

## INTISARI

### **PENGARUH KONSENTRASI SELULOSA NANOKRISTALIN TERHADAP SIFAT FISIS DAN MEKANIK BIOPLASTIK DARI PATI JAGUNG/POLIVINIL ALKOHOL**

Oleh

Luky Panca Prasetya

17/414599/PA/18099

Telah dilakukan pembuatan bioplastik berbahan pati jagung/polivinil alkohol (PVA) dengan penambahan gliserol sebagai *plasticizer* serta selulosa nanokristal atau *cellulose nanocrystal* (CNC) sebagai *filler*. Pengujian dilakukan untuk mengetahui pengaruh penambahan konsentrasi CNC masing-masing sebesar 0%; 3,125%; 6,25%; 12,5% terhadap perubahan sifat dan karakteristik dari bioplastik. Kristalinitas dari bioplastik akan meningkat seiring bertambahnya konsentrasi CNC dengan nilai terbesar pada variasi 12,5% CNC yaitu 43,6% sementara gugus fungsi memiliki kesamaan antara setiap variasi hanya pada variasi 12,5% CNC terdeteksi ikatan C=O sehingga dapat diketahui bahwa terdapat nilai minimum tertentu dari CNC yang ditambahkan agar muncul ikatan tersebut. Hasil uji tarik menunjukkan nilai tertinggi pada sampel tanpa penambahan CNC sebesar  $10 \pm 2$  MPa. Pengujian biodegradasi menunjukkan bahwa waktu degradasi dari bioplastik cenderung semakin lama seiring pertambahan variasi CNC sementara penambahan konsentrasi CNC cenderung dapat meningkatkan rasio swelling pada rentang sekitar 72% hingga 87%. Uji UV-Visible Spectroscopy menunjukkan bahwa nilai transparansi dari bioplastik akan berkurang seiring bertambahnya persentase CNC.

**Kata kunci :** bioplastik, pati jagung, PVA, gliserol, CNC.

## **ABSTRACT**

### **THE EFFECT OF CELLULOSE NANOCRYSTALLINE CONCENTRATION ON THE PHYSICAL AND MECHANICAL PROPERTIES OF BIOPLASTIC FROM CORN STARCH/POLYVINIL ALCOHOL**

By

Luky Panca Prasetya

17/414599/PA/18099

A bioplastic made from corn starch/PVA has been made with the addition of glycerol as a plasticizer and cellulose nanocrystal (CNC) as a filler. Tests were carried out to determine the effect of increasing the concentration of CNC, each of which was 0%; 3.125%; 6.25%; 12.5% to changes in the properties and characteristics of bioplastics. Crystallinity of bioplastics will increase with increasing CNC concentration with the largest value at 12.5% CNC variation, which is 43.6% while the functional groups have similarities between each variation only at 12.5% CNC variation is detected C=O chemical bond so that it could be seen that there is a certain minimum value of added CNC so that the bond appears. The results of the tensile test showed the highest value in the sample with a variation of 12.5% CNC at  $10 \pm 2$  MPa. Biodegradation testing shows that the degradation time of bioplastics have a tendency to getting longer as the CNC variation increases, meanwhile the addition of CNC concentration could increase the swelling ratio in the range of about 72% to 87%. UV-Visible Spectroscopy shows that the transparency value of bioplastic will decrease as the percentage of CNC increases.

**Key words :** bioplastic, corn starch, PVA, glycerol, CNC