ABSTRAK

KONVERSI SELULOSA DARI KULIT PISANG KEPOK (*Musa paradisiaca* L) MENJADI GULA ALKOHOL MENGGUNAKAN KATALIS Cr_2O_3/nGO

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Pada penelitian ini telah dilakukan preparasi katalis Cr_2O_3 menggunakan metode presipitasi-gelasi dan preparasi nGO menggunakan metode Hummers termodifikasi. Preparasi katalis Cr_2O_3/nGO dilakukan dengan impregnasi menggunakan alat *ultrasonic cleaner* sesuai dengan tiga perbandingan massa Cr_2O_3/nGO yaitu 0,125/1 ; 0,25/1 ; 0,5/1. Analisis *X-Ray Diffraction* (XRD) menunjukkan katalis berukuran 28,19 ; 26,30 dan 26,31 nm. Analisis *Diffuse Reflectance Spectroscopy* (DRS) menunjukkan nilai energi celah pita sebesar 1,70 ; 1,77 dan 1,80 eV. Analisis *Scanning Electron Microscopy* (SEM) menunjukkan bahwa Cr_2O_3 terdistribusi merata pada permukaan nGO. Nanoselulosa telah dipreparasi menggunakan metode delignifikasi, *bleaching* dan hidrolisis asam sehingga diperoleh nanoselulosa berukuran 16,52 nm dan mempunyai indeks kristalinitas sebesar 33,03%. Nanoselulosa dikonversi menjadi gula alkohol menggunakan Cr_2O_3/nGO di bawah sinar UV disertai aliran gas H_2 dengan variasi waktu 1, 2, 3, 4 dan 5 jam. Hasil konversi menunjukkan bahwa persentase nanoselulosa terkonversi tertinggi sebesar 36,38% pada variasi katalis 1 nGO : 0,5 Cr_2O_3 dengan waktu konversi selama 4 jam. Analisis *High Performance Liquid Chromatography* (HPLC) menunjukkan katalis Cr_2O_3/nGO mampu mengkonversi nanoselulosa menjadi glukosa dengan konsentrasi 56 ppm glukosa, namun belum mampu mengkonversi nanoselulosa menjadi gula alkohol.

Kata Kunci : Cr_2O_3, nGO, nanoselulosa, gula alkohol, konversi

ABSTRACT

CONVERSION OF CELLULOSE FROM KEPOK BANANA PEELS (*Musa paradisiaca* L) TO ALCOHOL SUGAR USING CATALYST Cr_2O_3/nGO

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In this research, the preparation of the Cr_2O_3 catalyst using the precipitation-gelation method and the preparation of nGO using the modified Hummers method were conducted. Furthermore, the preparation of the Cr_2O_3/nGO catalyst was carried out using the impregnation method with the help of an ultrasonic cleaner with three mass ratios of Cr_2O_3 to nGO which are 0.125/1, 0.25/1, and 0.5/1. X-Ray Diffraction (XRD) analysis showed the particle sizes of the catalyst were 28.19 nm, 26.30 nm, and 26.31 nm. Diffuse Reflectance Spectroscopy (DRS) analysis showed band gap energy values of 1.70 eV, 1.77 eV, and 1.80 eV. Scanning Electron Microscopy (SEM) study showed an even distribution on the surface of Cr_2O_3/nGO. Nanocellulose was prepared using delignification, bleaching, and acid hydrolysis methods to obtain nanocellulose with a particle size of 16.52 nm with a crystallinity index of 33.03%. Nanocellulose was converted to sugar alcohol using Cr_2O_3/nGO under UV light irradiation accompanied by H_2 gas flow with time variation of 1, 2, 3, 4, and 5 hours. The conversion results showed that the highest percentage of nanocellulose conversion was 36.38%, with a Cr_2O_3/nGO catalyst ratio of 0.5/1 and a reaction time of 4 hours. High-Performance Liquid Chromatography (HPLC) analysis showed that Cr_2O_3/nGO catalyst could convert nanocellulose into glucose with a concentration of 56 ppm. Still, it was not able to convert nanocellulose into sugar alcohols.

Keyword : Cr_2O_3, nGO, nanocellulose, sugar alcohols, conversion