

EXPERIMENTAL INVESTIGATION ON VCR DI DIESEL ENGINE FUELLED WITH DUAL BIODIESEL BLENDS OF PALM AND JATROPHA

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Abstract—As we know from year to year the emission standards are become stringent due to Global Warming Effect. It is difficult for the developing countries like India to meet such stringent emission standards as it involves expensive technologies. In this crisis, there is a need to search for the cost-effective methods to reduce emissions from IC engines. Previous research shows that Biodiesel fueled diesel engines emit less CO₂, HC and Smoke emissions than Diesel fueled Engines. In this study, a dual biodiesel blend, mixture of two different kinds of biodiesel namely palm and jatropha with diesel was considered for evaluation in a single cylinder DI diesel engine after going through physical properties analysis. The objective of present work is to investigate experimentally the effects of Dual Bio-diesel blends on performance and emissions of VCR DI constant speed Diesel Engine under various loads and Compression Ratios.

Performance and Emission Tests were conducted on VCR Diesel Engine running at a constant speed of 1500 r.p.m. under various loads and compression ratios. Results showed that Brake power (BP) is increased by 1.5% for the test fuel D90PB5JB5 compared to Diesel. BSFC of D90JB5PB5 Test Fuel is almost same as that of conventional Diesel fuel whereas D80JB10PB10 test fuel showed a slight increase in BSFC at all loads when compared to fossil Diesel fuel. Brake Thermal Efficiency is maximum for D90JB5PB5 Bio-diesel blend and it is minimum for D80JB10PB10 when compared to diesel. It was observed that CO and HC emissions were decreased when Engine is running with dual-biodiesel blends when compared to conventional diesel fuel.

Keywords- Global Warming, Dual Biodiesel blends, palm and Jatropha.

I. INTRODUCTION

Environmental concerns have increased regarding vehicular pollution. Many governments have neglected this issue which has been significantly contributing to climate change. The Research works carried out in this area focus on improving efficiencies and limiting emission levels. Biodiesel reportedly offers a good solution to the above-mentioned problems due to its similar properties to conventional diesel. Biodiesel is produced from trans-esterification reaction of triglycerides of vegetable oils and alcohol in presence of a catalyst. The final product consists of fatty acids of alkyl esters [1]. According to the Ministry of Railways of Govt. of India, Indian Railways reportedly consume more than two billion litres of diesel per year. The Ministry also reports that a small reduction in its diesel consumption through blending of biodiesel can create substantial saving in its fuel bill with benefits of cleaner environment due to low carbon emissions. National Policy on Bio-Fuels by Ministry of New and Renewable Energy, Govt. of India, proposes an indicative target of 20% biodiesel blending by the year 2017. Jatropha curcas contains fatty acids, which are well suited for biodiesel productions. The plant can grow in arid, semiarid conditions and wastelands of India (except for saline or alkaline wasteland). According to Forbes India, the plant requires small amount of fertilizer and water (about 50 litres per plant). The plant is not browsed by cattle and it is also pest-resistant [2]. It has a high-seed yield that continues to be produced for 30–40 years. Oil content in the jatropha seeds is around 30–40%. Forbes also states