

CONVERSION OF WASTE BAGASSE TO BIO-OIL BY PYROLYSIS AND UTILIZATION OF ITS PRODUCTS

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Introduction

One day our sources for traditional sources including petroleum would be depleted. Bagasse is most promising eco friendly alternative source of renewable energy source as a industrial residues in the context of current energy scenarios. And it is cheap, abundantly available and does not require significant effort to collect. It has additional benefits in terms of transportation because it can be utilized on the spot after sugar crushing.

Although now a days the industries are using sugar cane bagasse for many applications such as production of pulp, boards and paper products, and civil works. But most large and medium sized mills can use up to 75% of bagasse to generate heat and electricity so the remaining 25% of bagasse is going waste therefore we planning to utilize that to produce alternative fuel.

Since our college is surrounded with 10-15 sugar industries within the vicinity of 25 km. Therefore we have elected to work on it as a project work. Initially we had studied the problems of sugar industries and majorly we found that tons of bagasse is wasting as a by product, and bagasse is mainly containing 80% - 90% of volatile matter which is more advantage in case of pyrolysis process. Hence we are going to concentrate on conversion of bagasse into useful liquid fuel by pyrolysis method.

Objective:

Our current investigation is to convert the waste bagasse into useful liquid fuel by pyrolysis process. In present scenario the population in India is increasing so that the demand for energy also increasing exponentially. The people are looking towards the fuels like petrol, diesel and kerosene etc. Therefore through this project we are seeking towards alternative fuel (bio-oil) for clean, domestic and renewable energy which is commonly accepted as the key for the future, not only for India and also for the world.

Methodology: pyrolysis

For the improvement of maximum energy from particular biomass, the technically and economically viable process should be selected. the pyrolysis and gasification are the current techniques for the renovation of biomass into bio oil or gaseous fuels before burning it. but the problem of gasification is the obscurity of storage, transportation and handling of

gaseous fuels. In case of pyrolysis of biomass the liquid products have advantages in transport, storage, combustion, retrofitting and flexibility in production and marketing and even bio liquid is safe product than the gaseous product. thus the bio oil is identified and presented as a bio fuel applicant. it has numerous socio-economic advantages as well as it is one efficient conversion way compared to other thermo-chemical conversion technologies.

pyrolysis has been receiving more awareness as an capable method in converting biomass into bio fuel. the pyrolysis is carrying out at the temperature between 350-750 °C. and flow chart of this pyrolysis process is illustrated as below figure 1.

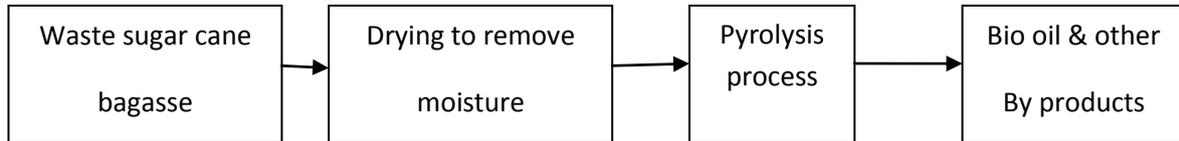


Figure 1. Flow chart of pyrolysis process



Result and conclusion:

We had conducted the experiment with 3kg of bagasse, initially at 80° C the non-condensable gases were liberating through outlet and we got bio-oil which is having moisture at 100°C . In between the temperature range of 160-190°C we got bio-oil of having less moisture content, we reached the temperature range upto 450-500°C .

The waste bagasse can be utilized for producing energy or else it may lead to many issues like space management, disposal, transportation, dust etc. Therefore if we utilize it to produce an alternative source of energy, we can survive for the future days and pollution is the most causing effect for health imbalance of human as well as animals and birds in today's environmental conditions, but this bio-oil decreases the pollutants which are destroying the environment, hence it can be used as a socio-economic fuel.

- S.Czernik and A.V.Bridgwater (Applications of biomass fast pyrolysis oil)
- Ugur Morali, Sevgi Sensoz (Characterization of bio-oil and bio-char)
- Beeharry (Availability and moisture content of different bio-masses)
- Garcia-Perez (Study of density content)

Scope for future work:

- The non-condensable gases which are producing in this process can be utilized directly for the gas turbines as a fuel.
- Instead of waste sugar cane bagasse, we can use other wastes like municipal waste, waste trees' leaves etc.