Abstract

The major factors responsible for the development of alternate energy resources are environmental regulations and the gradual depletion of fossil fuel reserves. Biofuel is one such example of alternative fuels which is both renewable and environment friendly and thus it can easily be used in diesel engines with minimal modifications. In today's modern paced agriculture based economy biodiesel can be seen as the sustainable transportation fuel, as this alternative fuel is a solution to multiple problems such as gradually increasing environmental concerns and immense decline in the number of petroleum reserves. In our attempt of a sustainable future biodiesel can be taken as a long term solution for such problems.

This research focuses on production of biodiesel from Jatropha oil and experimentally investigates its performance and emission characteristics in a 4 stroke diesel engine using different blending mixtures with diesel. For this purpose biodiesel is produced from Jatropha oil through transesterification process. The blending mixtures of Jatropha biodiesel and diesel are prepared on volume basis through magnetic stirring. These blends are named as JB20D80, JB30D70, JB40D60 and JB50D50. It is observed that JB20D80 reduces the BSFC by 17.89% and increases the BTE by 3.18% in comparison to JB50D50 at maximum loading and approaches the results of diesel.

The properties of the biodiesel produced are compared with the properties of conventional diesel. Along with this the performance and emission characteristics of different blending mixtures obtained is evaluated at constant compression ratio. Experiment reveals that among all the tested biodiesel-diesel blends at various engine loading conditions, optimum results are obtained for JB20D80. All the characteristics of the engine performances have been displayed graphically and their comparison with diesel is also shown.

Introduction

Today India has emerged as one of the prominent players in the global energy market, with third place in the world for primary energy consumption, according to the reports of India Energy Outlook 2021 published by the International Energy Agency (IEA). As the energy demands are continuously increasing, government of India is turning their heads towards alternate energy