

Generation of Bio-Fuel (Bio-Briquettes) from Agricultural Waste: A Review

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Abstract

Waste is an unavoidable by product of most human activities which is increasing day by day with increase in economic development and rising living standards. The principal of solid waste are residential households and agricultural waste. The pollution through the agricultural waste and other loose bio devastate materials like forestry fallen leaves and bio mass wood waste materials is becoming more problematic in many developing nations. So to reduce problems related to pollution the briquette plant project is offered by the briquetting plant manufacturers.

Keyword- Bio briquettes, Agricultural Waste

I. INTRODUCTION

Solid waste (SW), commonly known as trash or garbage in the U.S. and as refuse or rubbish in the UK, is a waste type consisting of everyday items that are discarded by the public. "Garbage" can also refer specifically to food waste, as in a garbage; the two are sometimes collected separately. In 1947 cities and towns in India generated an estimated 6 million tons of solid waste; in 1997 it was about 48 million tonnes. More than 25% of the municipal solid waste is not collected at all; 70% of the Indian cities lack adequate capacity to transport it and there are no sanitary landfills to dispose of the waste. Over the last few years, the consumer market has grown rapidly leading to products being packed in cans, aluminium foils, plastics, and other such non-biodegradable items that cause incalculable harm to the environment.

Biomass, as a renewable energy source, has started to look much more favourable again in recent years. There are many reasons for this trend, ranging from increased socio-political discussion on our future energy supply to technological progress. The latter, in particular, has helped change the image of biomass: while fewer regard it as old fashioned, expensive or even dirty, today biomass raise its profile as a renewable and profitable energy carrier. New processing methods have even improved the fuel and handling characteristics of biogenic fuels. Those that have made the biggest difference are briquetting and palletisations, from the solid fuel industry. Both of these techniques are based on compacting the original loose material to yield one basic advantage: a higher energy densification.

A. The Raw Material

The raw material is always the beginning of each value chain for processed products. Therefore, before starting to briquette, the main questions are: what to briquette and how to get the raw material. Basically, each kind of biomass might be used for the production of biomass briquettes as a fuel. It is rare that energy plants are cultivated and grown for the only purpose of a later briquetting. Moreover, briquetting is applied to improve the quality of an original fuel material and thereby add value to a poor quality product, mainly agro-residues. Briquetting biomass-residues is one way to solve a problem: how to put the huge volume of wastes from agricultural and agro-processing to some useful purpose.

B. Composition and Production

Biomass briquettes, mostly made of green waste and other organic materials, are commonly used for electricity generation, heat and cooking fuel. These compressed compounds contain various organic materials, including rice husk, bagasse, ground nut shells, municipal solid waste, agricultural waste. The composition of briquettes varies by area due to the availability of raw materials. The raw materials are gathered and compressed into briquette in order to burn longer and make transportation of the goods easier. These briquettes are very different from charcoal because they do not have large concentrations of carbonaceous substances and added materials. Compared to fossil fuels, the briquettes produce low net total greenhouse gas emissions because the materials used are already a part of the carbon cycle.

II. DIFFERENT TYPES OF AGRICULTURAL WASTE USED TO MAKE BIO-BRIQUETTES

Andrew Setiawan Rusdianto, et al.(2015), carried out the study on preparation of biofuels as bio pellet are popular as an alternative for replacing firewood for cooking. The potential of bio pellet as a bio-fuel produced from cassava skin became the focus of this

study. The purpose was to determine the process and composition of bio pellet based on mass balance. The material was collected from several fermented cassava industries located in Jember Regency and Yogyakarta Special Region. The flow of this study includes material collection, preparation, drying, and calorie measurement, and proximate analysis. The cassava skin used in this study was stemmed from “tape” industries.

Daniyanto et al. (2015) found out that Bagasse has a high moisture content, bulk density of the fibrous and will cause obstacle in gasification process. To improve the quality of bagasse as feedstock gasification can be done with Torre faction pre-treatment. Torre faction pre-treatment is used to improve the quality of biomass as a feed stoke. For the Indonesian bagasse gasification process, the optimum temperature of dry torrefaction is 150 °C. Torrefaction of bagasse with temperatures above 200 °C will tend to undergo carbonization reaction, decreasing hydrogen and methane content in syn-gas and decreasing quality of bagasse as raw material for gasification.

JitthepPrasityousil (2012) carried out the study on determination of the optimum mixing ratio for solid fuel briquettes produced by extrusion of rejected material of municipal waste composting char (MWCC) and sawdust char (SC). Parameters like Moisture content, Volatile matter, Ash content, Sulphur content, Calorific value are measured for the briquettes samples. The rejected municipal waste can be used for the industries as the source of fuel. It will reduce the size of landfill space and also helpful to promote the reuse of waste.

M. Bernardo et al.(2012) performed a characterization of chars obtained in the co-pyrolisis of waste mixtures composed by plastics, tires and pine biomass, to provide knowledge about the composition, leaching behaviour and risk assessment of these materials in order to define strategies for their possible valorisation or safe disposal.. An acidic demineralization procedure was successfully applied to the chars and high efficiency removals of the majority of the heavy metals were achieved. The demineralization study also demonstrated that hazardous heavy metals such as chromium, nickel and cadmium are significantly immobilized in the char matrix. The char is used as a fuel.

M.F. Zainuddin et al. (2014) presented study on reducing pineapple residues which were recycled through open burning before replanting, contributed to the air pollution. To manage the pineapple residues, the best way is converting them into animal feed. This is done by densification process. This process increase bulk density, improve storability, reduce transportation costs, and enables easier handling with proper storage equipment.

Md. Ahiduzzaman et al (2013), developed a biomass fired stove is developed to use as the replacement of the electric heater. To make the briquettes the biomass stove is capable to raising the temperature. The stove is made of refractory brick and clay. The stove is fired with rice husk briquette. The stove provides heat to die barrel instead of electric heater. The stove shows satisfactory performance by replacing the 6 kW electric-heater in this study.

NehaPatni, Shibu G. Pillai et al. (2013) examined that Excessive consumption of fossil fuels, particularly in large urban areas, has resulted in generation of high levels of pollution during the last few decades. All petroleum-based fuels can be replaced by renewable biomass fuels such as bioethanol, bio-diesel, bio-hydrogen, etc. The bioethanol can be produced from lignocellulosic biomass, starchy materials such as corn, wheat, cereals etc and sucrose containing feedstocks. Major portion of the production methods uses corn for the same, but since India being the second largest producer of wheat and there is availability of different varieties of wheat, we have selected wheat as a feedstock.

III. CONCLUSION

While comparing with bio briquettes the result obtained is good compare to coal. Bio-mass briquettes have drawn worldwide interest as an energy source because it does not negatively affect the environment.

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