

## ABSTRAK

### KONVERSI NANOSELULOSA DARI LIMBAH KULIT PISANG KEPOK (*Musa x paradisiaca L.*) MENJADI GULA ALKOHOL MENGUNAKAN NANOKOMPOSIT $\text{LaCr}_{0,96}\text{Ti}_{0,04}\text{O}_3/\text{nGO}$ DENGAN RASIO (0,7/1) DI BAWAH IRRADIASI SINAR UV

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Telah dilakukan penelitian mengenai konversi nanoselulosa menjadi gula alkohol menggunakan nanokomposit  $\text{LaCr}_{0,96}\text{Ti}_{0,04}\text{O}_3/\text{nGO}$  dengan perbandingan berat 0,7/1. Nanokomposit  $\text{LaCr}_{0,96}\text{Ti}_{0,04}\text{O}_3/\text{nGO}$  disintesis dengan metode sol-gel menggunakan pektin sebagai agen pengemulsi, metode *freeze drying*, metode sonikasi, dan kemudian dikarakterisasi dengan XRD, DRS UV-Vis, SEM-EDX, dan FTIR. Hasil analisis XRD menunjukkan terbentuknya 2 fase kristal utama yaitu  $\text{LaCrO}_3$  dan  $\text{LaTiO}_3$  serta diperoleh ukuran kristal  $\text{LaCr}_{0,96}\text{Ti}_{0,04}\text{O}_3$  sebesar 33,08 nm dan  $\text{LaCr}_{0,96}\text{Ti}_{0,04}\text{O}_3/\text{nGO}$  sebesar 41,35 nm berdasarkan metode *Scherrer*. Hasil analisis DRS UV-Vis menunjukkan energi celah pita sebesar 1,43 eV. Hasil analisis SEM-EDX menunjukkan bahwa nanokomposit memiliki morfologi dengan beragam bentuk. Nanoselulosa dipreparasi melalui tahapan delignifikasi, *bleaching* dan hidrolisis asam, diperoleh ukuran kristal sebesar 18,47 nm dan indeks kristalinitas sebesar 64,33%. Konversi nanoselulosa menggunakan nanokomposit  $\text{LaCr}_{0,96}\text{Ti}_{0,04}\text{O}_3/\text{nGO}$  (0,7/1) dilakukan dibawah irradiasi sinar UV dengan variasi waktu 60, 120, 180, 240 dan 360 menit. Hasil konversi menunjukkan bahwa konsentrasi gula pereduksi tertinggi yaitu 207 ppm pada variasi waktu 240 menit.

**Kata Kunci:** nanokomposit,  $\text{LaCr}_{0,96}\text{Ti}_{0,04}\text{O}_3/\text{nGO}$ , nanoselulosa, gula alkohol.

## ABSTRACT

### CONVERSION OF NANOCELLULOSE FROM BANANA PEEL (*Musa x paradisiaca L.*) INTO SUGAR ALCOHOL USING $\text{LaCr}_{0.96}\text{Ti}_{0.04}\text{O}_3/\text{nGO}$ NANOCOMPOSITES WITH RATION (0.7/1) UNDER UV IRRADIATION

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Research has been conducted on the conversion of nanocellulose into sugar alcohol using  $\text{LaCr}_{0.96}\text{Ti}_{0.04}\text{O}_3/\text{nGO}$  nanocomposites with a weight ratio of 0.7/1. The  $\text{LaCr}_{0.96}\text{Ti}_{0.04}\text{O}_3/\text{nGO}$  nanocomposites were synthesized via the sol-gel method using pectin as an emulsifying agent, followed by freeze-drying, sonication, and characterization using XRD, UV-Vis DRS, SEM-EDX, and FTIR. XRD analysis revealed the formation of two main crystalline phases,  $\text{LaCrO}_3$  and  $\text{LaTiO}_3$ , with crystal sizes of  $\text{LaCr}_{0.96}\text{Ti}_{0.04}\text{O}_3$  and  $\text{LaCr}_{0.96}\text{Ti}_{0.04}\text{O}_3/\text{nGO}$  being 33.08 nm and 41.35 nm, respectively, according to the Scherrer method. UV-Vis DRS analysis showed a bandgap energy of 1.43 eV. SEM-EDX analysis indicates that the nanocomposites have a morphology with various shapes. Nanocellulose was prepared through delignification, bleaching, and acid hydrolysis, yielding a crystal size of 18.47 nm and a crystallinity index of 64.33%. The conversion of nanocellulose using  $\text{LaCr}_{0.96}\text{Ti}_{0.04}\text{O}_3/\text{nGO}$  (0.7/1) nanocomposites was carried out under UV irradiation with varying times of 60, 120, 180, 240, and 360 minutes. The conversion results showed that the highest concentration of reducing sugars was 207 ppm at a time of 240 minutes.

**Keywords:** nanocomposites,  $\text{LaCr}_{0.96}\text{Ti}_{0.04}\text{O}_3/\text{nGO}$ , nanocellulose, sugar alcohol.