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EXPERIMENTAL INVESTIGATION ON THE COMBUSTION, PERFORMANCE AND EMISSION CHARACTERISTICS OF BLENDED WASTE PLASTIC OIL IN A COMMON RAIL DIRECT INJECTION ENGINE

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Abstract

Each day, the utilization of diesel engines in man-made system is expanding, and this pattern is anticipated to persist. The engine operating parameters are a crucial factor to consider when attempting to optimize the engine to meet the heightened performance and emission criteria. Modifying the engine speeds, a combustion of waste plastics biodiesel and diesel has a significant impact on the engine performance, emissions, and combustion characteristics. Throughout this investigation, single-cylinder direct injection CI engine underwent a series of experiments, in which the engine speed was varied between 1250 and 2000 rpm while maintaining a constant load. Comparing the WPOB20D80 engine operating 1250 rpm to the experimental test findings, it was observed that the brake thermal efficiency increased 6.1% and specific fuel consumption decreased by 6.5%. Additionally, significant reduction in oxides of nitrogen, carbon dioxides and smoke emission were found at a speed of 2000 rpm, with decreases of 15.7%, 5.57%, and 20.4% respectively. Conversely, it was found that the cylinder pressure of the WPOB20D80 is lower than that of the D100 (diesel fuel). Furthermore, the emissions of carbon monoxide (CO) and hydrocarbon are higher when using blends of waste plastics oil biofuel.

Key words: biofuels, combustion, light duty engine, NOx emission, waste plastic oil

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