ABSTRAK

PEMANFAATAN *HYDROGEN IN-SITU ETHANOL* PADA *HYDROTREATING* MINYAK JELANTAH UNTUK MENINGKATKAN *YIELD GREEN DIESEL*

(Erdalia Chantika, 2025, Skripsi : 46 Halaman, 11 Tabel, 10 Gambar)

Minyak jelantah memiliki potensi besar sebagai bahan baku dalam produksi bahan bakar terbarukan, khususnya *green diesel.* Penelitian ini bertujuan untuk meningkatkan *yield green diesel* dari minyak jelantah melalui proses *hydrotreating in-situ ethanol* menggunakan katalis NiMo/γ-Al_2O_3. Proses ini memanfaatkan *ethanol* sebagai donor hidrogen internal *(in-situ)* untuk menggantikan kebutuhan hidrogen eksternal dalam proses hidrodeoksigenasi. Variabel yang diteliti meliputi konsentrasi etanol (5%, 10%, dan 15%) serta temperatur reaktor (340°C, 370°C, 400°C, 430 °C dan 460°C). Karakteristik produk dianalisis melalui uji densitas, viskositas kinematik, titik nyala, cetane number, dan GC-MS. Hasil menunjukkan bahwa kondisi optimum diperoleh pada konsentrasi *ethanol* 15% dan suhu 460°C, menghasilkan *yield green diesel* sebesar 60,025%, densitas 763,197 kg/m^3, viskositas 2,682 mm^2/s, dan titik nyala 61°C. Namun, cetane number yang diperoleh masih di bawah standar minimum SNI sebesar 70. Proses ini menunjukkan potensi besar dalam konversi limbah minyak menjadi bahan bakar ramah lingkungan, sekaligus mendukung pengurangan ketergantungan terhadap bahan bakar fosil.

Kata Kunci :
Green Diesel, Hydrotreating, Minyak Jelantah, Etanol In-Situ, NiMo/γ-Al_2O_3, *Yield*

ABSTRACK

UTILIZATION OF IN-SITU HYDROGEN ETHANOL IN THE HYDROTREATING OF USED COOKING OIL TO INCREASE GREEN DIESEL YIELD

(Erdalia Chantika, 2025, *Thesis : 46 Pages , 11 Table, 10 Figure)*

Used cooking oil has great potential as a raw material in the production of renewable fuels, particularly green diesel. This study aims to increase the yield of green diesel from used cooking oil through an in-situ ethanol hydrotreating process using a NiMo/γ-Al_2O_3 catalyst. This process utilizes ethanol as an internal hydrogen donor (in-situ) to replace the need for external hydrogen in the hydrodeoxygenation process. The variables studied include ethanol concentration (5%, 10%, and 15%) and reactor temperature (340°C, 370°C, 400°C, 430°C, and 460°C). Product characteristics were analyzed through density tests, kinematic viscosity, flash point, cetane number, and GC-MS. The results showed that the optimal conditions were achieved at an ethanol concentration of 15% and a temperature of 460°C, yielding 60.025% green diesel, a density of 763.197 kg/m^3, a viscosity of 2.682 mm^2/s, and a flash point of 61°C. However, the cetane number obtained was still below the minimum SNI standard of 70. This process demonstrates significant potential for converting oil waste into environmentally friendly fuel, while also supporting the reduction of dependence on fossil fuels.

Key Word :

Green Diesel, Hydrotreating, Cooking Oil, Etanol In-Situ, NiMo/γ-Al_2O_3, *Yield*