

Investigating the performance of blends of diesel and alcohol in a single cylinder diesel engine

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Abstract

Ethanol can be considered as a renewable source of fuel and it is a nontoxic type of fuel. Currently, Ethanol is not utilized as a fuel in Sri Lanka and production is done as a byproduct of sugar production using molasses. Due to its economic value in the alcohol beverage industry, it has a high market value because of TAX. Although its production cost is far less than any other commercial fuel that has been used in the country. Anyhow since the world is using low carbon alcohols as a fuel and a blend with gasoline exclusively for the low cost and clean emission, there is viability to use it with diesel. The most prominent issue that comes up with this blend is that both fuels are immiscible at ambient conditions and in an improved condition behave as a microemulsion. Due to that reason, the fuel blend should come up with an emulsifier. In this research, the main objective was to investigate the applicability of blends of diesel and ethanol (Diesanol) in diesel engines while minimizing the fuel consumption irrespective of the immiscibility of the two fluids. The overall objective of the research was to propose to use ethanol as a green fuel to reduce emission in diesel vehicles as a sustainable fuel while keeping the vehicle performance. To test the stability of the mixture while using a covalent emulsifier biodiesel a series of tests was designed. The tests were done using commercially available anhydrous ethanol and diesel. Biodiesel was produced by transesterification of used cooking oil. To fulfil the continuous supply of a perfect blend of fuels to the engine a blending machine should be developed. According to the performance of the engine, it is found that increasing the percentage of ethanol up to 15% can reduce fuel consumption.

Keywords: Diesanol, Emission, Ethanol, Fuel Consumption, Renewable Fuel

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