

## **NIKEL TEREDUKSI ASAM ASKORBAT TERIMPREGNASI PADA KARBON AKTIF DARI TEMPURUNG KELAPA UNTUK KATALIS TRANSESTERIFIKASI MINYAK NYAMPLUNG**

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### **INTISARI**

Preparasi katalis nikel tereduksi asam askorbat terimpregnasi pada karbon aktif dari tempurung kelapa untuk transesterifikasi minyak nyamplung menjadi biodiesel telah berhasil dilakukan. Penelitian ini bertujuan untuk mengetahui karakter, aktivitas dan selektivitas katalis Ni teremban karbon tempurung kelapa pada proses transesterifikasi minyak nyamplung menjadi biodiesel. Preparasi katalis logam Ni pada karbon tempurung kelapa dilakukan dengan menggunakan logam Ni dan menggunakan agen pereduksi asam organik, yaitu asam askorbat. Variasi pengembangan logam Ni terhadap karbon tempurung kelapa sebesar 5 dan 10%, sehingga menghasilkan katalis KA, Ni(5-As)/KA, Ni(10-As)/KA dan Ni(5-H<sub>2</sub>)/KA. Katalis KA, Ni(5-As)/KA, Ni(10-As)/KA dan Ni(5-H<sub>2</sub>)/KA dikarakterisasi menggunakan XRD, FTIR, SAA, SEM dan uji keasaman secara gravimetri menggunakan adsorpsi basa ammonia (NH<sub>3</sub>). Uji aktivitas dan selektivitas katalis dilakukan melalui proses transesterifikasi minyak nyamplung. Proses transesterifikasi minyak nyamplung dalam refluks pada suhu 60 °C dengan perbandingan rasio methanol:minyak 9:1 dan katalis 6% massa minyak selama 120 menit. Produk hasil transesterifikasi dianalisis menggunakan GC-MS.

Hasil penelitian menunjukkan katalis Ni(10-As)/KA memiliki aktivitas dan selektivitas tertinggi dalam proses transesterifikasi minyak nyamplung menjadi biodiesel dibandingkan dengan katalis KA, Ni(5-As)/KA dan Ni(5-H<sub>2</sub>)/KA. Katalis Ni(10-As)/KA memiliki total keasaman, luas permukaan, rerata diameter pori dan volume pori berturut-turut sebesar 15,68 mmol/g; 373,42 m<sup>2</sup>/g; 2,32 nm; 0,21 cm<sup>3</sup>/g. Hasil produk biodiesel dan metil ester yang diperoleh dari transesterifikasi minyak nyamplung menggunakan katalis Ni(10-As)/KA sebesar 74,4 dan 74,05% b/b.

Kata kunci: karbon, asam askorbat, nikel, transesterifikasi, minyak nyamplung.

**ASCORBIC ACID REDUCED NICKEL IMPREGNATED ON AN ACTIVATED  
CARBON FROM COCONUT SHELL FOR NYAMPLUNG OIL  
TRANSESTERIFICATION CATALYST**

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**ABSTRACT**

Preparation of ascorbic acid reduced nickel impregnated on an activated carbon from coconut shells for the transesterification of nyamplung oil into biodiesel has been successfully carried out. This study aims to determine the character, activity and selectivity of Ni catalysts impregnated on coconut shell carbon in the transesterification process of nyamplung oil into biodiesel. The preparation of Ni metal catalysts on coconut shell carbon is carried out using Ni metal and using organic acid reducing agents, namely ascorbic acid. The variation in the development of Ni metal against coconut shell carbon is 5 and 10%, resulting in KA, Ni(5-As)/KA, Ni(10-As)/KA and Ni(5-H<sub>2</sub>)/KA catalysts. KA, Ni(5-As)/KA, Ni(10-As)/KA and Ni(5-H<sub>2</sub>)/KA catalysts were characterized using XRD, FTIR, SAA, SEM and gravimetric acidity tests using ammonia base adsorption (NH<sub>3</sub>). The test of catalyst activity and selectivity is carried out through the process of transesterification of nyamplung oil. The transesterification process of oil is contained in reflux at 60 °C with a ratio of methanol:oil ratio of 9:1 and catalyst of 6% oil mass for 120 min. Transesterified products were analyzed using GC-MS.

The results showed that the Ni(10-As)/KA catalyst has the highest activity and selectivity in the transesterification process of oil into biodiesel compared to the KA, Ni(5-As)/KA and Ni(5-H<sub>2</sub>)/KA catalysts. Ni(10-As)/KA catalysts have a total acidity, surface area, average pore diameter and pore volume of 15.68 mmol/g, respectively; 373.42 m<sup>2</sup>/g; 2.32 nm; 0.21 cm<sup>3</sup>/g. The results of biodiesel and methyl ester products obtained from the transesterification of nyamplung oil using Ni(10-As)/KA catalysts of 74.4 and 74.05 wt%.

**Keywords:** carbon, ascorbic acid, nickel, transesterification, nyamplung oil.