ENEPLAN
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Pyrolysis

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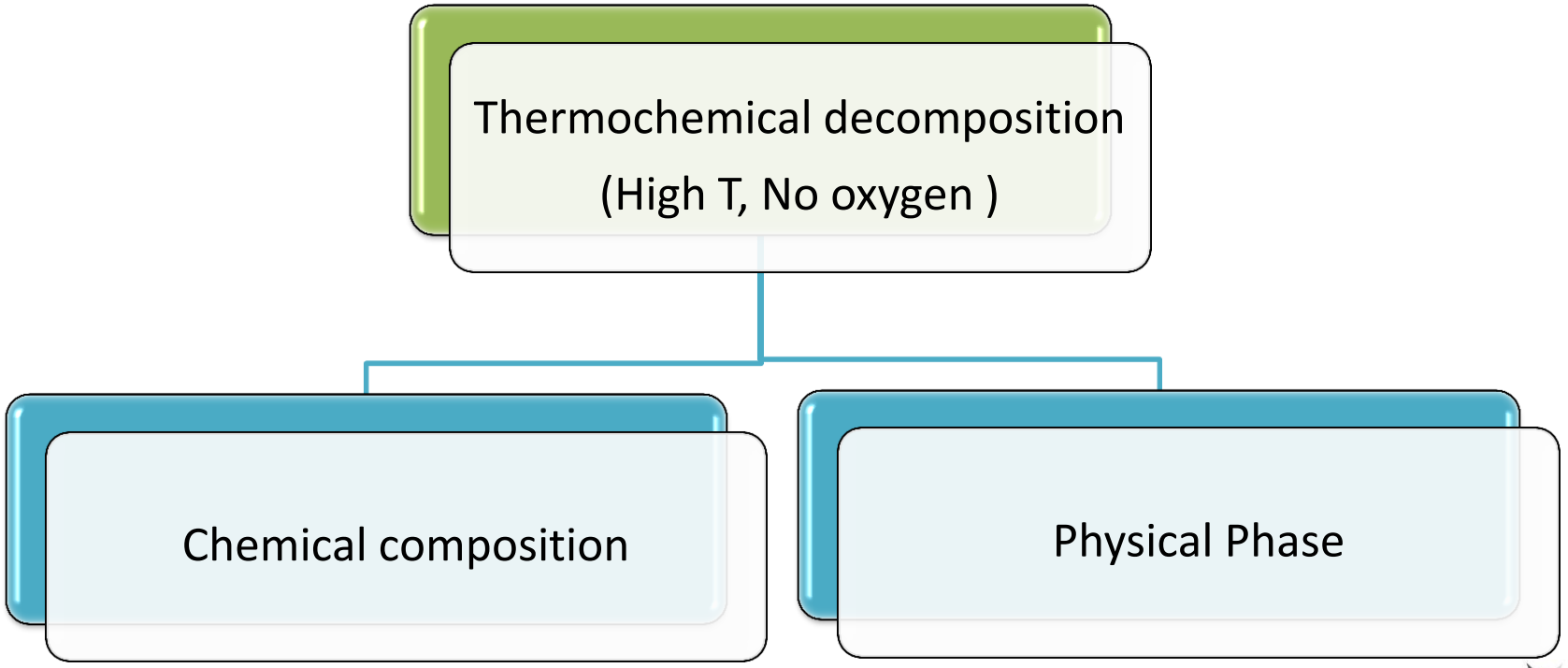
PROCEDURE



PRODUCTS

1. **Char**: solid product characterized by its density, moisture, ash, volatile, carbon content, elemental analysis, energy value and porous properties.

2. **Bio oil**: Less energetic then hydrocarbons.

3. **Pyrolytic gas**: usually identified and quantified by gas chromatograph with a thermal conductivity detector. Some of the gases that can be identified are CO_2, H_2, O_2, N_2, CO, CH_4 . They depend on the composition of original biomass feed stocks

PROBLEMS

Some problems may occur in the combustion systems when these liquids are burnt raw without upgrading.

This because:

- very high water content, detrimental for ignition
- organic acids in oils are highly corrosive to common construction materials
- solid may be in the liquids - this may block injectors or corrode turbine blades
- over time, the reactivity of some components in the oil may lead to formation of larger molecule resulting in high viscosity and slower combustion

PARAMETERS

Parameters affecting Pyrolysis:

-Temperature

-Types of biomass

-Heating rate

-Particle size

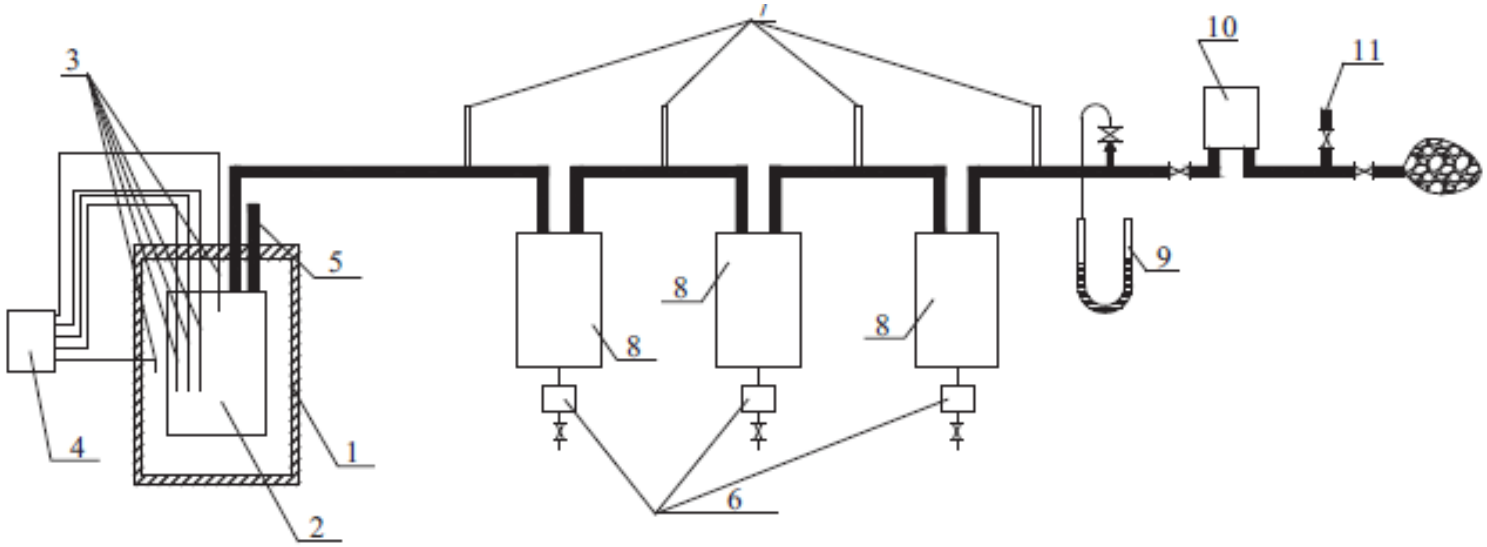
-Retention ,

-Use of catalyst,

-Environment

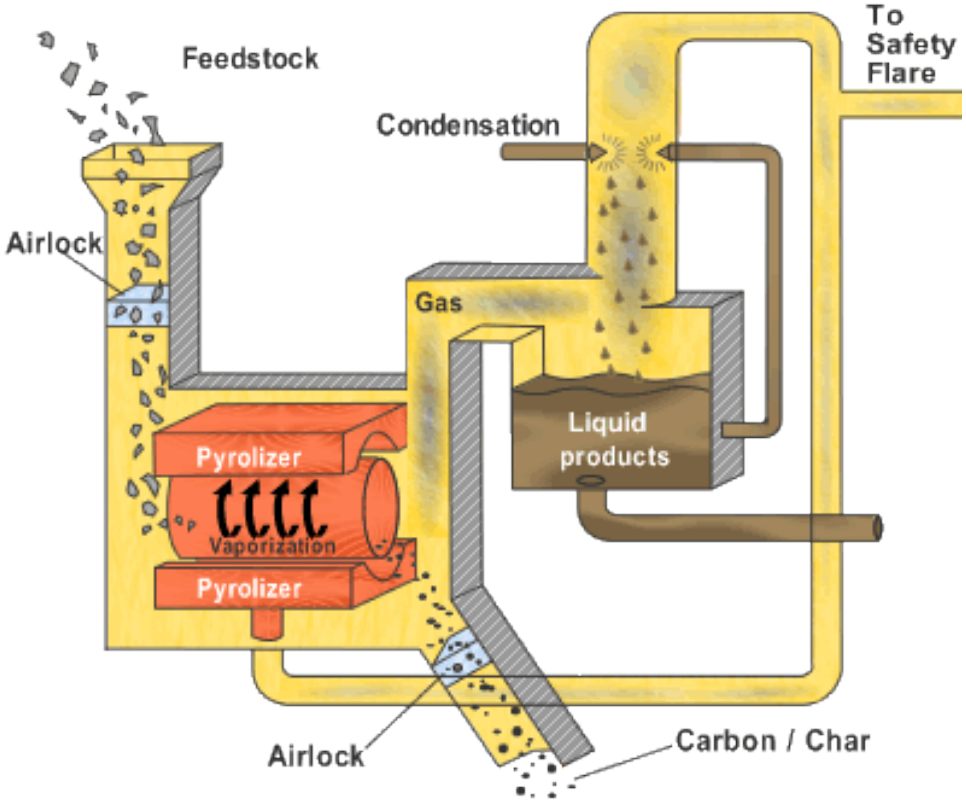
-Moisture content

PROCEDURE



Fixed bed pyrolysis system (1-furnace; 2-pyrolysis reactor; 3-thermocouple; 4-temperature controller; 5-N_2 pipe; 6-liquid gathering tank; 7-thermometer; 8-condenser; 9-pressure gauge; 10-sampling vent)

PROCEDURE


Feedstock
To Safety Flare
Condensation
Airlock
Gas
Liquid products
Pyrolizer
Vaporization
Pyrolizer
Airlock
Carbon / Char

ADVANTAGES

- There is no or fewer air emissions and this is beneficial to both human and ecology (Eunomia Research and Consulting, 2008).
- Pyrolysis plants are modular. They are made up of small units, which can be added to or taken as waste streams or volumes change (e.g. with increased recycling) and are therefore more flexible and can operate at a smaller scale than mass burn incinerators.
- Pyrolysis plants are quicker to build and set up.
- Pyrolysis processes produce more useful products than standard incineration. This is because; gases, oils and solid char obtained from the process can be used as bio-fuels or purified as a feedstock