ABSTRAK

KONVERSI MINYAK JELANTAH MENJADI BIODIESEL DENGAN VARIASI JUMLAH ENZIM LIPASE TERIMOBILISASI DI *PACKED BED REACTOR*

(Bayu Setiawan, 80 Halaman, 9 Tabel, 18 Gambar, 4 Lampiran)

Biodiesel merupakan bahan bakar alternatif yang dapat diproduksi dari minyak jelantah melalui proses transesterifikasi menggunakan enzim lipase terimobilisasi dalam packed bed reactor. Penelitian ini bertujuan untuk mengetahui pengaruh variasi jumlah enzim terhadap *yield* dan kualitas biodiesel yang dihasilkan. Variasi jumlah enzim yang digunakan yaitu 10; 12,5; 15; 17,5; dan 20 gram dengan rasio mol minyak 1:5 dan 1:7 pada suhu 40 °C. Parameter yang dianalisis meliputi yield, densitas, viskositas, titik nyala, angka setana, angka asam, angka iodin, angka saponifikasi, gliserol total, dan kadar metil ester. Hasil optimum diperoleh pada penggunaan enzim 12,5 gram dengan rasio mol 1:5 yang menghasilkan *yield* 90,02% dan kadar metil ester 97,57%, serta memenuhi SNI 7182:2015.

Kata kunci: Biodiesel, Enzim Lipase Terimobilisasi, Minyak Jelantah, *Packed Bed Reactor*.

ABSTRACT

CONVERSION OF WASTE-COOKED OIL INTO BIODIESEL WITH VARIATIONS IN THE AMOUNT OF IMMOBILIZABLE LIPASE ENZYMES IN A PACKED BED REACTOR

(Bayu Setiawan, 80 *Page*, 9 *Tables*, 18 *Figures*, 4 *Attachments*)

Biodiesel is an alternative fuel that can be produced from used cooking oil through a transesterification process using immobilized lipase enzymes in a packed bed reactor. This study aims to determine the effect of variations in the amount of enzymes on the yield and quality of the biodiesel produced. The variations in the amount of enzymes used were 10; 12.5; 15; 17.5; and 20 grams with an oil mole ratio of 1:5 and 1:7 at a temperature of 40 °C. The parameters analyzed included yield, density, viscosity, flash point, cetane number, acid number, iodine number, saponification number, total glycerol, and methyl ester content. The optimum result was obtained by using 12.5 grams of enzyme with a mole ratio of 1:5 which produced a yield of 90.02% and a methyl ester content of 97.57%, and met SNI 7182:2015.

Keywords: *Biodiesel, Immobilized Lipase Enzyme, Waste Cooking Oil, Packed Bed Reactor.*