Production of Bio-mix biodiesel fuel and it impact on diesel engine application

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Abstract

In India, food industries are growing fast day by day. The wastage coming out from these industries like meat waste and used cooking oil are nearly 3 million tons/year. Due to the lag of waste management, these wastes have been dumped in landfills which increase environmental pollution and health problem for human as well as animals. To solve this problem, an attention has been made to develop a renewable alternative fuel through bio-mix approach. For biodiesel production, pig fat, waste cooking oil and jatropha oil were used. The pig fat was extracted from the waste pig meat, waste cooking oil was taken from the college canteen and jatropha oil was procured from the local market. These feedstocks was mixed together to form a raw bio-mix oil. This raw bio-mix oil was converted to bio-mix methyl esters through transesterification reaction. The reaction parameters like methanol/oil ratio, catalyst and reaction time were investigated. Two sample of bio-mix biodiesel (BMB-I and BMB-II) were prepared, BMB-I in the presence of Nano- catalyst and BMB-II was base catalyst (KOH). Furthermore, fuel properties have been investigated and were found within the standard values. Engine study shows that both the bio-mix biodiesel (BMB-I, BMB-II) have higher break specific fuel consumption (BSFC) and lower brake thermal efficiency (BTE) as compared to diesel fuel. Exhaust emissions like NOx, CO, CO_2, HC and smoke were found to be lower for BME-I as compared to BMB-II and diesel fuel respectively. Thus the Nano-catalyst was used in this study was found to be cost effective and low toxic for biodiesel production.

References

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