RUN PETROL ENGINE ON WASTE PLASTIC FUEL

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ABSTRACT

Plastics are everywhere on earth . It plays very vital role in modern manufacturing processes . Every manufacturer consider plastic due to its cheap cost and durability . Over a 100million tones of plastics are produced annually worldwide, and used plastics are became major pollutant for our environmentt. there's need to discover some substitute for it like biodegradable plastic. Here, the method of converting waste plastic into value added fuels is explained as a viable solution for recycling of plastics. Thus two universal problems like problems of waste plastic and problems of fuel shortage are being tackled simultaneously. during this study, plastic wastes were used for the pyrolysis to urge heating oil that has an equivalent physical properties because the fuels like petrol, diesel etc. Pyrolysis runs without oxygen and in heat of about 300°C which is why a reactor was fabricated to supply the specified temperature for the reaction. The waste plastics are subjected to depolymerisation, pyrolysis, thermal cracking and distillation to get different value added fuels like petrol, kerosene, and diesel, lube oil etc. Converting waste plastics into fuel hold great promise for both the environmental and economic scenarios
Key Words :Pyrolysis , Plastic waste

1. INTRODUCTION

So it is sometimes hard to believe that plastics have only been commonly available for about the last one hundred years. Yet in this time the impact that they have made upon the quality of our lives and on the products that we have access to has been enormous. Plastics give us the possibility of manufacturing well-designed, beautiful products from the very many different types of plastics materials that are commonly available today. Within manufacturing technology there is a very high degree of technological understanding of plastics and a range of sophisticated technological processes that enable us to make them and shape them in numerous ways. This book aims to show you a little of what can be done. However, waste plastics can become a source of enormous energy with the correct treatment. In recent years, huge amounts of waste plastic are available in municipal solid waste (MSW) and many places. With an annual increase rate of approx 50%, in 1995, the production of plastic in the world had reached 150 million tons. According to information the yield of waste plastic is 100 million tons. Every part of earth are polluted by plastic waste.

2. METHODOLOGY

2.1. Pyrolysis process for conversion of waste plastic into fuel

Pyrolysis process for conversion of waste plastic into fuel Pyrolysis is the chemical decomposition of organic substances by heating the word is originally coined from the Greek-derived elements pyro "fire" and lysys "decomposition". Pyrolysis is usually the first chemical reaction that occurs in the burning of many solid organic fuels, cloth, like wood, and paper, and also of some kinds of plastic. Anhydrous Pyrolysis process can also be used to produce liquid fuel same as diesel from plastics. Pyrolysis process is thermal degradation process of plastic in the privation of oxygen. Plastic waste is processed in container at 300 to 350C .

Fig1 Sample of plastic waste to processed

Fig2 experimental setup

This process of conversion of plastic into fuel can be understand by the fig3

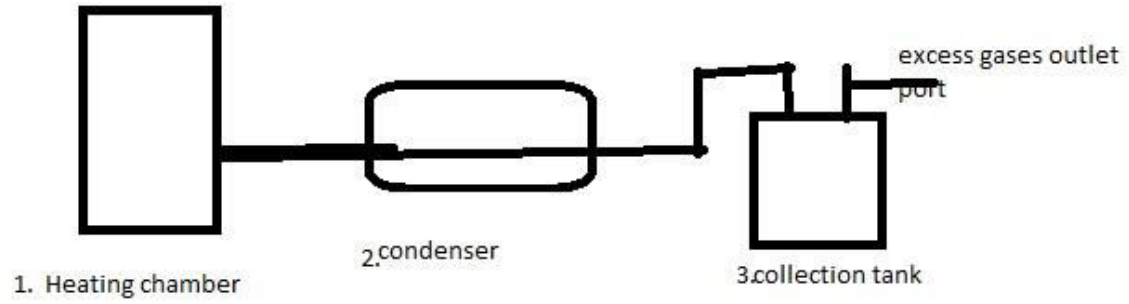

Fig3 line diagram of experimental setup

In heating chamber waste plastic is heated about 300 ^{o} C , after heating vapor formation started and this vapour further passes through condenser where the vapor condence. And then after condense liquid collected into collection tank .

Fig4 final product

. OBSERVATION TABLE 1

3.1. COMPERISION HDPE OIL WITH PETROL AND DEISEL OIL

Fuel properties	HDPE	PETROL	DIESEL
Density	790.45 kg/m3	711 to 737 kg/m3	820 to 900 kg/m3
Viscosity	0.781 poise	1.5 to 4 poise	1 to 3.97 poise
Specific gravity	0.782	0.82	0.81 to 0.96
Flash point(^{O}C)	23	22	26
Fire point (^{O}C)	26	25	29
Cloud point (^{O}C)	Below 2	1 to 3	2.5 to4
Pour point (^{O}C)	-4.5 to -5	-4 to -20	-2 to -12
Colour	Yellow, light transparent	Brown transparent	Dyed blue

4. OBSERVATION TABLE 2

4.1. COMPERISION LDPE OIL WITH PETROL AND DEISEL OIL

Fuel properties	LDPE	PETROL	DIESEL
Density	525.35 kg/m3	711 to 737 kg/m3	820 to 900 kg/m3
Viscosity	0.655 poise	1.5 to 4 poise	1 to 3.97 poise
Specific gravity	0.658	0.82	0.81 to 0.96
Flash point (^{O}C)	24	22	26
Fire point (^{O}C)	27	25	29
Cloud point (^{O}C)	Below 0	1 to 3	2.5 to 4
Pour point (^{O}C)	-2 ^{O} C	-4 to -20	-2 to-12
Colour	Pale yellow	Brown transparent	Dyed blue

5. RESULT AND DISCUSSION

By heating the close combustion chamber with propane gas burner at the temperature of 300 to 350 C and adding 2 kg of plastic waste after 45 min we get 500ml of liquid collected in our collection tank. This liquid is pale yellow in color and smells like plastic . We take 100 ml of this liquid and put this into Suzuki gixxer 150cc bike and run bike at speed of 50km/h . The performance is slightly similer as petrol performance .

6. CONCLUSION

By using this fuel oil in 150cc Suzuki gixxer bike it increases effeciecy of bike by 10% to 15% as compared to regular petrol used in the bike. Engine run with waste plastic oil results in higher thermal efficency. By comparing the density of HDPE oil with regular petrol its gives slightly same value. Also comparing the density of LDPE oil WITH regular diesel oil its gives slightly same value. Yes it is proved by the above experiment that waste plastic oil can be used as fuel, and it also helps in reducing plastic pollution.

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