

**PENGARUH *CROSSLINKER* GLUTARALDEHIDA TERHADAP
KINERJA NANOKRISTAL SELULOSA BAKTERIAL SEBAGAI
SUPERABSORBEN**

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Diajukan untuk memenuhi sebagian dari syarat memperoleh gelar Sarjana Sains
Program Studi Kimia



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ABSTRAK

Polimer superabsorben (SAP) dari nanokristal selulosa bakterial terikat silang telah diperoleh melalui teknik *freeze-drying*. Selanjutnya pengaruh penambahan glutaraldehida (GA) sebagai *crosslinker* terhadap kinerja SAP dilakukan dengan memvariasikan konsentrasi GA (0, 1, 2, 3 dan 4% m/m). Nanokristal selulosa bakterial (BCNC) diperoleh melalui hidrolisis asam menggunakan asam sulfat, sedangkan SAP diperoleh melalui reaksi ikat silang antara BCNC dengan GA. BCNC dan SAP yang diperoleh dikarakterisasi dengan FTIR, XRD, dan TEM/SEM untuk mengetahui adanya perubahan/pergeseran gugus fungsi, kristalinitas, dan morfologinya. Kinerja dari SAP yang diteliti meliputi *water absorbency*, *swelling rate*, dan *water retention*. Hasil analisis FTIR menunjukkan telah terjadi ikatan silang antara molekul BCNC. Hasil analisis XRD menunjukkan bahwa BCNC bersifat kristalin sedangkan SAP bersifat sangat amorf. Morfologi BCNC dan SAP berturut-turut berbentuk jarum dan aerogel. BCNC dengan penambahan GA 2% m/m berpotensi untuk digunakan sebagai SAP yang ramah lingkungan untuk berbagai aplikasi, misalnya pada *sanitary napkins* dengan hasil *water absorbency* mencapai 82,45%, *swelling rate* 5 menit dan *water retention* sebesar 4,18% selama 5 jam.

Kata kunci: *Superabsorben, nanokristal selulosa bakterial, crosslinker, aerogel.*

ABSTRACT

The superabsorbent polymer (SAP) from bacterial cellulose nanocrystals crosslinked has been obtained through freeze drying technique. Furthermore, the effect of glutaraldehyde (GA) as a crosslinker on SAP performances was done by varying the concentration of GA (0, 1, 2, 3 and 4% m/m). Bacterial cellulose nanocrystal (BCNC) was obtained by acid-hydrolysis using sulfuric acid, whereas SAP was obtained through the crosslinking reaction between BCNC and GA. BCNC and SAP that has been obtained were characterized by FTIR, XRD, and TEM / SEM to detect changes in the functional groups, crystallinity, and morphology. The performances of SAP that investigated includes water absorbency, swelling rate, and water retention. The results of the FTIR analysis show that cross-linked between the BCNC molecules have occurred. The XRD analysis results show that BCNC is crystalline while SAP is very amorphous. BCNC and SAP morphology are needle and aerogel, respectively. BCNC with the addition of GA 2% m/m has potential to be used as an environmentally friendly SAP for various applications, for example in sanitary napkins with the result of water absorbency attain 82.45%, a swelling rate of 5 minutes and water retention of 4.18% for 5 hours.

Keywords: Superabsorbent, bacterial cellulose nanocrystal, crosslinker, aerogel.

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