

## INTISARI

### **PEMBUATAN NANOFIBER POLI (VINIL ALKOHOL)/KITOSAN (CS) DENGAN METODE ELEKTROSPINNING YANG TERTAUT SILANG DENGAN GLUTARALDEHIDA SEBAGAI MEMBRAN ANTIBAKTERI**

Oleh

**FAMES HUMALA PUTRA LOI**  
**11/313653/PA/13737**

Nanofiber *Chitosan/poly (vinyl alcohol)* telah berhasil dibuat dengan metode elektrospinning dengan menggunakan larutan *Chitosan* (4 wt% dan 5 wt%) dan *poly (vinyl alcohol)* (PVA) 20 wt% dengan perbandingan 30:70 dan 50:50 di dalam pelarut asam asetat 2%. Morfologi dari nanofiber sebelum dan setelah direndam dalam *Glutaraldehyde* diteliti menggunakan *Scanning Electron Microscopy* (SEM). Membran elektrospinning direndam pada suhu kamar selama 24 jam. Setelah direndam, membran nanofiber PVA/CS mengalami peningkatan diameter. Sebelum perendaman, diameter rata-rata dari nanofiber PVA/CS 4 wt% 70:30 yaitu  $(160 \pm 20)$  nm dan 50:50 yaitu  $(120 \pm 30)$  nm sementara nanofiber PVA/CS 5 wt% 70:30 yaitu  $(300 \pm 60)$  nm dan 50:50 yaitu  $(240 \pm 30)$  nm. Setelah perendaman, diameter rata-rata nanofiber PVA/CS 4 wt% 70:30 yaitu  $(220 \pm 30)$  nm dan 50:50 yaitu  $(200 \pm 30)$  nm sementara nanofiber PVA/CS 5 wt% 70:30  $(340 \pm 40)$  nm dan 50:50 yaitu  $(250 \pm 40)$  nm. Hasil dari pengukuran diameter rata-rata menunjukkan kenaikan terhadap peningkatan konsentrasi *Chitosan*. Nanofiber PVA/CS 5 wt% dengan perbandingan 70:30 memiliki diameter rata-rata paling tinggi yaitu  $(300 \pm 60)$  nm sementara PVA/CS 4 wt% dengan perbandingan 50:50 memiliki diameter rata-rata paling kecil yaitu  $(120 \pm 30)$  nm. Peningkatan rasio PVA dalam campuran akan menyebabkan nilai *swelling ratio* yang tinggi. Nanofiber PVA/CS 5 wt% 70:30 memiliki nilai *swelling ratio* 1450%. Sementara untuk uji anti bakteri dengan menggunakan bakteri patogen *Escherichia coli*. Nanofiber PVA/CS 5 wt% 70:30 memiliki sifat anti bakteri, tetapi sifat resistensinya terhadap bakteri masih lemah.

Kata kunci: *Chitosan*, *Poly (vinyl alcohol)*, nanofiber, *Glutaraldehyde*, *swelling ratio*, uji anti bakteri, elektrospinning

## ABSTRACT

### FABRICATION OF POLY (VINYL ALCOHOL)/CHITOSAN (CS) ELECTROSPUN NANOFIBER CROSSLINKED WITH GLUTARALDEHYDE FOR ANTIBACTERIAL MEMBRANE

By

**FAMES HUMALA PUTRA LOI**  
**11/313653/PA/13737**

Nanofibers Chitosan/poly (vinyl alcohol) have been successfully produced by electrospinning method using solution of Chitosan (4 wt% and 5 wt% ) and poly (vinyl alcohol) (PVA) 20 wt% with ratio 30:70 and 50:50 in 2% acetid acid solvent. The morphology of nanofibers before and after submersion in Glutaraldehyde was investigated using Scanning Electron Microscopy (SEM). Electrospun nanofiber was submersed at temperature room for 24 hours. After submersion, there was increase in the diameter of nanofiber PVA/CS membrane. Before submersion, the average diameter of nanofiber PVA/CS 4 wt% 70:30 is  $(160 \pm 20)$  nm and 50:50 is  $(120 \pm 30)$  nm while nanofiber PVA/CS 5 wt% 70:30 is  $(300 \pm 60)$  nm and 50:50 is  $(240 \pm 30)$  nm. After submersion, the average diameter of nanofiber PVA/CS 4 wt% 70:30 became  $(220 \pm 30)$  nm and 50:50 became  $(200 \pm 30)$  nm while nanofiber PVA/CS 5 wt% 70:30 became  $(340 \pm 40)$  nm and 50:50 became  $(250 \pm 40)$  nm. As results showed the increases in the average diameter of nanofibers with increasing the concentrasion of Chitosan. Nanofiber PVA/CS 5 wt% with ratio 70:30 has highest average diameter  $(300 \pm 60)$  nm while PVA/CS 4 wt% with ratio 50:50 has the smallest average diameter  $(120 \pm 30)$  nm. The increasing of PVA ratio in the solution cause higher swelling ratio. Nanofiber PVA/CS 5 wt% with ratio 70:30 has highest swelling ratio 1450%. For bacterial treatment using patogen bacterial *Escherichia coli*, nanofiber PVA/CS 5 wt% with ratio 70:30 has antibacterial characteristic but low bacterial resistance.

Keywords: Chitosan, Poly (vinyl alcohol), nanofiber, Glutaraldehyde, swelling ratio, antibacterial, electrospinning