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Design & Fabrication of Machine to Extract Base Oil From Waste Plastic-An Overview

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Abstract - The study focused on the design and fabrication of a machine to extract base oil from waste plastic as an effort in finding environment-friendly means of waste recycling. This is the basic idea behind the paper. Besides helping to remove a lot of plastic waste generated thus creating a neat and tidy environment. It also helps to generate fuel which when converted to convenient form can be used as a source of energy The Pyrolysis process was the basis in the design and fabrication of the equipment. It is a prototype/laboratory scale model that will serve as baseline in developing technology for energy recovery from waste plastics. The main components were the reactor assembly, condensing chamber, vapor line assembly, smoke cleansing unit and the waste water collecting unit. The conversion of waste plastics into fuel is depend upon the type of the plastic that to be used for the conversion.

Key Words: **Reactor,Pyrolysis,Fabrication.**

1.INTRODUCTION

This paper will be prepared based upon the properties of plastics. The crude oil will be prepared based upon the types of plastics and its properties. The conversion process of the crude oil will be determined by the pretreatment process. Based on the various conversion techniques the crude oil will be extracted from the wastage of plastics. Although the impact of waste plastic to our health and environment may not always cause noticeable harm or destruction, research indicates that plastic waste in landfill and in badly managed recycling systems could be having an impact from the chemicals contained in the plastic. Plastic is generally derived from petroleum and when placed in landfills becomes carbon sink and if incinerated it increases carbon emissions It is the process of conversion of plastic to mixed oil in an inert atmosphere or oxygen free atmosphere at elevated temperature. It is used to produce liquid fuel similar to diesel with a higher cetane value and lower sulphur content than traditional diesel6. The advantage of pyrolysis over landfill and incineration is in terms of environmental protection because it reduces the risk of air, water and soil pollution. In pyrolysis, the possibility of recycling is improved, because the resulting product such as gas and liquid can be used as combustible fuel to substitute fossil fuels.

2. LITERATURE REVIEW

The paper titled "Design of Viable Machine to Convert Waste Plastic into Mixed Oil for Domestic Purpose" by Yasha Shukla, Hemant Singh, Shiwangi Sonkar and Deepak Kumar states in the abstract that the aim of the article is to provide a more efficient design of machine to convert waste plastic into mixed oil for domestic purpose. In this machine daily domestic waste like polyethene, polypropylene or normal plastic carrying bag are converted to oil. This machine employs a closed container (stainless steel), temperature controlling electric heater and layers of insulating materials, these materials make machine more efficient and safer for use. For effective pyrolysis process the temperature of stainless steel container (full of waste plastics) is raised by temperature controlling electric heater and for condensation process, water at room temperature is employed.

The paper titled "Design, Fabrication and Performance Study of a Biomass Solid Waste Pyrolysis System for Alternative

Liquid Fuel Production" by Md. Akram Hossain, Md. Raquibul Hasan & Md. Rofiqul Islam, the abstract is presented here. Now-a-days production of Bio-fuel is a prime concern in the world due to decrease other fuel source. The conversion of devdaru seeds into pyrolytic oil by fixed bed reactor has been taken into consideration in this study. A fixed bed pyrolysis system has been designed and fabricated for obtaining liquid fuel from biomass solid wastes. The major components of the system are: fixed bed reactor, liquid condenser and liquid collectors. The devdaru seeds in particle form is pyrolized in an externally heated 7.6 cm diameter and 46 cm high fixed bed reactor with nitrogen as the carrier gas. The reactor is heated by means of a cylindrical biomass source heater. Rice husk, cow dung and charcoal are used as the energy source. The products are oil, char and gas. The parameters varied are reactor bed temperature, running time and feed particle size. The parameters are found to influence the product yields significantly. The maximum liquid yield is 51 wt% at 5000C for a feed size of <1.18 mm at a gas flow rate of 5 liter/min with a running time of 90 minute. The pyrolysis oil obtained at these optimum process conditions are analyzed for some of their properties as an alternative fuel. We get the higher heating value of devdaru seeds oil is 24.22 MJ/kg. The heating value of the oil is moderate.

Harsha Vardhan Reddy T, Aman Srivastava, Vaibhav Anand and Saurabh Kumar stated in their paper entitled "Fabrication and Analysis of a Mechanical System to Convert Waste Plastic into Crude Oil" that use of plastics are increasing day by day. One of the major problems following it is the disposal of waste generated from plastics. Since plastics are made of crude oil, why can't it be reverse processed? i.e., plastics back to crude oil. This is the basic idea behind the paper. Besides helping to remove a lot of plastic waste generated thus creating a neat and tidy environment. It also helps to generate fuel which when converted to convenient form can be used as a source of energy. This combined advantage has inspired us to design and develop a machine which can efficiently convert plastic to suitable form of fuel. In this paper, a method is suggested to convert waste plastic to useful fuel. The objective of this is to develop a machine which converts plastics to some useful form of fuel

L.k shreepati "oil to fuel conversation" that use plastic to convert oil there pdf gives detail overview of the setup.

The paper titled "Turning mixed plastic wastes into a useable liquid fuel" by S.L. Low, M.A. Connor and G.H. Covey, the abstract is presented here. As landfill and incineration become more expensive and less accepted, the recycling of plastic wastes is gaining increasing importance. More emphasis is thus being given to new disposal options, which have high energy recovery values and are more environmentally attractive. Pyrolysis is one promising method for the treatment of mixed and contaminated plastic wastes. Plastics are thermally degraded to produce useful liquid hydrocarbons, which can then either be added to existing fuel or solvent product, or returned to a refinery where they can be added to the feedstocks.

3. CONCLUSIONS

Based on the result of the study, the waste plastic oil converter was found to be operational and functional. This article is centralized on the idea that plastic is convertible into mixed oil. The design of the machine is efficient in this conversion. The unique feature of the design is that it is made for small scale or domestic purpose and is convenient with respect to size and weight (so that it is easily portable). In the machine pyrolysis process takes place in a temperature controlled heater which is very essential for the efficient output of oil. Layers of Insulating material prevent undesired heat loss and also provide better safety to the user. This machine can be used by local rag pickers to produce oil and contribute to waste management at places where municipal system is not available or not working efficiently. This design of the machine would contribute a lot to the development of the waste management system in the country.

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