

ESTABLISHMENT OF JATROPHA OIL CAKE BASED BIOGAS PLANT

Considering the future scenario of non-edible oil seeds utilization for biodiesel production in the country from *Jatropha curcas* (Jatropha), there is need for efficient utilization of their cakes. The current production of *Jatropha curcas* seed would be very large in comparison to all other non-edible oil seeds by the introduction of National Biodiesel Mission started in year 2003 in the country. These crops in India have been selected as major source of non-edible oil for production of biodiesel. One of the major problems arising in the coming years is disposal of cake after expelling oil from seed. The cake neither can be used for animal feeding nor directly can be used in agricultural farming due to its toxic nature. The generation of biogas from these cakes would be the best solution for its efficient utilization. Biogas from cake provides energy for heating, cooking, lighting and engine operation and digested cake slurry can be directly put for agricultural farming.

The aim of this project was to establish, evaluate and demonstrate a biogas plant which can treat de-oiled jatropha oil cake, a byproduct during the biodiesel production process in the Integrated Biodiesel Plant installed and commissioned in UPES campus of Dehradun. The major objective of the project was to design and establish a Biogas plant for jatropha oil cakes left after extraction of oil. Performance evaluation of Biogas plant and identification of important factors, which affect the production of biogas was carried out. A possible maintenance schedule for the plant was developed and the socio-economic of the plant was accomplished. It is found that the use of organic waste and cow dung with slurry ensures that the mixture can be handled easily, so that the process operates smoothly with improved biogas productivity and better economic results than pure slurry plants. Anaerobic digestion of jatropha oil seed cakes was a good way of cake disposal which provides better quality renewable gaseous fuel (biogas) than cattle dung generated biogas. Along with fuel, anaerobic digestion gave good manure value effluent for organic farming. Studies revealed that biogas generation potential of *Jatropha curcas* oil seed cakes is in the range of 220 - 250 liter per kg of cake. Total biogas generation potential from *Jatropha curcas* cakes from this project, was found as 110000 – 125000 liters (220 - 250 liter per kg of cake x 500 kg of dry cake available daily) which was made be available for regular use in UPES Campus.