

Plastic Waste Pyrolysed Oil

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ABSTARCT

There has been an ever increasing global demand for energy in recent years. The demand especially from liquid fuels is very high and the limited resources of fuel production has created bottleneck leading to an energy crisis. This has led to exploring other resources for fuel production, one of which is plastic. Being a non-degradable source, plastics disposed off in the open environment as wastes pose a threat to the environment. Most of the waste plastics end up as landfills. It can instead be used as a source for making fuel. The work describes an attempt to use the waste plastic to synthesize potential fuel called 'Pyrolysis Oil' since the process used in order to obtain the oil is Pyrolysis. The obtained oil from different grades of waste plastics is analyses so as to validate its use as fuel.

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1. INTRODUCTION

Management of plastic waste is a big issue in India. According to Central Pollution Control Board (CPCB), India generates 5.6 million tons of plastic waste annually and approximately only 60% of collected plastic waste is re-cycled. [1]Tons of Plastic waste is dumped on land and huge amounts are disposed of into the water bodies. These plastic wastes could instead be used for producing fuel. Pyrolysis of waste plastic could provide a better way to dispose of the waste plastic which causes environmental pollution. Pyrolysis is a thermo chemical decomposition of organic material at elevated temperatures in the absence of oxygen. Pyrolysis of organic substances produce gas and liquid products which are termed as bio-fuels and leave a solid residue richer in carbon content, char. The project is thus selected with an objective of using this non degradable waste plastic as a source to extract fuel which after analysis can be used as an alternative source of energy.

2. MATERIAL

The plastic used in this study was used waste plastic containers (HDPE) for domestic purposes. Waste plastics were cleaned with detergent and water to remove contained foreign materials such as mud and oil. Washed out waste plastics were dried and cut into small pieces in the range of 0.5 inches to 2 inches by using scissor.



PROPOSED METHODOLOGY

1. Identification of waste plastics. (PE/PP/PS/LDPE/HDPE)
2. Subjecting the waste plastic for pyrolysis process.
3. Condensation of the gas to obtain raw fuel.

4. Conversion of raw fuel into its pure form (diesel etc.) by the process of distillation.

SET UP FOR TRIAL EXPERIMENT

Experimental setup of trial test conducted, wherein 1000 grams of plastic was dumped into a closed container and heated.

Semi liquid fuel obtained after burning the waste plastic, which can be further processed into diesel.



3. RESULT

1. Through our experimentation we concluded that about 600 to 750ml of diesel fuel could be obtained by burning 1Kg of plastic, which results in to be quite environmentally friendly.
2. Lesser emission of unburnt HYDROCARBONS in waste plastic pyrolysis oil compared to that of diesel.
3. The diesel or oil thus obtained has a higher efficiency with around 30 to 40% low production cost compared to that available in the market.

Conclusion:

It is very difficult to find out alternative of plastic. Even plastic's demand is increasing every day as well as their waste. This project analysis has observed the use of waste plastics, a factory planning and its feasibility in Metropolitan City. It is easily assumed that, when the use of waste plastic will increase then the solid waste management will search more ways to find out to collect them. The implementation of this project can develop so many opportunities in the city. It can be a solution to control waste plastic, develop a new technique or idea, and detect the source of diesel for the country. Bangladesh is such a country where this kind of project could be very promising and effective in the future the use of plastic pyrolysis oil in diesel engine in the aspect of technical and economical is compared and found that oil is able to replace the diesel oil. Though the plastic pyrolysis oil offers lower engine performance, the plastic waste amount is enormous and it needed to be process to reduce the environmental problems. Moreover, the engine can be modify follow the combustion condition of plastic pyrolysis oil. The waste plastic used in the process must be PE or PP or LDPE in order to protect the contamination of chlorine in the oil.

4. References

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