

ABSTRAK

ANALISA PENGARUH PENAMBAHAN BODIESEL MINYAK JAGUNG TERHADAP PERFORMA MESIN DIESEL

Oleh

WAYAN DARMAYASA

Biodiesel minyak jagung berpotensi digunakan sebagai bahan bakar alternatif mesin diesel karena karakteristiknya yang mendekati bahan bakar diesel konvensional. Penelitian ini bertujuan menganalisis pengaruh campuran biodiesel minyak jagung terhadap performa mesin diesel yang ditinjau dari daya engkol, torsi, dan konsumsi bahan bakar spesifik engkol (Brake Specific Fuel Consumption/bsfc). Pengujian dilakukan pada mesin diesel satu silinder menggunakan bahan bakar Pertamina Dex serta campuran biodiesel B20, B30, dan B40. Variasi pengujian meliputi bukaan katup 0,5; 1; dan 1,5 putaran serta putaran mesin 1100 rpm, 2000 rpm, dan 3000 rpm. Data hasil pengujian dianalisis secara kuantitatif. Hasil penelitian menunjukkan bahwa variasi campuran biodiesel berpengaruh terhadap performa mesin diesel. Campuran B30 memberikan performa paling optimal dengan keseimbangan terbaik antara daya, torsi, dan efisiensi bahan bakar, menghasilkan daya engkol maksimum sebesar 2,932 kW (2,16% lebih tinggi dibandingkan Pertamina Dex) pada 3000 rpm, serta nilai BSFC terendah sebesar 0,15 kg/kWh (25% lebih rendah dibandingkan Pertamina Dex) pada 2000 rpm. Oleh karena itu, campuran biodiesel minyak jagung B30 direkomendasikan sebagai campuran terbaik pada kondisi pengujian ini.

Kata kunci: Biodiesel, minyak jagung, Performa mesin, Putaran mesin

ABSTRACT**ANALYSIS OF THE EFFECT OF ADDING CORN OIL BIODIESEL ON
DIESEL ENGINE PERFORMANCE****By****WAYAN DARMAYASA**

Corn oil biodiesel has the potential to be used as an alternative fuel for diesel engines due to its properties that are comparable to those of conventional diesel fuel. This study aims to analyze the effect of corn oil biodiesel blends on diesel engine performance in terms of power, torque, and brake specific fuel consumption (bsfc). The experiments were conducted on a single-cylinder diesel engine using Pertamina Dex as the reference fuel and corn oil biodiesel blends of B20, B30, and B40. The test conditions included valve openings of 0.5, 1, and 1.5 turns and engine speeds of 1100 rpm, 2000 rpm, and 3000 rpm. The experimental data were analyzed quantitatively. The results indicate that variations in biodiesel blend composition significantly affect diesel engine performance. The B30 blend provided the most optimal performance, achieving the best balance between brake power, torque, and fuel efficiency. The maximum power obtained with B30 was 2.932 kW, which is 2.16% higher than that of Pertamina Dex at 3000 rpm. In addition, the lowest bsfc value of 0.15 kg/kWh was recorded at 2000 rpm, representing a 25% reduction compared to Pertamina Dex. Therefore, the B30 corn oil biodiesel blend is recommended as the optimum blend under the tested operating conditions.

Keywords: *Biodiesel, Corn oil, Engine performance, Engine speed*