

ABSTRAK

UJI AKTIVITAS NANOKATALIS $\text{Ni}_{0,65}\text{Cu}_{0,35}\text{Fe}_2\text{O}_4$ UNTUK KONVERSI NANOSELULOSA KULIT PISANG KEPOK (*Musa paradisiaca* L.) MENJADI GULA ALKOHOL DI BAWAH IRRADIASI SINAR UV

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Pada penelitian ini, katalis $\text{Ni}_{0,65}\text{Cu}_{0,35}\text{Fe}_2\text{O}_4$ telah dipreparasi menggunakan metode sol-gel dan pektin sebagai agen pengemulsi, dilanjutkan dengan kalsinasi pada temperatur 600 °C. Katalis ini digunakan untuk uji konversi selulosa menjadi gula alkohol menggunakan sinar UV serta aliran gas H_2 10 ml/menit dengan waktu konversi 15, 30, 45, dan 60 menit. Analisis keasaman dengan metode gravimetri, menunjukkan bahwa katalis $\text{Ni}_{0,65}\text{Cu}_{0,35}\text{Fe}_2\text{O}_4$ memiliki keasaman 1,34 mmol piridin/gram. Berdasarkan metode *Fourier Transform Infra Red* (FTIR) situs asam Lewis lebih dominan. Hasil analisis difraksi sinar-X (XRD) katalis terdiri dari beberapa fasa kristal yakni fasa NiFe_2O_4 , CuFe_2O_4 , CuO , dan NiO . Hasil analisis morfologi katalis dengan metode *Transmission Electron Microscop* (TEM) menunjukkan morfologi permukaan yang heterogen. Hasil analisis energi senjang dengan metode *Diffuse Reflectance Spectroscopy* (DRS) menunjukkan nilai energi senjang sebesar 1,5 eV. Uji Fehling mengindikasikan bahwa hasil terbaik diperoleh menggunakan aliran gas H_2 10 ml/menit dengan waktu konversi 60 menit. Analisis menggunakan *High Performance Liquid Chromatography* (HPLC) menunjukkan bahwa katalis $\text{Ni}_{0,65}\text{Cu}_{0,35}\text{Fe}_2\text{O}_4$ hanya mampu mengkonversi nanoselulosa menjadi gula reduksi.

Kata Kunci : nanoselulosa, nanokatalis, gula alkohol.

ABSTRACT

ACTIVITY TEST NANOCATALYST $\text{Ni}_{0.65}\text{Cu}_{0.35}\text{Fe}_2\text{O}_4$ FOR THE CONVERSION OF KEPOK BANANA SKIN NANOCCELLULOSE (*Musa paradisiaca* L.) INTO SUGAR ALCOHOL UNDER UV RAYS IRRADIATION

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On this research, catalyst of $\text{Ni}_{0.65}\text{Cu}_{0.35}\text{Fe}_2\text{O}_4$ had been prepared with using sol-gel method and pectin as an emulsifying agent, followed by calcination at temperature 600 °C. The catalyst is used for converting nanocellulose into sugar alcohols under UV rays with the exposure time of 15, 30, 45, and 60 minutes. Analysis of acidity with gravimetric method, showed that the catalyst $\text{Ni}_{0.65}\text{Cu}_{0.35}\text{Fe}_2\text{O}_4$ have the acidity 1,34 mmol piridin/gram. Method based on Fourier Transform Infra Red (FTIR) lewis acid site is more dominant. The results of the analysis of the X-ray difraction (XRD) catalyst consists of several crystal phase i.e. phase NiFe_2O_4 , CuFe_2O_4 , CuO , and NiO . The results of catalyst morphology analysis with transmission electron microscope (TEM) method showed heterogeneous surface morphology. The results of the analysis of gap energy using the Diffuse Reflectance Spectroscopy (DRS) method show the value of the gap energy of 1,5 eV. The fehling test indicated that the best results were obtained using a 10 mL H_2 gas flow per minute with a conversion time of 60 minutes. Analysis using high performance liquid chromatography (HPLC) showed that the $\text{Ni}_{0.65}\text{Cu}_{0.35}\text{Fe}_2\text{O}_4$ catalyst was only able to convert nanocellulose into reducing sugar.

Keywords : nanocelulose, nanocatalyst, sugar alcohol.