

ABSTRAK

Pengaruh Variasi Rasio Metanol Dan Waktu Reaksi Terhadap Produksi Biodiesel Dari Minyak Biji Ketapang (*Terminalia catappa* Linn)

Geriya Nurita Hazar, 2026, 48 Halaman, 7 Tabel, 12 Gambar, 4 Lampiran

Penelitian ini bertujuan untuk menganalisis pengaruh variasi rasio metanol terhadap minyak dan waktu reaksi terhadap produksi biodiesel dari minyak biji ketapang (*Terminalia catappa* Linn). Minyak biji ketapang diperoleh melalui proses ekstraksi menggunakan metode *mechanical press*, kemudian dikonversi menjadi biodiesel melalui reaksi transesterifikasi menggunakan katalis natrium hidroksida (NaOH). Variasi yang digunakan dalam penelitian ini meliputi rasio metanol:minyak sebesar 4:1, 6:1, 8:1, dan 10:1 serta waktu reaksi 60, 90, dan 120 menit. Hasil ekstraksi menunjukkan bahwa dari 2.625 gram biji ketapang diperoleh 1.630 gram minyak dengan volume 1.800 mL dan *yield* minyak sebesar 62,1%. Karakteristik minyak yang diperoleh meliputi kadar asam lemak bebas (FFA) sebesar 1,41%, densitas 900 kg/m³, viskositas 39,74 cSt, dan kadar air 0,0%. Biodiesel yang dihasilkan kemudian dianalisis berdasarkan parameter *yield*, densitas, viskositas, kadar air, angka asam, titik nyala, dan angka setana. *Yield* biodiesel tertinggi diperoleh pada rasio metanol:minyak 4:1 dengan waktu reaksi 120 menit yaitu sebesar 96%. Nilai densitas biodiesel berada pada rentang 886,0–887,2 kg/m³, sedangkan viskositas berada pada rentang 3,89–4,69 cSt. Kadar air biodiesel berada pada rentang 0,010–0,020%, dan angka asam berada pada rentang 0,22–0,28 mg KOH/g. Berdasarkan hasil pengujian, biodiesel yang dihasilkan telah memenuhi persyaratan mutu biodiesel berdasarkan SNI 7182:2015.

Kata Kunci: *Biodiesel, biji ketapang, mechanical press, transesterifikasi, rasio metanol, waktu reaksi*

ABSTRACT

The Effect of Variations in Methanol Ratio and Reaction Time on Biodiesel Production from Ketapang Seed Oil (*Terminalia catappa* Linn)

Geriya Nurita Hazar, 2026, 48 Pages, 7 Tables, 12 Figures, 4 Appendices

The aim of this study was to analyze the effects of the methanol-to-oil ratio and reaction time on the production of biodiesel from ketapang seed oil (*Terminalia catappa* Linn.). Ketapang seed oil was extracted using a mechanical press and subsequently converted into biodiesel through a transesterification reaction employing sodium hydroxide (NaOH) as the catalyst. The methanol-to-oil molar ratios investigated were 4:1, 6:1, 8:1, and 10:1, while the reaction times were 60, 90, and 120 min. The extraction process yielded 1,630 g of oil with a volume of 1,800 mL from 2,625 g of ketapang seeds, corresponding to an oil yield of 62.1%. The extracted oil exhibited a free fatty acid (FFA) content of 1.41%, a density of 900 kg/m³, a viscosity of 39.74 cSt, and a moisture content of 0.0%. The resulting biodiesel was characterized in terms of yield, density, viscosity, moisture content, acid value, flash point, and cetane number. The highest biodiesel yield (96%) was obtained at a methanol-to-oil ratio of 4:1 and a reaction time of 120 min. The density of the biodiesel ranged from 886.0 to 887.2 kg/m³, while its viscosity ranged from 3.89 to 4.69 cSt. The moisture content and acid value were in the ranges of 0.010–0.020% and 0.22–0.28 mg KOH/g, respectively. Based on the test results, the produced biodiesel satisfied the quality requirements of SNI 7182:2015.

Keywords: *Biodiesel, ketapang seeds, mechanical press, transesterification, methanol ratio, reaction time*