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PERFORMANCE ANALYSIS OF CRDI-EGR ENGINE UTILIZING WASTE CHICKEN OIL ASSISTED WITH $C_5H_{12}O$ AS BIODIESEL – AN APPROACH TOWARDS GREEN ENVIRONMENT

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Abstract

The research article addresses the appropriate use of chicken waste oil, which are widely squandered in India. But by turning waste oil into valuable energy, waste management systems may be developed. Using a catalytic ester conversion process called transesterification, used chicken oil is transformed into biodiesel. In a CRDI engine, the modified biodiesel is tested against regular diesel. Pentanol ($C_5H_{12}O$), also known as Amyl Alcohol, is added to biodiesel in concentrations of 10%, 20%, and 30% to improve its fuel characteristics. Research in this area focuses on engine features such as performance, emissions, and combustion. In certain ways, biodiesel is superior to diesel in terms of properties. However, these adjustments are not particularly appreciated. The results of comparing the attributes of biodiesel to B30+30% $C_5H_{12}O$ show that the latter raises BTE by 10% and lowers BSFC by 8% more than the former. Additionally, it lessens emissive substances including smoke, CO, and HC. However high oxygen content in Biodiesel increases NO_x emissions which are harmful to the ecosystem. But using $C_5H_{12}O$ with biodiesel reduces the NO_x emissions considerably. But still, the results are not far superior to Biodiesel. Hence Exhaust Gas Recirculation (EGR) is used to recirculate the exhaust gases thereby reducing NO_x emissions. With B30+30% $C_5H_{12}O$ using EGR the NO_x value is reduced drastically up to (1175ppm) than with B30 (1375ppm). In conclusion, it is clear that B30, which contains 30% $C_5H_{12}O$, has considerably superior qualities than all other samples, demonstrating that it can be utilized as a substitute for traditional diesel.

Key words: CRDI-EGR engine, C5H12O, emissions, engine performances, waste chicken oil

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