ABSTRAK

PEMBUATAN BIODIESEL DARI MINYAK GORENG BEKAS MENGGUNAKAN BIOKATALIS BIJI KEMIRI DENGAN METODE INTERESTERIFIKASI

Aliya Safia Rezeki, 2026, 51 Halaman, 7 Tabel, 10 Gambar, 4 Lampiran

Ketergantungan Indonesia terhadap bahan bakar fosil mendorong pengembangan energi alternatif seperti biodiesel. Minyak goreng bekas berpotensi sebagai bahan baku biodiesel berbiaya rendah, namun proses transesterifikasi konvensional memiliki kelemahan berupa pembentukan sabun dan produk samping gliserol. Metode interesterifikasi dengan biokatalis alami menjadi alternatif yang lebih ramah lingkungan. Penelitian ini bertujuan mengkaji pengaruh variasi % massa biokatalis biji kemiri (*Aleurites moluccana*) dan waktu reaksi terhadap karakteristik biodiesel yang dihasilkan, serta mengevaluasi kesesuaiannya dengan SNI 04-7182-2015. Reaksi dilakukan pada suhu 60°C, kecepatan pengadukan 180 rpm, rasio mol minyak:metil asetat 1:6, dengan variasi % massa biokatalis 4% dan 8% (w/w) serta waktu reaksi 1,2,3,4 dan 5 jam. Karakterisasi meliputi *crude yield*, densitas, viskositas, angka asam, *flash point*, angka setana, dan kadar FAME melalui *Gas Chromatography* (GC). Kondisi optimum diperoleh pada % massa biokatalis 8% dan waktu reaksi 4 jam dengan *crude yield* 98,4%, densitas 899,6 kg/m³, viskositas 5,61 cSt, angka asam 0,30 mg KOH/g, *flash point* 180°C, dan angka setana 66,8. Analisis GC mengkonfirmasi keberadaan metil palmitat, metil stearat, metil oleat, dan metil linoleat sebagai FAME, serta triasetin sebagai produk samping.

Kata kunci: Biodiesel, biji kemiri, biokatalis, interesterifikasi, metil asetat, minyak goreng bekas

ABSTRACT

BIODIESEL PRODUCTION FROM WASTE COOKING OIL USING CANDLENUT SEED BIOCATALYST VIA INTERESTERFICATION METHOD

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Indonesia's heavy reliance on fossil fuels has driven the development of alternative energy sources such as biodiesel. Waste cooking oil is a promising low-cost feedstock, yet conventional transesterification suffers from saponification and glycerol by-product issues. Interesterification using natural biocatalysts offers a greener alternative. This study aimed to examine the effect of candlenut seed (Aleurites moluccana) % mass of biocatalyst and reaction time on biodiesel characteristics, and to evaluate compliance with SNI 04-7182-2015. *The reaction was conducted at 60°C, 180 rpm stirring speed, and an oil-to-methyl acetate molar ratio of 1:6, with % mass of biocatalyst 4% and 8% (w/w) and reaction times of 1,2,3,4 and 5 hours. Product characterization covered crude yield, density, viscosity, acid value, flash point, cetane number, and FAME content via Gas Chromatography (GC). The optimum condition was obtained at 8% biocatalyst and 4 hours of reaction time, yielding a crude yield of 98.4%, density of 899.6 kg/m³, viscosity of 5.61 cSt, acid value of 0.30 mg KOH/g, flash point of 180°C, and cetane number of 66.8. GC analysis confirmed methyl palmitate, methyl stearate, methyl oleate, and methyl linoleate as FAME components, with triacetin identified as a reaction by-product.*

Keywords: *biodiesel, candlenut seed, biocatalyst, interesterification, methyl acetate, waste cooking oil.*