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# Production of Briquettes from Rural Waste for Future of Pollution Free Thermal Energy Sources

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**Abstract**: The paper presents the results of a project focused on the development of briquettes from waste. Today, the biggest problem that our country is facing how the waste that we generate can be disposed of properly. Every day, 1.6 lakhs tonnes of waste is generated in India. This waste currently lacks a useful purpose, and its indiscriminate burning generates co, co2 emissions [1]. Biomass briquettes are a bio-fuel substitute to coal and charcoal [2]. Briquettes are mostly used in the developing world [country] where cooking fuels are not as easily available. People have been using biomass briquettes since before recorded history. Biomass briquettes are a renewable source of energy and avoid adding fossils, carbon to the atmosphere [3]. The briquettes are perfect substitute for the fuels which affect the environment.

**Keywords**: Bio-fuel, Briquettes machine, calorific value, incentives.

## I. INTRODUCTION

The white or coloured longitudinal cylindrical or random shaped pieces of solid combustible fuel converted from agricultural and forest waste residues in the form of briquettes are termed as agro briquettes .The agro briquettes functions as a combustible fuel and it may possess some colour depending upon the raw material used as input. However, because conventional coal is always black, in order to distinguish this product which has similar function as coal and termed as white coal. It can be efficiently and effectively and eco friendly used to replace coal, fire wood , furnace oil or any such fuel in heat processing plants. The white coal i.e. solid briquettes are produced from agro waste solid cylindrical random shaped and sized longitudinal solid blocks. The white coal is generated from agro waste after applying immence mechanical pressure to the extent of 200 kg/cm2 .It is very interesting to note that during the production process no external binders or chemicals are used to bind the crushing of raw material .This white coal is good substitute to coal fuel.

### INCENTIVES FROM THE GOVERNMENT

1. From govt. Of India :

The government of India , ministry of non conventional energy announced a series of incentives with a view to promote projects of entrepreneurs engaged in developing alternative energy force . the measure incentives are:

2. 100% depreciation:

Govt. Has allowed depreciation to extent of total value of plant and machinery in the first year.

3. No license fee:

The whole industry of non conventional energy resource has been exempted for obtaining any license.

### COMPARISION OF BRIQUETTES AND COAL:

| SN | Briquettes | Coal |
|---|---|---|
| 01 | Consistency in availability of raw material | There is acute scarcity |
| 02 | Can be economically used in boilers | Use of coal is too expensive |
| 03 | Calorific value 3500-5000 k cal/kg | Calorific value 20% more |
| 04 | Ash content in white coal is negligible | Fly ash content is 20 to 40% |
| 05 | Production is pollution free, eco friendly | Pollution level is too high |
| 06 | Sulphuric/phosphoric gases not emitted | Lot of emission takes place |
| 07 | Less expensive for pollution control | Expensive measures required |
| 08 | Storage convenient because of regular shape and size | Coal requires a lot of space for storage |
| 09 | Moisture content is 2 to 5 % | Moisture content is 25 to 30% |

DIFFERENT CALORIFIC VALUES**:**

The calorific values of various raw materials are given as below:

1. Saw wood - 3900 k cal/kg
2. Groundnut shell – 3800 k cal/kg
3. Custard shell – 3900k cal/kg
4. Cotton stalk – 3700 k cal/kg
5. Sugarcane bagasse – 4200 k cal/kg
6. Coffee husk – 3800 k cal/kg
7. Coir pith – 3000k cal/kg
8. Bajara husk – 3300 k cal/kg

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9. Jungle leaves and other – 3000 k cal/kg
10. Wheat straw – 2200 k cal/kg

## II. MATERIALS AND METHODS

**Raw material input**

Any material containing lignite and cellulose is suitable for densification. The tests have been carried out successfully on a variety of material as listed below and all such materials have proved to fulfil the requirement.

1. .forest waste:
   - Saw dust
   - Scrapped pieces of wood
   - Tree bark and twigs pine needles
   - Wild grass
   - Any type of forest waste

2. Agricultural waste:
   - Wheat straw, rice husk, coffee husk
   - Shells of groundnut, almond and cotton stalks, custard shell
   - Paddy straw, soybean husk.
   - Bagasse of sugarcane
   - Dry leaves and trash maize stalks, mustered stalks.
   - Jawar ears , bajara ears
   - The raw material from above type can be briquettes individuals and or in combination depending upon their local availability and blending.

3. Bagasse and press mud:
   - It is the potential source of power. Bagasse is a fibrous residue left after the extraction of juice from sugarcane in suger factories of manually or electrically operated juice extracting machine. The quality of bagasse depends on the fibre cointain of the sugarcane. Availability of bagasse is very high in various states of the country.

## III. MANUFACTURING PROCESS

The Briquette press is a RAM type. It is designed for continuous heavy duty operation with two load wheels. One of the load wheels acts as a pulley. It is driven by the main motor of about 75hp through the flat belt. The oil homogenous prepared powder from raw material is used as lubricant.

It is fed through screw conveyor to the machine by means of vertical screw with its own geared motor.

It pre-compresses and forces the material downwards into the feeder box. From feeder box the material is forced by the raw through a tapered die system on the cooling tower in the form of briquettes. The total operation is a continuous process. It is controlled and operated by a panel board. Panel board also provides safety measurement

## FINANTIAL ASPECTS

| SR. NO. | Installed Capacity | |
|---|---|---|
| | **Description** | **Particulars** |
| 01 | Production per annum | 5400 Mertric Tonne |
| 02 | Working hours per day | 20 hours |
| 03 | Working in a year | 270 hours |
| 04 | No of shifts per day | 3 shifts of 8 hours each |
| 05 | Production Rate/hour | 1 Ton per hour |

*Figures and Tables*

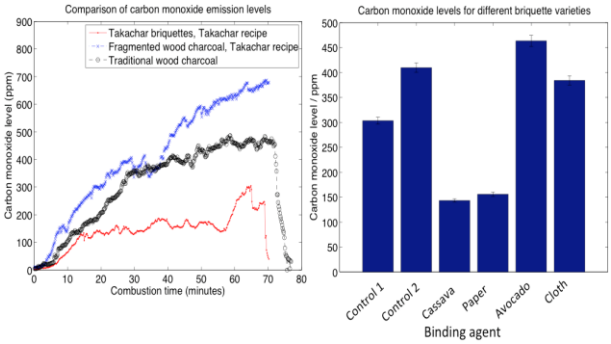


Fig 1. Carbon monoxide emissions from the combustion of various charcoal briquette

The left plot (a) shows sample combustion time course (on the x-axis) as well as the carbon monoxide readout (on the y-axis) inside a typical Kenyan household, using the Lascar CO Datalogger.

Fig. 2. Samples briquettes produced with 100% waste


Figure 2. Diagram showing model briquetting press

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LINKS AND BOOKMARKS

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[2] https://archive.epe.gov/epawaste/nonhaz/municipal/web/html/airem.html
[3] www.biomass.briquetting.com/product.php

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Examples of reference items of different categories shown in the References section include:

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## IV. RESULT AND DISCUSSION

The briquette project has proved to be best disposal of agricultural waste as it produce a low cost fuel for the low income families hence it is economical and the briquettes used as a fuel do not affect the environment as it do not release harmful gases to an atmosphere. it is the best substitute for the coal and charcoal.

## V. CONCLUSION

It has been concluded that the disposal of waste is the biggest problem that every country is facing today hence the need of smart but proper disposal methods also how waste can be used as resource, is increasing. The domestic use of briquettes in low-income families constitutes an important alternative that should be further developed as it allows for the economic revaluation of wood waste and the mitigation of greenhouse gas emissions. The sawdust briquette has positive results compared to the bio-fuel materials currently used, with a higher bulk density, similar levels of calorific power, less moisture, and low levels of fixed carbon, chlorine and sulphur, promoting a healthier environment for the consumer and the environment

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