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EMMISSIONS STUDIES ON OXYGENATE-PETROL BLEND FUELED ON BIKE ENGINE

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ABSTRACT

As the fossil fuels are depleting day by day, there is a need to find out an alternative fuel to fulfill the energy demand of the world. Ethanol is one of the best available sources to fulfill the energy demand of the world because it has good indissolubility with petrol fuel and suitable physical -chemical properties for application of commercial petrol engine. In this work we take 40% ethanol and 60% of petrol on volume basis and then take the readings of various exhaust gasses i.e. CO, CO2, HC & O2.Compared this study with 100% petrol fuel on Hero Honda Splendor bike.

1. INTRODUCTION

The major part of all energy consumed worldwide comes from fossil sources (petroleum, coal and natural gas). However, these sources are limited, and will be exhausted by the near future. Thus, looking for alternative source of new and renewable energy such as hydro, biomass, wind, solar, geothermal, hydrogen and nuclear is the vital importance. Alternative
new and renewable fuels have the potential to solve many of the current social problem and concerns, from air pollution and global warming to other environmental improvements and sustainability issues and also solving the problem of recent increases in petroleum prices and uncertainties concerning petroleum availability.

WORLD PRIMARY ENERGY DEMAND BY FUEL

Global primary energy demand is expected to increase by 1.5% per year between
2007-2030, reaching 16.8 billion toe –an overall increase of 40%. Actually on average, demand declined by 0.2% per year in 2007-2010, as a result of a pronounced drop in 2009: preliminary data point to a fall of up to 2%. This would be the first fall in global energy since 1981. Demand growth rebounds after 2010, averaging 2.5% per year in 2010-2015. The pace of demand growth slackens progressively after 2015, averaging1.5%
per year in the period of 2030. Fossil fuels remain the dominant sources of primary energy worldwide, which accounts for
almost 77% of the overall increase in energy demand between 2007 and2030. Their share of world demand, nonetheless, falls marginally, from 81% to 80%. On volume basis, coal sees by far the biggest increase in the demand over the projection
period, followed by gas and oil. Still oil is the single largest fuel in the primary fuel mix in 2030, although its share drops, from 34% now to 30% while Coal remains the
second largest fuel, its share increasing by two percentage point to 29%. Non-hydro
modern renewable energy technologies (including wind, solar, geothermal, tide, and wave energy) have fasted rate of increase in demand, but their share of total energy use still only nudges above 2% in 2030-up from less than 1% today.

ENERGY CONSUMPTION IN INDIA

India is the fourth largest primary energy consumer, after China, USA and Russia. Total primary energy consumption in 2009 was 487.6 million tonnes of oil

equivalent (Mtoe) or 4.6 percent of total global primary energy consumption (Table1).

As per Planning Commission of India, the primary energy consumption would reach 738.07Mtoe by 2016-17 of which approximately 38 percent would be met through imports In terms of demand, India

had the third largest energy demand in the world after China and the United States and was just ahead of Russia.

TABLE1- Primary energy consumption (Mtoe)

Country	Primary Energy Consumption (Mtoe)
China	2210.3
United States	2205.9
Russian Federation	644.4
India	487.6
Japan	474.0
World Aggregate	11,654

USE OF OXYGENATES IN PETROL

OXYGENATES AS AN ADDITIVES

Oxygenated fuel is a chemical compound which contains oxygen. It helps fuel to burn more efficiently and reduces atmospheric pollution. It can also reduce deadly carbon monoxide emissions and smog formation. Oxygenated fuel works by allowing the fuel in vehicles to burn completely. Because more of the fuel burns, fewer will be the harmful chemicals released into the atmosphere. In addition to support cleaner burning, oxygenated fuels also help to cut down the non -renewable fossil fuel demand.

HAZARDS AND PRECAUTIONS

POTENTIAL HEALTH FFECTS

Skin: It can causes moderate skin irritation and cyanosis of the extremities.

Ingestion: It may cause gastrointestinal irritation with nausea, vomiting and diarrhea and

systemic toxicity with acidosis. It may cause central nervous system depression, symptoms like excitement, which is followed by headache, dizziness, drowsiness, and nausea. Its advanced stages can cause collapse, unconsciousness, coma and can death death due to respiratory failure.

Eye: It can causes severe eye irritation, painful sensitization to light, chemical conjunctivitis and corneal damage.

Inhalation: Inhalation of high concentrations may cause central nervous system effects like nausea, head pain, dizziness, and coma. It can cause respiratory tract irritation and narcotic effects in high concentration. Its vapours may cause suffocation.

Chronic: It can cause reproductive and fatal effects. The laboratory experiments have resulted in mutagenic effect. Studies on animals have reported the development of tumors. Prolonged exposure to ethanol can damage liver, kidney and heart.

FIRST AID MEASURES

Eyes: Immediate wash your eyes with plenty of water for at least 15 minutes by occasionally lifting the upper and lower eyelids. Get a medical aid quickly. Gently lift the eyelids and flush continuously with water.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothes before reuse.

Ingestion: Do not induce vomiting and if victim is conscious and alert, give him 3-5 cups of milk or water. Never give anything by mouth to any unconscious person and get a medical aid for him.

Inhalation: Get remove from exposure of ethanol and move to the fresh air immediately.

If he is not breathing give him artificial respiration and if his breathing is difficult, give him oxygen and get a medical aid. Do not give him mouth-to-mouth resuscitation.

FIRE FIGHTING MEASURES

General Information: The ethanol containers can create inside pressure if it has exposed to heat or fire. During any fire, wear a self-contained breathing equipments. Ethanol vapours can form an explosive mixture with air. Ethanol vapours can travel to a source of ignition and can produce a flash back. It will be burn if involved in a fire. It can release vapours that form explosive mixtures at temperatures above the flashpoint. Extinguishing Media: For small fires use dry chemicals, CO2, water spray or ethanol resistant foam. For large fires, water

spray, fog, or alcohol-resistant foam can be used.

Use water spray to cool fire-exposed areas. Water may be ineffective in the ethanol fire.

HANDLING AND STORAGE

Handling: Wash clothes after handling. Use only in a well-ventilated area and round and bond containers when transfer of material is to be done. Use always spark-proof tools and explosion proof equipment while handling ethanol. Avoid the ethanol contact with eyes,

skin and clothes. Keep container tightly closed always. Avoid contact with heat, spark and flames.

Storage: Store away from heat, sparks, and flame. Always keep away from sources of ignition. Store in a tightly closed container and contact with oxidizing materials. Store

ethanol in a cold, dry, well ventilated area away from incompatible substances. within the network and the number of hops to each destination are recorded. Each entry is marked with a sequence number assigned by the destination node.

STABILITY AND REACTIVITY

Chemical Stability: It is stable under normal temperatures and pressures

Conditions to Avoid: Avoid ethanol with incompatible materials, ignition sources, excess heat and oxidizers.

Hazardous Decomposition Products: Ethanol can produce Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

ECOLOGICAL INFORMATION

Ecotoxicity: Ethanol effects in ground water are unknown. When released into water it will volatilize and may probably biodegrade.

Environmental: When released to the atmosphere it may photo degrade in hours (polluted urban atmosphere) to an estimated range of 5 to 7 days in less polluted areas.

Table 2: Properties of ethanol

Properties	Ethanol
Formula	C_2H_5OH
Density Kg/m^3 (At 1atm & 20°C)	789
Auto ignition Temperature, (°C)	420
Boiling point, (°C)	78.4
Pour point, (°C)	-117.3
Flash point, (°C)	13–14
Viscosity (mPa s)	1.20
Stoichiometric air fuel ratio, (kg/kg)	9.0
Lower Calorific Value, (kJ/kg)	26795
Specific heat ,(kJ/kgK)	2.72
Latent heat of vaporization, (kJ/kg) (At 15.5 °C)	920

Figure 1 Working Model

Result

It is observed that concentration of poisonous molecule (CO) decrease by 55% approximately and hydrocarbon which is responsible for air pollution (unburnt carbon element is a main source for air pollution) its concentration is also decrease from 500 PPM to 300 PPM which is beneficiary for environment.

PARTICULATES	STANDARD	PETROL	BLENDED FUEL (60% PETROL & 40% ETHENOL)
CO (%)	3.5	1.75	0.800
HC (PPM)	4500	500	300
CO_2 (%)	1.50	1.100	0.500
O_2 (%)	15.007	17.55	19.70
TEMPRATURE (°C)	25	23.2	23

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