Faculty of Engineering & Technology

Gurukula Kangri (Deemed to Be University) Haridwar

Department of Mechanical Engineering

AICTE Training and Learning (ATAL) , New Delhi

Sponsored Five (05) Days Faculty Development Programme on

"ALTER NATE FUELS : BIOFUELS"

The Department of Mechanical Engineering successfully organized a 5 days Faculty Development Programme under AICTE-ATAL scheme from 21st September2020 to 22nd September 2020. Around 125 participants from all over the India were participated in this FDP.

The resource persons were from different states of the India. Total 15 sessions were conducted in this FDP. The inaugural session was held on 21st September 2020. **Mr. Sanjeev Kumar Lambha** coordinator of this FDP addressed all the participants and welcomed them in joining the ATAL sponsored FDP on **"ALTER NATE FUELS:BIOFUELS."**

After that Respected **Prof. Roop Kishore Shastri, Vice Chancellor** Gurukul Kangri (Deemed to Be University) congratulated **Prof. Pankaj Madan**, **Director** of FDP and **Mr. Sanjeev Kumar Lambha**, and all his organizing committee for organizing this program at the National level, he said that a alternate fuels is very big in demand in near future. Prof. Pankaj Madan also presented his valuable thoughts on alternative fuels and its unsees in near future.

The various topics on biofuels like "Quality aspects of Biofuels", "Application of solar energy on Biomass conversion process", "Ethanol Production" etc were beautifully discussed with participants.

The validatory session was on 22nd September 2020. Mr. Sanjeev Lambha thanks to participants and all his team members and ended with Shanti Path.

Solid Fuels

Natural fuels:- wood, coal.
Manufactured fuels:- charcoal, coke.

WOOD

Type of Wood	Water	Sugar	Fat-tar	Cellular Tissue	Lignin
Beach wood	12.57	2.41	0.41	45.57	39.14
Birch wood	12.48	2.65	1.14	55.62	28.21
Fir (Boot)	13.87	1.26	0.97	55.90	26.91
Pine wood	12.87	4.05	1.63	53.27	28.18

Day 5 :Session I

ALTERNATIVE ENERGY

Resource Person:
Dr. Varun Pratap Singh
Associate Professor
Department of Mechanical Engineering,
C.O.E.R, Roorkee, India.

Points to be discussed

1. Introduction and literature review
2. Gaps identified
3. Objectives
4. Methodology adopted
5. Time schedule
6. Progress till now
7. Work to be done
8. Expenditure
9. Paper Publications

d) Methanogenesis:

Finally, methanogenic organisms consume the acetate, hydrogen, and some of the carbon dioxide to produce methane.

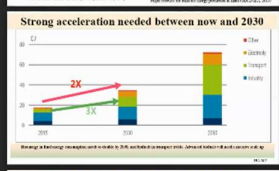
Methanogens are very sensitive to changes and prefer a neutral to slightly alkaline environment.

If the pH is allowed to fall below 6, methanogenic bacteria cannot survive.

Methanogenesis is the rate-controlling portion of the process because methanogens have a much slower growth rate than acidogens.

Therefore, the kinetics of the entire process can be described by the kinetics of methanogenesis

Strong acceleration needed between now and 2030



Fuel ethanol production worldwide

Global ethanol production is projected to

2G Ethanol Production : A Close Loop Approach

Prof. Bindu Banerjee, FNAAS, FAMSc, FBRSI
Professor, Agricultural & Food Engineering Department
Indian Institute of Technology Kharagpur
India

Key Energy Drivers

Thermochemical conversion of Biomass

Pyrolysis | Gasification | Combustion

Charcoal | Biofuel | Combustible gas | Heat

Barbeque Charcoal | Metallurgic industry | Fuel | Motor | Gas turbine | Boiler | Stove

Electricity | Generator | Steam turbine | District heat

	Combustion	Gasification	Pyrolysis
Oxidizing Agent	Greater than stoichiometric supply of oxygen*	Less than stoichiometric oxygen* or steam as the oxidizing agent	Absence of oxygen or steam
Typical Temperature Range with Biomass Fuels	800°C to 1200°C (1450°F to 2200°F)	800°C to 1200°C (1450°F to 2200°F	350°C to 600°C (660°F to 1100°F)
Principle Products	Heat	Heat and Combustible gas	Heat, Combustible liquid and Combustible gas
Principle Components of Gas	CO_2 and H_2O	CO and H_2	CO and H_2

WIT Transactions on Ecology and The Environment, Vol 269, © 2010 WIT Press

Clean Heat and Power Using Biomass Gasification for Industrial and Agricultural Projects February 2010

Biomass is any organic matter, especially plant matter, which can be converted to fuel and is therefore regarded as a potential energy source.

Bioenergy is the energy which is retrieved from biomass.

Primary/Raw biomass : forestry products, grasses, crops, animal manure, and aquatic products (seaweed)

Secondary Biomass: materials that undergone significant changes from raw biomass, i.e. Paper, cardboard, cotton, natural rubber products, form waste, leather waste, wood waste, garbage etc.

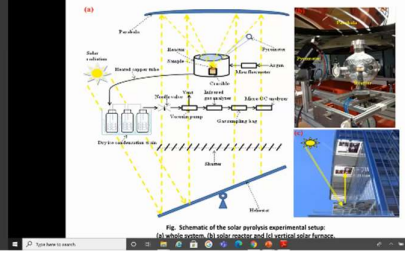


Fig. Schematic of the solar pyrolysis experimental setup:
(a) whole system, (b) solar reactor and (c) vertical solar furnace.

ATAL-FDP
on
ALTERNATE FUELS: BIOFUELS

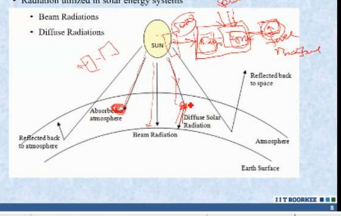
Dept. of Mechanical Engineering
Gurukul Kangri University, Haridwar

Application of Solar Energy in Biomass Energy Conversion Process

Anil Kumar

SOLAR ENERGY DISTRIBUTION

- Radiation utilized in solar energy systems
  - Beam Radiations
  - Diffuse Radiations



FUEL

A fuel is any material that can be made to react with other substances so that it releases energy as heat energy or to be used for work.

Broadly classified as;

i. Fossil Fuel

A fossil fuel is a fuel formed by natural processes, such as anaerobic decomposition of buried dead organisms, containing organic molecules originating in ancient photosynthesis that release energy in combustion.

ii. Biofuel

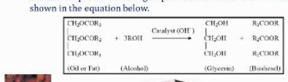
A biofuel is a fuel that is produced through contemporary processes from biomass, rather than a fuel produced by the very slow geological processes involved in the formation of fossil fuels, such as oil.

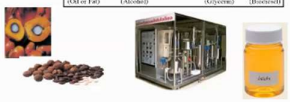
The process of manufacturing biofuel is done in various stages, required special devices which need energy.

- ***Thermal energy***
- ***Electrical energy***

TRANS-ESTERIFICATION

- Transesterification defined as the process in which non edible/edible oil is allowed to chemically react with alcohol.
- Transesterification is the process of exchanging the organic group R of an ester with the organic group R of an alcohol.
- Biodiesel is produced through a process known as transesterification, as shown in the equation below.



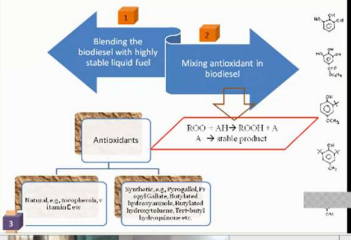


RESEARCH MOTIVATION

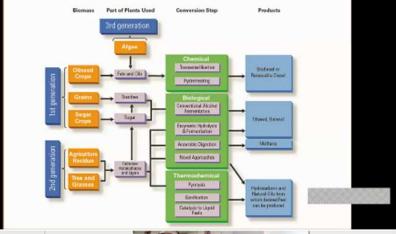
E^3- Energy, Employment & Environment

Global Warming **Ozone Layer Effect** **Health Effect** **Biodiesel**

Methods to increase the stability



Classification of biomass resources



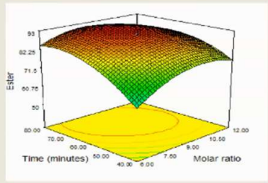
Day 2:Session I

STRESS MANAGEMENT & MEDITATION

Resource Person:

Dr. Anand Jaiswal
Assistant Professor
Department of Fine Arts
Kurukshetra University, Kurukshetra
Haryana, India

Ester vs Time &Molar ratio

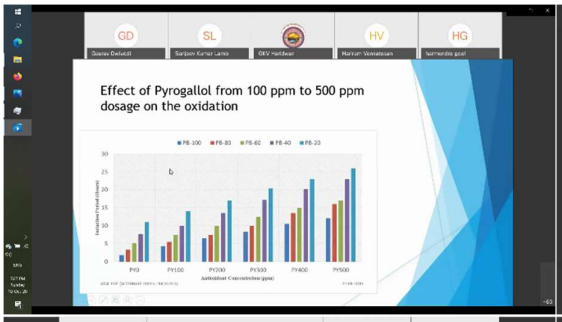


60

Technology Changes In Petrol Engines
As per Bharat Stage-6

- The emission of carbon monoxide is to be reduced by 30% and NOx by 80%.
- To meet the emission requirements of Bharat Stage-6, the carburetors in petrol engines need to be replaced by the programmed fuel injectors.
- To further reduce tail pipe emissions, the exhaust system would be fitted with three way catalytic converters.
- The norms also mandates On-Board Diagnostic System (OBD) for all BS-6 compliant vehicles.

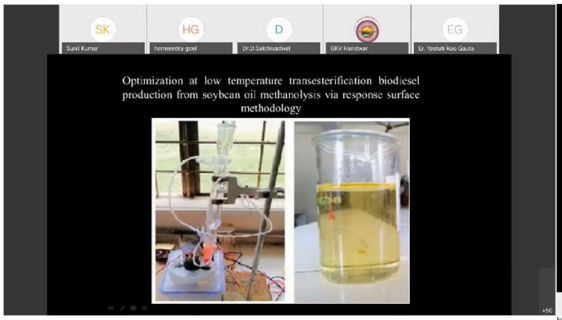
7


Effect of Pyrogallol from 100 ppm to 500 ppm dosage on the oxidation


THE GLOBAL GOALS
For Sustainable Development


THE GLOBAL GOALS
For Sustainable Development


Day 1: Session III
QUALITY ASPECTS OF BIOFUELS
Resource Person:
Dr. Gaurav Dwivedi
Assistant Professor
Department of Mechanical Engineering
Maulana Azad National Institute of Technology
Bhopal, M.P., India


Optimization at low temperature transesterification biodiesel production from soybean oil methanolysis via response surface methodology


ONE WEEK AICTE APPROVED
ATAL ONLINE FACULTY DEVELOPMENT PROGRAMME
ON
ALTERNATIVE FUELS :BIOFUELS
VALEDICTORY
September 25 2020
ORGANISED BY
Department of Mechanical Engineering
FACULTY OF ENGINEERING & TECHNOLOGY
GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR INDIA