

Ethanol

[Literature](#), [Russian Literature](#)



Ethanol as a transportation Fuel of Ethanol as a Transportation Fuel Much speculation borders on the application of ethanol in the transportation industry as a motor fuel. Environmental, social, economic, fuel life cycle in addition to engine design are some of the factors affecting adoption of ethanol as a biofuel (Larsen, Johansen and Schramm 2009). With increasing environmental concern and sustainable development, the development of fuels with capability of the reducing greenhouse gas emissions with added advantage of being renewable is gaining favor (Larsen & Sønderberg 2007). Bioethanol is believed to have such potentials. However, this desirability is dependent on the production method from a varied range of biomass resources (First generation and second generation). In general Bioethanol shows great promise as a replacement for fossil fuels.

The production of bioethanol is however cumbered with problems both in the acquisition of biomass and its eventual processing to the final product. Pollution, water utilization and soil degradation are some of the major drawbacks in bioethanol development. Also, fossil fuels used in production, food versus fuel problems, coupled with conflicts in competing land use interests (Larsen, Johansen & Schramm 2009). Current ethanol production are associated with N₂O a more potent greenhouse gas for this reason bringing into contention the potential of bioethanol in reducing greenhouse gases and the overall objective of controlling global warming. The land cultivated for feedstock, other than economically empowering farmers, improving infrastructure and technology is likely to increase cabondioxide emissions at a greater rate that outweighs the advantage of the bioethanol. Cheap feedstock's and high energy efficiency crops are present trends in

bioethanol production. Industries that previously did not utilize their waste materials are persistently using this waste for the production of ethanol. Ethanol as fuel differs from gasoline based on properties. Ethanol is hygroscopic and prone to contamination by water, and this is further complicated by the fact that its production is favored by maintaining an optimal amount of water (Larsen, Johansen and Schramm 2009). Ethanol also has poor blending capabilities with both diesel and gasoline when it contains water and use of fuel containing some water is an issue. Problems with engine start have been reported in cold climates and also the inflammable and volatile properties of ethanol. Ethanol content in gasoline used for regular vehicles is limited up to 10% blend. However, there are vehicles that use up to 85% ethanol blend (Larsen & Søndberg 2007). Blended ethanol increases torque, power, and engine energy efficiency due to superior octane rating. However, the less energy per liter of fuel reduces mileage. Cleaner tailpipe emission reduces the impacts of air toxics i. e. benzene and butadiene although aldehydes are still prevalent. 82% of ethanol production in the world is predominantly from Brazil and the United States and is the first generation made from starch. In the USA, the EPA is mandated to ensure that all transportation fuel contains a minimum amount of renewable fuel under the RFS program in Energy Policy Act (EPA) of 2005. Also, under the Energy Independence and Security Act (EISA) of 2007. These laws aim to reduce greenhouse gas emissions by using renewable fuels, reducing imported petroleum, and ultimately developing and expanding the renewable fuels sector. These are clear indications of the governments support in use of bioethanol as fuel for transportation (Staley &

Saghaian 2011).

Based on the information collected on the pros and cons of using bioethanol as a transportation fuel it is evident that its use is beneficial with added benefits in mitigating pollution, improving economy and recycling. Also, its improvement in performance of the car engine in energy efficiency and mileage is commendable. With the adoption of bioethanol challenges will arise, but it is the objective of developers to minimize detrimental effects while at the same time improving desired qualities.

References

Larsen, U., Johansen, T., & Schramm, J. (2009). Ethanol as a Future Fuel for Road Transportation: Main report. DTU Mekanik.

Larsen, H. H., & Sønderberg Petersen, L. (2007). “ Bioethanol for transport”. Risø energy report 6: Future options for energy technologies. 49-53 Risø National Laboratory.

Staley, D., & Saghaian, S. (2011). Government Policy and Ethanol: What Does the Future Hold? Journal of Food Distribution Research, 42(1), 111.