OMICS Group Conferences
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World Congress on
Petrochemistry and Chemical Engineering
November 18-20, 2013 Hilton San Antonio Airport, TX, USA

Studying the effect of compression ratio on an engine fueled with waste oil produced biodiesel/ diesel fuel

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Wasted cooking oil from restaurants was used to produce neat (pure) biodiesel through transesterification, and then used to prepare biodiesel/diesel blends. The effect of blending ratio and compression ratio on a diesel engine performance has been investigated. Emission and combustion characteristics were studded when the engine operated using the different blends (B10, B20, B30, and B50) and normal diesel fuel (B0) as well as when varying the compression ratio from 14 to 16 to 18. The result shows that the engine torque for all blends increases as the compression ratio increases. The bsfc for all blends decreases as the compression ratio increases and at all compression ratios bsfc remains higher for the higher blends as the biodiesel percent increase. The change of compression ratio from 14 to 18 resulted in, 18.39%, 27.48%, 18.5%, and 19.82% increase in brake thermal efficiency in case of B10, B20, B30, and B50 respectively. On an average, the CO2 emission increased by 14.28%, the HC emission reduced by 52%, CO emission reduced by 37.5% and NOx emission increased by 36.84% when compression ratio was increased from 14 to 18. In spite of the slightly higher viscosity and lower volatility of biodiesel, the ignition delay seems to be lower for biodiesel than for diesel. On average, the delay period decreased by 13.95% when compression ratio was increased from 14 to 18. From this study, increasing the compression ratio had more benefits with biodiesel than that with pure diesel.

Biography

Mohamed El Kassaby has completed his Ph.D. at the age of 32 years from Illinois University at 1983. He is the chair professor for Internal combustion engine branch at Alexandria university. He has published more than 35 papers in reputed journals and serving as an member in the committee for per motion of the teaching staff for higher education in the Egyptian universities.

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