PRODUKSI BIODIESEL DARI MINYAK JELANTAH MENGGUNAKAN KATALIS BERBAHAN BAKU CANGKANG TELUR BEBEK DAN KOSOLVEN ETIL ASETAT

INTISARI

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Telah dilakukan pengolahan biodiesel dari minyak jelantah menggunakan cangkang telur bebek sebagai katalis dan etil asetat sebagai kosolven. Penelitian ini mempunyai tujuan untuk mengetahui pengaruh variasi massa katalis berbahan baku cangkang telur bebek dan variasi waktu reaksi transesterifikasi terhadap persentase *yield* yang diperoleh dari proses transesterifikasi minyak jelantah. Preparasi katalis dilakukan melalui mengkalsinasi cangkang telur bebek dengan temperatur 900 °C selama 4 jam. Katalis berbahan baku cangkang telur bebek dikarakterisasi menggunakan instrumen XRD, menunjukkan mengandung senyawa CaO, $CaCO_3$ dan $Ca(OH)_2$. Variasi massa katalis yang digunakan ialah 0,2; 0,4; dan 0,6 g; sedangkan variasi waktu reaksi yang digunakan ialah 10, 15, dan 20 menit. Hasil pengolahan biodiesel dianalisa menggunakan instrumen GC-MS. Berdasarkan penelitian dapat diketahui bahwa penambahan katalis serta waktu reaksinya mampu meningkatkan *yield* biodiesel yang diperoleh. Pembentukan metil ester optimum diperoleh pada kondisi variasi massa katalis 0,6 g dan variasi waktu reaksi 20 menit yang menghasilkan biodiesel dengan persentase *yield* sebesar 54,47% dan jumlah konversi biodiesel sebesar 100%.

Kata kunci : Biodiesel, minyak jelantah, cangkang telur bebek, kosolven, etil asetat

BIODIESEL PRODUCTION FROM WASTE COOKING OIL USING DUCK EGGSHELL-BASED CATALYST AND ETHYL ACETATE COSOLVENT

ABSTRACT

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Production of biodiesel from waste cooking oil using duck eggshell as a catalyst and ethyl acetate as cosolvent has been carried out. This research aims to determine the effect of duck eggshell-based catalyst mass variation and transesterification reaction time variation on the percentage yield obtained from the waste cooking oil transesterification process. Catalyst preparation was carried out by calcining duck eggshell at 900 °C for 4 hours. The duck eggshell- based catalyst was characterized using an XRD instrument, which showed the presence CaO, $CaCO_3$, and $Ca(OH)_2$ compounds. The variations of catalyst mass used were 0,2; 0,4 and 0,6 g; while the variations of reaction time used were 10, 15, and 20 minutes. The biodiesel product was analyzed using a GC-MS instrument. Based on the research, it can be seen that the addition of catalyst and reaction time can increase the yield of biodiesel obtained. The optimum methyl ester was obtained under conditions of variation of 0,6 g catalyst mass and variation of 20 minutes reaction time, which produced biodiesel with a yield percentage of 54,47% and a biodiesel conversion of 100%.

Keywords : Biodiesel, waste cooking oil, duck eggshell, cosolvent, ethyl acetate