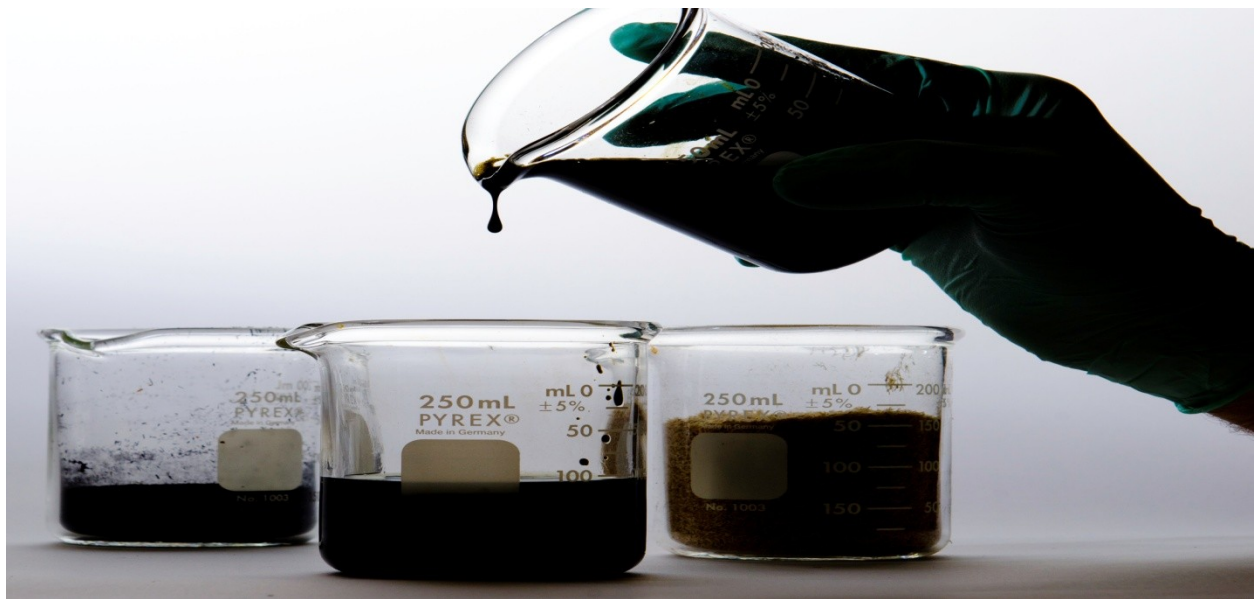


Fossil fuels are the main energy sources at present, but considering their natural limitation in availability and the fact that they are not renewable, there exists a growing need of developing new and renewable energy sources. Biomass is an ideal material for this purpose as it is the largest primary energy resource in the world. Wood and other forms of biomass including energy crops and agricultural and forestry wastes are some of the main available resources which account for 14-15% of total energy consumption. As a result of the energy demand, the cost of fossil based fuels and disposal of waste are increasing. Biomass, as a renewable material which has a negligible content of sulfur, nitrogen and ash, is very clean. The usage of biomass reduces the dependency on fossil fuels and the carbon dioxide emission to environment. Biomass absorbs CO₂ during growth and emits it during combustion. Biomass helps the atmospheric CO₂ recycling and its contribution to the greenhouse effect is low.



The term bio-oil is referred to as liquid fuels that are predominantly produced from biomass. Liquid bio-oil has become more attractive recently because of its environmental benefits. Bio-oil is nonpolluting, locally available, accessible, sustainable and reliable fuel obtained from renewable sources. Electricity generation from bio-oil has been found to be promising method in the nearest future and lies in biomass integrated gasification/gas turbine technology, which offers high-energy conversion efficiencies.

Biomass oil and residues can be converted to more valuable forms through a processes of thermo chemical upgrading .It involves a thermo chemical biomass conversion technology which is termed “pyrolysis” which is subset of gasification systems. In pyrolysis, the partial combustion is stopped at a lower temperature (450°C to 600°C), resulting in the creation of a liquid bio-oil, as well as gaseous and solid products. The pyrolysis oil can then be used as a fuel for any use dependent on the interest of the user. Pyrolysis of agricultural residues can help meet renewable energy targets by displacing fossil fuels and, thereby, deal with concerns about global warming. Pyrolysis offers more scope for recovering products from agricultural waste than simply burning

it. When agricultural residues are burnt directly in a furnace/boiler, the only practical product is heat; however, when they are pyrolyzed first, bio-oil, gases and biochar can not only be used as a fuel but can also be purified and used as a feedstock for petrochemicals and other applications. The use of the biochar for soil amendment and as a carbon-sequestering, climate-mitigating agent is gaining worldwide attention.

The biomass pyrolysis is attractive because solid biomass and wastes can be readily converted into liquid. These liquids, as crude bio-oil or slurry of charcoal of water or oil, have advantages in transport, storage, combustion, retrofitting and flexibility in production and marketing.

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