

INTISARI

FABRIKASI DAN KARAKTERISASI NANOFIBER POLYVINYL ACETATE (PVAc)/EKSTRAK KUBIS UNGU (*Brassica oleracea*) DAN POTENSINYA SEBAGAI *SMART WOUND DRESSING*

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Penelitian ini bertujuan untuk mengetahui pengaruh konsentrasi larutan ekstrak kubis ungu/*Red Cabbage* (RC) terhadap morfologi dan hidrofilitas membran PVAc/RC serta mengetahui pengaruh pH terhadap perubahan warna membran nanofiber PVAc/RC. Nanofiber berhasil difabrikasi menggunakan metode *electrospinning* dengan konsentrasi RC sebesar 2%, 3%, dan 4%. Karakterisasi FTIR menunjukkan puncak serapan baru yang mengindikasikan PVAc/RC yaitu pada panjang gelombang 3414 cm^{-1} yang mengindikasikan O-H *stretching*, 2925 cm^{-1} dan 2846 cm^{-1} merepresentasikan C-H *stretching*, 1725 cm^{-1} menandakan C=O *stretching*, serta 1635 cm^{-1} menunjukkan keberadaan gugus aromatik melalui getaran C-H dan C=C yang khas pada struktur cincin aromatik. Karakterisasi SEM menunjukkan penambahan RC menurunkan diameter nanofiber kemudian meningkat seiring meningkatnya konsentrasi RC yaitu diameter nanofiber PVAc dari $(922 \pm 4)\text{ nm}$ menjadi $(486 \pm 5)\text{ nm}$, $(616 \pm 9)\text{ nm}$, dan $(752 \pm 8)\text{ nm}$ berturut-turut pada konsentrasi awal RC 2%, 3%, dan 4%. Hasil pengujian sudut kontak menunjukkan penambahan RC dapat meningkatkan hidrofilitas nanofiber. Hasil pengujian kolorimetri pH mengonfirmasi perubahan warna signifikan nanofiber pada tingkat pH yang berbeda yaitu merah muda dan ungu pada pH asam dan hijau pada pH basa. Berdasarkan hasil penelitian, nanofiber PVAc/RC berpotensi digunakan sebagai *smart wound dressing* dengan sensor *real time* sebagai pendeteksi infeksi luka berdasarkan perubahan warna.

Kata kunci: antosianin, kubis ungu, nanofiber, pembalut luka, sensor pH kolorimetri

ABSTRACT

FABRICATION AND CHARACTERIZATION OF POLYVINYL ACETATE (PVAc)/RED CABBAGE (*Brassica oleracea*) EXTRACT NANOFIBERS AND THEIR POTENTIAL AS A SMART WOUND DRESSING

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This research aimed to investigate the effect of Red Cabbage (RC) solution concentration on the morphology and hydrophilicity of PVAc/RC membranes, as well as to determine the effect of pH on the color change of PVAc/RC nanofiber membranes. Nanofibers were successfully fabricated using the electrospinning method with RC concentrations of 2%, 3%, and 4%. FTIR characterization showed new absorption peaks indicating PVAc/RC at a wavelength of 3414 cm^{-1} indicating O-H stretching, 2925 cm^{-1} and 2846 cm^{-1} representing C-H stretching, 1725 cm^{-1} indicating C=O stretching, 1635 cm^{-1} indicating the presence of aromatic groups through characteristic C-H and C=C vibrations in the aromatic ring structure. SEM characterization showed that the addition of RC initially decreased the nanofiber diameter, which then increased with increasing RC concentration, specifically the PVAc nanofiber diameter from $(922 \pm 4)\text{ nm}$ to $(486 \pm 5)\text{ nm}$, $(616 \pm 9)\text{ nm}$, and $(752 \pm 8)\text{ nm}$ at initial RC concentrations of 2%, 3%, and 4%, respectively. Contact angle test results showed that the addition of RC increased the hydrophilicity of the nanofibers. The pH colorimetry test results confirmed significant color changes of the nanofibers at different pH levels, namely pink and purple at acidic pH and green at basic pH. Based on the research results, PVAc/RC nanofibers have the potential to be used as a smart wound dressing with a real-time sensor for detecting wound infection based on color changes.

Keywords: anthocyanin, red cabbage, nanofiber, wound dressing, colorimetric pH sensor