Abstract

My work has been focused on the mustard oil based bio diesel which is important renewable and alternative fuel in future. Mustard oil, is a by-product of mustard plant seed processing, was used as a input for biodiesel production via transesterification. Diesel fuel is much higher use than any other gasoline fuels because diesel engines have many adaptable domestic uses like eg. small irrigation water pumping systems, light weight four/two seated auto cab & cars engine and small electricity generators etc. Mustard oil based bio diesel fuel properties are observed and tested in the fuel testing laboratory with standard procedure. It is found that mustard oil based bio-diesel that prepare in laboratory has slightly different properties than diesel fuel. Then an experimental set-up is construct to study the performance of a small kirloskar diesel engine in the internal combustion engine laboratory by using different blends (like B20, B30, B50 etc) of mustard oil based bio-diesel under different operating conditions. It is also observed that there is no difficulty found in running the small kirloskar diesel engine but, to determine the optimum performance of there should be a slight deviation in bio diesel blend. To avoid complicated specification in modification of the engine or the fuel injection system various blends of bio-diesel (B20, B30, B50 etc,) have been used. My work has focused on the performance of Mustard oil based biodiesel and its blend with fossil diesel on a single cylinder, 4 stroke, naturally aspirated, direct injection, and water cooled, Kirloskar Diesel Engine at 1500 rpm with variable loads. Initially, for testing on diesel engine I have determined the physical and chemical properties of Mustard oil and its blend with fossil diesel. Because the viscosity of pure mustard oil is high and it can be reduced through mixing with fossil diesel and heating them. The output characteristics and exhaust gas emission characteristics of engine are determined when we using Mustard oil and their blends with diesel on Kirloskar diesel engine. These results are then compared with pure fossil diesel results. By observation of the graphs, it was observed that the output characteristics are reduced and exhaust emission characteristics are increased at the similar load compared to those of fossil diesel. The main reason behind this is lower calorific value of biodiesel, high viscosity of biodiesel and delayed combustion process. Finally, there is a comparison of engine performance for different blends of bio-diesel have been find out to determine the optimum blend for different operating conditions.
The necessary requirement of alternation of fossil diesel awake the interest in biodiesel also, the Bio-diesel is one of the most promising alternatives for diesel engine. The optimal results can be achieved at 10% (B10) of Mustard oil mixture mixed with 90% of pure diesel when it has been tested on Diesel engine without any engine modifications. It is also concluded that Mustard oil can be used for efficient biodiesel production as an alternate to fossil diesel.

Firstly, in the start of my research work I read out the near about 400 research papers to find out the actual position of my related work. After the overview of 400 research paper I conform that the mustard oil based biodiesel has not used to check the performance of single cylinder diesel engine used for domestic purpose. Then I prepare the chapter plan for achieved our objective and start our work, first I prepare the biodiesel from mustard oil by using transestrification reaction. Then prepare its blend with fossil diesel and also check the stability of biodiesel. After that start to check the performance of single cylinder diesel engine. Then conclude the final results on the basis of characteristics. It is found that B10 blend is most efficient mustard oil based biodiesel for single cylinder diesel engine. It is also found that the mustard oil based biodiesel is most ecofriendly fuel.