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"WASTE PLASTIC DISPOSAL AND PROCESS OF WASTE PLASTIC TO THERMOFUEL BY PYROLYSIS PROCESS TO MINIMISE ENVIRONMENTAL CONCERNS IN THE WORLD"

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Abstract - Waste plastic disposal and excessive use of fossil fuels have caused environment concerns in the world. Both plastics and petroleum derived fuels are hydrocarbons that contain the elements of carbon and hydrogen. The difference between them is that plastic molecules have longer carbon chains than those in LPG, petrol, and diesel fuels. Therefore, it is possible to convert waste plastic into fuels. All around the globe companies and individuals are starting to produce fuel from waste plastic. The reuse of plastic could potentially keep enormous amounts of plastic out of landfills and out of the oceans. Over 500 billion pounds of new plastic is manufactured each year and roughly 33% of that is single use and thrown away. As so little plastic is recycled, we need to reframe plastic waste as an underused resource vs. landfill destined. If all plastic waste made it into the landfill, it would surely be mined in the future, but currently all plastic waste does not make it into our landfills. We need to stop polluting our oceans with plastic before it is too late, and start collecting all plastics suitable for this new fairly simple technology, a technology that is available now. The main objectives of this study were to understand and optimize the processes of plastic pyrolysis for maximizing the diesel range products. The technology is not overly complicated, plastics are shredded and then heated in an oxygen free chamber (known as pyrolysis) to about 400 degrees Celsius. As the plastics boil, gas is separated out and often reused to fuel the machine itself. The fuel is then distilled and filtered. Because the entire process takes place inside a vacuum and the plastic is melted - not burned, minimal to no resultant toxins are released into the air, as all the gases and or sludge are reused to fuel the machine. For this technology, the type of plastic you convert to fuel is important. If you burn pure hydrocarbons, such as polyethylene (PE) and polypropylene (PP), you will produce a fuel that burns fairly clean. But burn PVC (Polyvinyl chloride), and large amounts of chlorine will corrode the reactor and pollute the environment.

Key Words: Plastic disposal, fossil fuel, environment, hydrocarbons, waste plastic, fuel, recycled, landfill, polluting, technology, polyethylene (PE) and polypropylene (PP), PVC (Polyvinyl chloride).

1. INTRODUCTION *(Size 11, Times New roman)*

Plastics have become in indispensable part in today's world. due to their light weight durability, energy efficiency, coupled with a faster rate of production and design flexibility, these plastic are employed in entire gamut of industrial and domestic areas. Plastic are non-degradable polymers of mostly containing carbon, hydrogen and few others elements such as chlorine, nitrogen etc…Due to its non-biodegradable nature. The plastic waste contributes significantly to the problem of municipal waste management.

➢ Plastic are natural / synthetic materials.

➢ They are produced by chemically modifying natural substances or are synthesized from inorganic and organic raw material. on the basis of their physical characteristics, plastics are usually divided into thermosets, elastomers and thermoplastics.

➢ These groups differ primarily with regard to molecular structure, which is what determines their differing thermal behavior. The following table lists the characteristics of the various types of plastics.

So here we will convert waste plastic into diesel, plastics are shredded and then heated in an oxygen-free chamber (known as pyrolysis) to about 400 degrees Celsius. As the plastics boil, gas is separated out and often reused to fuel the machine itself. The fuel is then distilled and filtered. Because the entire process takes place inside a vacuum and the plastic is melted - not burned, minimal to no resultant toxins are released into the air, as all the gases and or sludge are reused to fuel the machine.

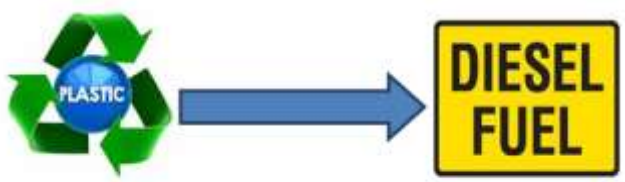
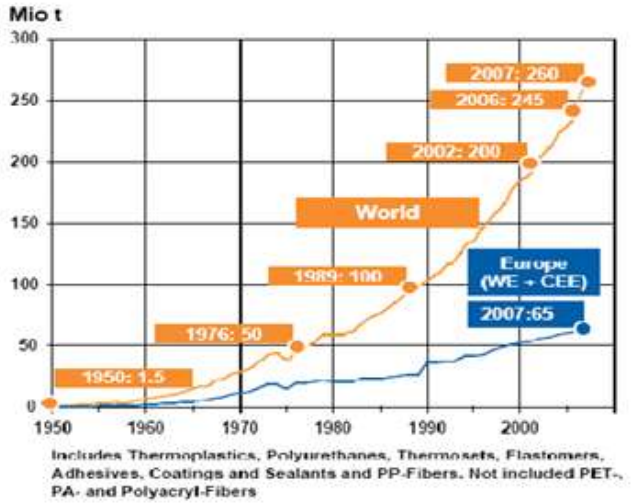


Figure 1 Diesel from waste plastic

Most of the big cities in country produces waste at a rate that outpaces its capacity to collect and dispose it of in a safe and environmentally sound manner. Its current approaches to waste management are neither effective nor sustainable. This necessitates a paradigm shift in thinking. Traditional end-of-pipe solutions to waste management problems only deal with symptoms of poor management and not the root causes. However, Plastics have opened the way for new inventions and have replaced other materials in existing products. They are light, durable and versatile, as well as resistant to moisture, chemicals and decay. Yet these are the same properties that present environmental challenges.



2. PROBLEM:

In Maharashtra from all 26 municipal corporations about 15000 to 18000 MT Municipal Solid Waste is generated per day. Out of which on an average 7-8% contribution is of plastic. Mumbai, Pune and Thane contribute more than 50% to total MSW. Though the percentage of Plastic MSW is less, it is so harmful due to its decomposition period of several million years. Indiscriminate littering of unskilled recycling/reprocessing and non-biodegradability of Plastic waste raises the following environmental issues:

➢ Indiscriminate dumping of plastic waste on land makes the land infertile due to its barrier properties.

➢ Lead and Cadmium pigments, commonly used in LDPE, HDPE and PP as additives are toxic and are known to leach out.

➢ During polymerization process fugitive emissions are released.

➢ During product manufacturing various types of gases are released.

➢ Non-recyclable plastic wastes such as multilayer, metalized pouches and other thermoset plastic poses disposal problems.

➢ Sub-standard plastic carry bags, packaging films (<40µ) etc. pose problem in collection and recycling.

➢ burning of plastics generates toxic emissions such as Carbon Monoxide, Chlorine,

Hydrochloric Acid, Dioxin, Furans, Amines, Nitrides, Styrene, Benzene, 1, 3

Butadiene, CCl4, and Acetaldehyde.

➢ Littered plastics give unaesthetic look in the city, choke the drain and may cause

Flood during monsoon.

➢ Recycling industries operating in non-conforming areas are posing threat to

Environment to unsound recycling practices.

3. CONCLUSIONS

The production of thermo fuel from waste plastics is one of the better methods to save the environment profitably. From 1kg of raw plastic material we can get up to 700gm of fuel & after distillation we will produce petrol, diesel, kerosene, naphtha, carbon & other contents separately. One of the most beneficial part of this project is that “it provides alternative to existing sources of fuels.” We here by conclude that our project will be a pillar to save the environment and source for fuel. Here are some advantages of our project:

1) It is an alternative source of fuel.
2) By using waste plastic as a raw material itself disposal of waste plastic.
3) The carbon can be used in cartage refilling.
4) Very less amount of process loss.
5) No need of engine modification.
6) Less amount of residue and large amount of product.
7) By segregating plastic from waste, we can use remaining waste for make of compost fertilizers.
8) It is a huge contribution in mission “Swachha Bharat” started by our PM

The contributors also focus on the effectiveness of recent technologies in mitigating environmental impacts, particularly those for managing plastics in the solid waste stream. Plastic and design engineers, polymers chemists, material scientists, and ecologists will find plastics and the environment to be a vital resource to this critical industry.

ACKNOWLEDGEMENT

The heading should be treated as a 3rd level heading and should not be assigned a number.

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