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Evaluating the Performance of Single Cylinder Diesel Engine Running on Blends of Diesel and Alcohol

H.C. Ambawatte*, A.K.C.I. Kodithuwakku, R.W.K. Anjana, K. Dilushan

Department of Mechanical & Manufacturing Engineering, Faculty of Engineering, University of Ruhuna

*Corresponding author: chithral@mme.ruh.ac.lk

ABSTRACT

This study is supposed to identify the applicability of alcohol, which blend with gasoline but not with diesel, and diesel blend for a diesel engine without any modifications to control the emissions. The study was conducted upon samples of ethanol and diesel which were mixed at percentages from 5 to 20 of the total volume. The most prominent issue with this blend is that the two fuels are immiscible at room temperature and behave as a microemulsion under normal conditions. To overcome the effect of microemulsion the fuels are blended with an emulsifier; biodiesel is produced by transesterification of discarded coconut oil which showed the best stability among biodiesel extracted from used palm olein and used white coconut oil. A stirring system feeds the blends of fuels while the performance of the single-cylinder, the 4-stroke diesel engine was tested. Each sample of 50ml fuel was rapidly stirred in a homogenizer while feeding to the engine. While maintaining the engine speed at 1000 rpm the engine performance was recorded against varying loads. Because this is an immiscible fuel blend, constant blending is required until the combustion. Up to 20% ethanol when the solubility is enhanced with an additive in the mix may retain stability until complete combustion.

Keywords: *Alternative Fuel, Diesel, Ethanol, Renewable*