

# BIO BREQUITTE BRICKS : USED AS A BIO FUEL FOR PREHEATING THE FURNACE



## Engineering

**KEYWORDS:** Sulphur free emission, No adhesive, Low cost.

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### ABSTRACT

Briquetting press machines are the machines that can convert biomass waste or agro waste into biomass briquettes without adding any chemical in the briquette making process. Eco friendly briquettes are used in cooking and many other industrial processes. They are easier to handle and cut greenhouse gas emissions.

In India, wooden furniture industries produce 45% of wood waste. Saw mills produce 52% of wood waste and only 20% of waste paper is being recovered annually and large amount of paper is littered in our university every day and we have used such wastes to convert it into a bio fuel.

### Introduction

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, ground nut shells, municipal solid waste, and agricultural waste. The composition of the 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.

One of the most common variables of the biomass briquette production process is the way the biomass is dried out. Researchers concluded that torrefaction and carbonization are the most efficient forms of drying out biomass, but the use of the briquette determines which method should be used.

Compaction is another factor affecting production. Some materials burn more efficiently if compacted at low pressures, such as corn stover grind. Other materials such as wheat and barley-straw require high amounts of pressure to produce heat. There are also different press technologies that can be used. A piston press is used to create solid briquettes for a wide array of purposes. Screw extrusion is used to compact biomass into loose, homogeneous briquettes that are substituted for coal in cofiring. This technology creates a doughnut-like, briquette. The hole in the center of the briquette allows for a larger surface area, creating a higher combustion rate.



In our manufacturing we used the waste wood and waste paper from all the renowned institutions can be used to generate the bio fuel using the briquette press, which can prove a vital step towards a greener india and a cleaner India.

We used wheat husk, cow dung, waste paper from the university, saw dust and wood waste thus inturn by using our methodology which is described below and much clear in the pictures.

It has various advantages that are Chemical free production, Renewable and reusable nature ,Less cost than other fuel, Easily available raw materials,Eco-friendly component, Pollution free burning,Low moisture and ash content, Calorific Value: 3800 +/- 200Kcal,Moisture:4%



**Working /Methodology**

**Mixing**

In this process, raw materials such as waste paper from the campus, wood waste from the construction sites in the institution, saw dust from the construction sites and the manufacturing practices lab, wheat husk and cow dung from the nearby village are used in different proportions to obtain certain briquettes.

For first type of brick, we used 40% saw dust, 40% paper waste and 20% water (by volume)

For second type of brick, we used 20% saw dust, 20% wheat husk, 40% paper and 20% water (by volume)

For third type of brick, we used 50% cow dung, 40% wheat husk and 10% of water (by volume)

For fourth type of brick we used 30% wood waste, 30% Paper and 30% cow dung, 10 % Water (By Volume)

Brick	Materials Used (% by vol)				
	Saw Dust	Paper Waste	Cow Dung	Wheat Husk	Water
Type 1	40%	40%	--	--	20%
Type 2	20%	40%	--	20%	20%
Type 3	--	--	50%	40%	10%
Type 4	30%	30%	30%	--	10%

**Pressing**

The mixture prepared from the above mentioned four types is pressed with the help of leveler. The pressure used is in turn equivalent to the normal human pressure and due to this compression takes place and the excess water from the sample eases out and the base of the mould and pitch of the material comes close. Thus in turn the paper and cowdung provides the necessary adhesiveness. No external glue or binding agent is used as it is not eco friendly.



**Desiccating**

In this process, the pressed brick which is mechanically pressed by the above processes is finally allowed to desiccate in the sun (i.e. allowed to dry in the sun) for about 5 to 7 days. As the moisture contents reduces, the briquette becomes brittle and this the peak time when we have to be ready for the final action. When the moisture content reduces to 5-7% the brick is ready to use .The desiccating is the major property for the preparation of our bio fuel.



**Efficacy**

It has calorific value around 3800 +/- 200Kcal

It liberates sulphur free smoke and has low moisture content which in turn helps the proper burning of BB brick without the production of ash

It has very low production cost and as the materials are produced at large scale which saves much of the time, it is easy to install and handle and no skilled work required and the major advantage of this is that it is eco friendly and does not cause pollution . The composition and shape of the material can be easily altered as per the requirements.

Materials	Mass	Time of Burning in furnace
Wood	1 kg	3-4 min
Paper	1 kg	30-40 sec
Cow Dung	1 kg	6-7 min
Brick(Type 1)	1 kg	11-12 min
Brick(Type 2)	1 kg	13-14 min
Brick(Type 3)	1 kg	7-8 min
Brick(Type 4)	1 kg	6-7 min

\*\*It is very clear from the above table that it shows the time of burning taken by 1 kg mass of substance and shows how much efficient which of the material is for the use at large scale.

**Conclusion**

As we know the depletion rate of the fossil fuels is very high and they gonna end soon.If the briquette press is installed in all the public and private institutions, a large amount of bio fuel can be produced which can replace large amount of fossil fuels and contribute towards greener India. By doing this we can also keep a check on the pollution caused by burning of coal and firewood

Hence we can say that B.B. Brick Plant is the plant for our environment and our better future. It is a trusted source of Energy. Briquetting plant or BB Bricks can be used as alternative source of energy by replacing firewood and charcoal with bio briquettes, producers can increase their income by 25%. Income generation along with saving our earth makes a sustainable solution to poverty reduction.

**REFERENCE**  
 1. [https://in.search.yahoo.com/?fr=hp-ddc-bd-tab&type=dc-bcr-sw\\_\\_alt\\_\\_ddc\\_dsssyctab\\_bd\\_com](https://in.search.yahoo.com/?fr=hp-ddc-bd-tab&type=dc-bcr-sw__alt__ddc_dsssyctab_bd_com) | 2. [http://www.google.com/product-detail/2015-High-efficiency-straw-briquette-press\\_60222337116.html](http://www.google.com/product-detail/2015-High-efficiency-straw-briquette-press_60222337116.html) | 3. [https://in.search.yahoo.com/search;\\_ylt=A0LEV2Mcs\\_w\\_\\_alt\\_\\_ddc\\_dsssyctab\\_bd\\_com&iscqry=](https://in.search.yahoo.com/search;_ylt=A0LEV2Mcs_w__alt__ddc_dsssyctab_bd_com&iscqry=) | 4. [https://en.wikipedia.org/wiki/Biomass\\_briquettes](https://en.wikipedia.org/wiki/Biomass_briquettes) | 5. <http://www.biopress17/turning-garbage-into-bio-fuel-with-biomass-briquette-press> | 6. [https://in.search.yahoo.com/yhs/search?hspart=ddc&hsimp=yhs-ddc\\_bd&p=slide+share&type=bl-bcr-sw\\_\\_alt\\_\\_ddc\\_dss\\_bd\\_com](https://in.search.yahoo.com/yhs/search?hspart=ddc&hsimp=yhs-ddc_bd&p=slide+share&type=bl-bcr-sw__alt__ddc_dss_bd_com) | 7. <http://radheengineering.com/faq.html#Q11>