Article review on how can biofuels be used to power automobiles

Parts of the World, Europe

The growing demand for energy, depletion of petrol, instability of world fuel prices, and the need to reduce greenhouse gas emissions (Cordoş et al. 2011; Pelkmans et al. 2007) has driven the world into the adoption of alternative motor fuels. Pioneered spectacularly in Brazil, Biofuels have been a widely applied alternative, and a subject of most academic interests, especially in the European Union. Biodiesel is environment friendly and locally available. There are efforts to persuade stakeholders to invest in biofuels technology as an indirect way to decrease the use of petrol and diesel in automobiles (Pelkmans et al. 2007). Biofuels are used only as blends of fuels. The major disadvantage, however, is the high production cost of the biofuels blends (as compared to diesel and petrol) which results in high prices. This is because; biofuels are produced mostly from agricultural products (vegetable oil), which increases their cost of production. Despite the high cost of production, many countries continue to support production and use of biofuels.

A study by Pelkmans et al. (2007) examines biofuels use in the European Region. According to the study, country-specific conditions, such as the agricultural potential and the economic strength, are very important in the introduction of biofuels. The actual success depends on the strength and dedication of the country’s agricultural sector and the industrial sector, the willingness of the government to support innovations and intervene in the market, and the existence and role of lobby groups (Pelkmans et al. 2007). The study further reveals that country policies should be streamlined so that the implementation of biofuels can be done in the most cost-efficient way. Biofuels can be used in four ways to power automobiles (Cordoş et al. 2011).

First, the vegetable oil can be converted into a product with similar properties as diesel fuel (transesterification). Secondly, pure vegetable oil can be mixed with different portions of diesel fuel. Third, the diesel fuel can be mixed with methyl ester of rape oil. Finally, pure vegetable oil (filtered) can be used directly in diesel engines, with changes in the engine since vegetable oil has higher viscosity.

The study by Cordoş et al. investigated the effects of biofuel (rapeseed oil) on the engine performance. The study revealed that the power of the engine decreases with an increase in the percentage of rapeseed oil in the fuel mixture due to the lower value of caloric power of rape oil (37. 6 MJ/kg) compared to (41. 8 MJ/kg) of diesel fuel. Diesel fuel has the highest value of torque while rape oil has the smallest value of torque. When the fuel mixture has low content of rape oil, the engine torque slightly decreases. The study, however, concluded that fuel based on rapeseed oil gives a fairly comparable performance to diesel fuel. Other than rape crop, other oil crops include soybean and palm oil.

Camelina (Camelina sativa) is another plant that can be used to produce biofuels. The study by Lebedevas et al. (2012) investigated the use of camelina-based biofuels in operating vehicle’s diesel engine. The findings revealed that; in terms of engine power, camelina-based methyl ester biofuels are equal to standard rapeseed methyl ester biodiesel. Camelina-based biofuels emit approximately 20% lower smoke compared to diesel fuel.

Other than vehicles, biofuels can also be used in aircrafts as reported by

Dennis (2010). Jatropha, biofuel refined from purging nuts, has been tested by China on Boeing 747-400 aircraft.

Works Cited

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