

A Review : Recycling Waste Lubricating Oil into Fuel

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ABSTRACT

This paper gives a brief review about recycling of waste lubricating oil into fuel. Waste lubricant which is generated in day to day life from garage and other service centres which get waste after use then waste lubricating oil effects on environment, and underground and surface waters, since it pollutes the atmospheric air as a result of burning and has harm living organisms. This paper main focus on finding alternative fuel resources and utilizing them to eliminate their negative effects, become of the limitation of petroleum products. According to some studies, it is estimated that crude oil will last only for roughly 80 more years, gaseous fuels for about 150 years, and coal for 230 years. So that various scientists and researchers try to develop new technologies that allow recycling or reusing waste material as an alternative fuels .A pyrolytic process has been carried out to recycle waste unusable lubricating oil into fuel and comparison of this fuel with fresh diesel are discussed.

Keywords: Waste Lubricating Oil, Alternative Fuel, Waste To Fuel, Pyrolytic Process.

I. INTRODUCTION

Waste lubricant oils and bio fuels are two important alternative fuel sources proved to be the best substitutes for existing petro fuels, since waste generated oils represent more than 60% of used lubricant oils. Therefore, waste oils are one of the most abundant pollutant residues that are generated nowadays, reaching the value of 24 million metric tonnes per year [1]. The preferred disposal option in most countries is incineration and combustion for energy recovery, though vacuum distillation and hydro-treatment have been researched to recycle this waste. However, these disposal routes are becoming increasingly impracticable as concerns over environmental pollution, and additional cost, sludge and wastewater disposal are recognized due to the undesirable contaminants present in waste lubricating oil [2]. During lubrication about 20% of the lubricating oil are consumed and the rest 80% are remain as such with some impurities. Thus a huge

quantity of used engine oil is left and wastage from different transport sectors every day [6]. Recycling of used lubricating oil is an intelligent

option for any country, more so for India, as it would conserve our natural resources as well as foreign exchange. Conversion of the waste lubricating into fuel by using pyrolysis technique has positive effects on environment and atmospheric air, and also has economical value [3]. For example, used oil from internal combustion engines generally accumulates a variety of contaminants, which increase the oil's toxicity.

II. METHODS AND MATERIAL

The aim of this study is to obtain fuel from waste lubricating oils by pyrolysis technique [3]. The idea of recycling used lubricating oil was presented in the year of 1930. Initially the used lubricating oils were burnt to produce energy, and later these oils were blended to engine oils after treatment. Due to the

increasing necessity for environmental protection to environmental, the disposal and recycling of waste oils has become very important. The recycling system was consisted of waste oil storage tank and produced fuel storage tank, pump, filter, a reactor, heaters having capacity of heating, mixer, condenser and control unit. It was designed and manufactured in industry to purify waste oil from dust, small carbon soot and metal particulates, and reutilize the waste oil [2]. The recycling of waste lubricating oils can be accomplished by three basic methods, which are Pre-treatment of used engine oil, heating and blending or pyrolytic distillation [5]. Pyrolysis is the thermal decomposition of materials at elevated temperatures in an inert atmosphere. It involves the change of chemical composition and is irreversible. The pyrolysis process is also used to produce ethylene, many forms of carbon, and other chemicals from petroleum, coal, and even wood, to produce coke from coal but in oil refining industry it uses in cracking of larger hydrocarbon into lighter one. The reactor is the most important part of the recycling system, since pyrolytic distillation or thermal treatment of the waste oil is performed in the reactor. It has a cylindrical shape and the size depends upon the capacity of reactor. For 10L capacity size 15 cm in diameter and 20 cm in height. This volume is enough to do all tests, which include characteristics of the fuel, performance and emissions. The reactor was isolated with proper insulation with a thickness of 5 cm to minimize heat loss from the reactor. It includes a mixer and electrical heaters. The mixer was used to mixing the oil and additive to obtain uniform blend and temperature in the oil. The heaters were used to heat the mixture of the purified oil and additive in order to make thermal cracking process more easily.. They can be capable of heating the mixture up to 400°C and more. The pyrolysis of waste oil has been carried out at 400°, to study the effect of temperature on the product quality and quantity. Through electronic control unit heating process was continue which increases the inside lubricating oil temperature unto 400°C. Due to heating vapour generated which

condense through condenser. Continuous bending also required [2]. The vaporized fuel due to heating process was condensed through condenser in which water was used as cooling fluid. The liquid product thus obtained from pyrolysis distillation process further subjected to laboratory test to obtain their properties.

III. RESULTS

Production of fuel from used engine oil with the help of pyrolytic distillation process which further goes to laboratory to check there properties and are given bellow

Table 1. Comparison of fuel obtained from waste lubricant with diesel.

Sr. No.	Properties	Diesel	Fuel
1	Density at 15°C (kg/m ³)	820-845	818
2	Viscosity at 40°C (mm ² /s)	2-4.5	3.49
3	Flash point(°C)	>55	59
4	Fire point(°C)	>50	53
5	Low heating value(kJ/kg)	42.700	42.500

IV. CONCLUSION

From above study it is concluded that when used oil is subjected to high temperature, it undergoes thermal breakdown of hydrocarbon by cracking process. As the temperature increases cracking also increase. At high temperature more conversion rate of waste lubricant into fuel take place. Table 1 shows that comparison between fuel and diesel by their properties hence concluded that conversion of waste lubrication oil can be made into useful fuel through the pyrolysis process. This fuel can be prepared from

waste lubrication oil and use to study the analysis of performance and emission characteristics of the fuel in diesel engines.

V. REFERENCES

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