IMPROVEMENT IN COLD FLOW PROPERTIES AND QUALITY OF BIODIESELS FOR ENGINE APPLICATION

A DISSERTATION

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ABSTRACT

Rapid depletion of petroleum products and rise in energy demands supresses the invention and research of alternative resources of energy. Biodiesel is being considered as a promising solution with a number of technical advantages over conventional petroleum diesel. However, commercial use of biodiesel has been limited because of some drawbacks including corrosivity, instability of fuel properties, higher viscosity, etc. Stability of fuel properties is especially important to ensure expected engine performance as well as engine life. Also the Biodiesel suffers with the disadvantage that the fuel quality is very much impacted by cold flow properties. Lots of work is being done on improving the quality of Biodiesel for engine application. Most of the research papers available in public domain reported some concerns on the stability of biodiesel fuel properties. Scattered studies on different aspects often lead to confusions in understanding the adverse effects of different factors on the degradation of biodiesel. In this report, different factors that cause instability and cold flow problems in biodiesel and their possible implications of different fuel properties have been reviewed. Possible remedies to improve the stability of biodiesel have also been included. The present thesis will therefore aim to study the improvement in quality of Biodiesels by binary blending.

From the experimental analysis, it is found microalgal biodiesel and kerosene has improved the CFP of Jatropha biodiesel and Pongamia biodiesel below the CFP of Petroleum Diesel. Jatropha and Pongamia biodiesel blended with 80% microalgal biodiesel attains the CP(cloud point) and PP(Pour Point) of 9.2°C and 5.5°C for JBM20(Jatropha biodiesel blended with 80% Microalgal biodiesel) and upto 12°C and 7.5°C for PoM20(Pongamia biodiesel blended with 80% microalgal biodiesel) respectively. Kerosene also lowers the cold flow propeties of Jatropha biodiesel upto diesel standards. With 60% kerosene blending the CP and PP of Jatropha biodiesel is found as 7°C and 3°C respectively and with 80% kerosene, it is found as -15°C and -18.3°C respectively. The tertiary blending of biodiesels can also be studied to lower the CP and PP of remaining biofuel.