanin from CT, with a quantified color change value (ΔE) greater than 5. Furthermore, antibacterial testing showed that the nanofiber with added CT exhibited antibacterial activity. Based on these results, PVAc/CT nanofibers show great potential for use as smart wound dressings capable of detecting wound infections through color changes resulting from increased pH values caused by infections.

Keywords: nanofibers, butterfly pea flower, antibacterial, pH colorimetric sensor, smart wound dressing