

Biomass waste to energy for automotive applications

The world energy production is based mainly on fossil fuels like crude oil, natural gas and coal. Increase in energy demand results in increasing fossil fuels consumption, which in turn contributes significantly to the environmental pollution and climatic changes. Biomass is considered to be one of the important solutions for substituting the fossil fuel resources. It has a unique potential for making a positive environmental impact, i.e., the CO₂ emitted in processing the biomass would be absorbed by the fresh biomass.

Non edible oil from *Jatropha* (*Jatropha curcas*) and *Karanja* (*Pongamia pinnata*) Plants are identified as major source for biodiesel production in India (Planning Commission, Government of India, 2003). The *Pongamia* and *Jatropha* de-oiled cakes, solid residues that are usually discarded after extraction of oil from the seeds, contains lignin and cellulose in varying ratios. Moreover, due to increasing demand of biodiesel, the quantity of de-oiled cakes has increased tremendously and about 2 tonnes of oil cake is discarded as a waste for every tonne of biodiesel produced. One of the major problems arising in the coming years is disposal of cake after expelling oil from seed. Usage of deoiled cakes as biomass resources rather than disposing it as waste is considered to be the best strategy to produce energy and solve the environmental problems.

Flash pyrolysis process has been developed in the centre for research in renewable energy (CRRE) under the Department of Mechanical and Aerospace Engineering of Karunya Institute of Technology and Sciences to produce liquid fuels from *Jatropha* and *pongamia* deoiled cakes and this study was carried out using research fund from Ministry of Nonconventional Energy Sources (MNES), India. The Bioenergy research Programs at the institute is actively working toward a secure and sustainable energy future for the state and nation. The centre strives to support a thriving Bioenergy industry using resources that can be produced in the country. The fuels produced during pyrolysis process can find applications, in automotive vehicles, driving aircraft engines and for electricity generation after suitable up gradation. The institute has research programs in biomass pretreatment and processing, biomass conversion technologies, biobased products, such as fuels, polymers, and chemicals, studies on the performance of compression

ignition engines fuelled by the pyrolysis oils and studies on the application of solar energy for thermochemical conversion of biomass.



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