

# BIOENERGETICS

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# BIOFUEL VS ENERGY

- Direct use of organic material
  - Harvested plant material
  - Waste material
    - Pulp manufacturing
    - Municipal waste
    - Animal wastes
- Combustion for heat
  - Dried solids
  - Gasses
  - Plant residues



# EACH TREE HAS UNIQUE GEOGRAPHY



Spruce Trees



Baobob Tree in Japan



# WOOD AS ALTERNATE BIOFUEL SUBSTRATE



# WOOD AS BIOMASS

- Processing involves timbering, drying, cutting into logs, and perhaps chipping
  - Thus, often easier to transport and use than herbaceous plant matter





# WOOD AS BIOMASS

- Trees varies in
  - Growth rate
  - Wood density
  - Additional compounds in wood
  - Chemical composition
  - Morphology



# DIFFERENT ENERGY SOURCES

- 1. DIFFERENT ENERGY SOURCES
- 2. DIFFERENCES BETWEEN RENEWABLE AND NON RENEWABLE ENERGY SOURCES
- 3. MEANING OF CLEAN ENERGY SOURCES

# CHARACTERISTIC FEATURES

- To understand the basic knowledge of Biomass and Biofuel and their importance over conventional fuel.
- Understanding the method of production of biofuel using biomass.
- To study the chemical composition of some commonly used biofuels



# BIOMASS/BIOFUEL/ETHANOL



# STRUCTURAL FEATURE OF ETHANOL

- Relatively small organic molecule
  - $C_2H_5OH$
  - Liquid at normal temperatures and pressures
  - Soluble in water
  - Stability
  - Organic solvent

# HERBS AS BIOMASS FOR BIOFUEL

- Based mainly on stems and leaves
- Derived from grasses and herbs
- Roots





# HERBACEOUS PLANT AS BIOMASS

- Grow best in grasslands
  - Need ecosystem disturbance to grow in otherwise forested areas
  - Need irrigation to grow in deserts, scrublands
  - Amenable to cultivation in greenhouses
  - Large soil spaces



# FUTURE ASPECTS

- TO SAVE ENVIORNMENT
- TO FIGHT AGAINST DISEASES
- TO FIND ALTERNATE ENERGY SOURCES
- BIOMEDICAL SOURCES
- MEDICINAL PLANTS

# BOOKS RECOMMENDED

- A TEXT BOOK OF MICROBIOLOGY BY DUBEY AND MAHESWARI
- GENERAL MICROBIOLOGY BY STANIER
- BIOTECHNOLOGY BY B.D.SINGH