

## **Biomass briquettes do not produce as much carbon dioxide as coal produces**

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### **Abstract:-**

Conventional fuels are not easily available in the developing countries.so to substitute them biomass briquettes are used. They provide thermal energy in place of coal,charcoal, firewood, etc. they provide clean energy.

Biomass briquettes do not produce as much carbon dioxide as coal produces.

Biomass briquettes can be used to produce electricity. Constantly rising fuel prices will be less influential if fuel can be easily produce domestically. India has started replacing charcoal with biomass briquettes. Biomass briquettes can created domestically, depending on availability of land.

### **Problem and objectives:-**

Coal is a basic source of energy used for generation of electricity. But coal is a non- renewable energy i.e. we can't recreate or use it later on, once it is used. There are huge disadvantages too of using coal. Burning of coal produces large amount of harmful gases that leads to global warming. Gases that are released due to burning of coal are carbon di oxide, sulphur dioxide, nitrogen oxide, etc.

But a superb substitute for such energy sources such as coal, charcoal, firewood is briquettes. Briquettes is a ecofriendly source of energy. They reduce the pollution to a great extent. There is a great need for a new source of energy that can substitute such harmful sources of energy. Increase in world population demands huge amount of energy. So, for these reason briquettes are helpful to us at a great extent.

There is increase in growth of industrial sector. Hence briquettes can act as a great source of energy to them. In many rural areas still now uses wood to cook food. Hence it leads to increase in activity of cutting down of trees. Briquettes can substitute them. Hence by doing so, trees will not be cut and there will be lessening of pollution.

Coal is also used in furnaces. This is a one more place that uses coal and overall it helps in increase in the pollution. Here too we can substitute coal with briquettes.



So our objective is to spread the ideas of briquette so that everyone should get know a better source of energy than coal, that reduces pollution as compare to coal.as briquettes are made from biological and agricultural waste products that can be available to everyone easily.

Briquettes can get us more amount of thermal energy. It constitute some products such as neem which on burning act as mosquito repellent, eucalyptus leaves that gives a pleasant aroma. Biomass briquettes are more economical than coal so, everyone should use them. People those who are not able to afford gas stove can use it.

So it's our moto to spread about briquettes a lot so that everyone from impecunious people to those who owns industries so can make use of briquettes.



### **Biomass Briquettes:-**

Biomass briquettes are a household and institutional fuel made by solidifying biomass waste. They can be produced with a range of raw materials including sawdust ,bagasse ,coffee husks, maize cobs, wheat and paper .Biomass briquettes are a biofuel which substitute to coal and to use briquettes ,where they are used to use briquettes, where they are used to heat industrial boils in order to produce electricity from steam. As industries realize the benefits decreasing pollution through the use of biomass briquettes has been steadily –increasing day by day. Briquettes, the use of biomass briquettes provide higher calorific value per dollar than coal when used for firing.



As we know boiler fuel has more cost, biomass briquettes on average saved 30-40% of it. Environmentally, the use of biomass briquettes produces much fewer greenhouse gases

### Uses of Briquettes:

Briquettes are widely used as fuel for green energy and used for any type of thermal application like steam generation in boilers, heating purpose, drying process and gasification plant to replace existing conventional fuel like coal, wood and other expensive fuels in against them has shown a promising results.



After discovery that coconut husk are well suited to be the main ingredient in bio briquettes the husk became a profit center. As it leaves very little residue and burns incredibly efficiently, biomass briquettes are reliable source for cooking in undeveloped country. Due to low cost and it's availability anywhere there is organic material, the developing world has relied on the burning biomass.

Two major components of developing world are India and China where the major use of biomass briquettes is in industrial applications usually to produce steam. India has started to replace charcoal with biomass briquettes in regards to boiler fuel, especially in southern parts of country because the biomass briquettes can be created domestically, depending on the availability of land.

Adaption of briquettes technology will not only create a safe hygienic way of disposing the waste but turn into a cash rich venture by converting waste into energy and also contributing towards a better environment.

**Neem: Azadirctha Indica**

So many medicinal uses of neem. In our day today life, as well as industrial use also. Neem use to kill bacteria, insects, mosquitoes, etc. the flower of neem use to reducing bile, stomach and intestinal ulcers, etc. as well as fruit use to hemorrhoids, bloody nose, eye disorders, etc.

The briquettes use in many industries in boiler and furnace. In that we used neem included briquettes the smoke which is less polluted. As compare to carosine. This is much better for us as well as atmosphere also.



Neem coated urea is being used an alternate to plain urea fertilizer in India. Neem leaves are dried in India and placed in cupboards to prevent insects eating, clothes and also in where rice is stored.

When burn the laves of Neem which smoke is produces they controlling the airborne bacteria in house. Suppose we take a 30-60 mg of Neem bark extract twice daily by mouth for weeks helps heal stomach and intestinal ulcers. as like this Neem have so many medicinal uses.

**Mosquitoes:--**

The burning of the Neem the mosquitos Stay away from us an our home. We applying extract of Neem root or leaf to the skin helps repels black flies. Also, applying Neem oil cream to the skin seems to protect against some types of mosquitos.

The leaves of Neem fond some chemical constituent, such as niribin, 6-desacetylnimbinen, nimbolide, n-hexacosanol, 7-desacety, amino acid, etc.





In some rural area now days also uses a smoke of Neem to protect himself from mosquitos . As well as Neem uses to control the diabetes, BP, acidity, and etc. because of this Neem also used in cosmetics, to remove pimpuls and so many things

### **Cow Dung:**

1) We all of us see the cow dung on the road. But we aver about there uses. It's a plentiful and renewable resource. Cow dung is used ad fertilizer for the agriculture. As well as a fuel for the furness and biogas producer. Row material used for the paper making, and insect repellent etc. some times cow dung is mixed with the straw and dunk are lit to provide heat and a fleam for cooking.

In now a days north America peoples also used a cow dung as one source of fuel. When the biogas produced this process in happed in absences of oxygen.



2) When burning of cow dung we found that they repel to the insects, including mosquitos. Cow dunk lead to as a pesticides in some area removing cow dung from filed pats reduces the grazing area. The cow pats give off methane. Which acts as a greenhouse gas in the atmosphere.cow dung is so useful to us as use for agriculture .

3) The cow dung commonly used for heat and cooking fuel. Cow manure is good for agriculture because of cow manure is rich in minerals, especially nitrogen, phosphorus and potassium. It can support the growth of beneficial microorganism when it's mixed with soil.



Ones of the world's largest biogas plants is currently being. Cow dung help to contribution to the reproduction of Danish carbon emission. Cow dung also a optional ingredient in the manufacture of adobe

mud brick housing depending on the availability of material at hand. Cow dung is a good re-source for maintaining the productivity status and enhance the benecial microbial population of soil. share of the Indian population relying on traditional biomass for cooking 72% per cent.as our above research we found that the many uses of cow dung in our day today life. For in our home, industries, furnees and so many other things also.

### Bagasse:-

1) It is use as a primary fuel source for sugar mills. When it burn properly it produce sufficient heat which requied typical sugar mill.in some countries bagasse use for the production of the pulp, paper, and board such as India, China, Colombia, Iran, Thailand, and Argentina.

Bagasse also use in making boards called as Bagasse board and Xanita board .bagasse also use in biofuel and, production off building materoials and etc. dry bagasse burn to produces steam, Which is the used to rotate turbines to generates electricity.

2) Percentage of material included in bagasse:-

Table 3.3 Chemical composition of bagasse

Component	Percent
Cellulose	45-55%
Hemicellulose	20-25%
Lignin	18-24%
Ash	1-4%
Waxes	<1%

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When moisture of brix and ash content are expressed as a percentage by mass. Cellulose rich bagasse is being widely investigated due to its potential for producing commercial quantities of cellulosic ethanol.

From research we found that using bagasse as a renewable power generation source and for production of bio-based materials.

3) In sugarcane plant we absorbed that the emission of CO<sub>2</sub> gas.in America, Australia they created the electricity by using bagasse. Hawaiian Electric industries also burns bagasse for cogeneration. Bagasse used for the production generic printing and writing papers as well as tissue products but it is also widely used for boxes and newspaper production.



**Peanut Shell:-**

Peanut shell is one main byproduct of the peanut processing factories. Peanut shell could be use in many different fields. It is suitable to be made into fuels for housing fireplaces and industrial biomass products.

Peanut shells are terrific source of nitrogen, phosphorous and potassium. Peanut shell are externally flammable. They are used to make some manufactured fireplace logs. When peanut shell burn with excess of oxygen and at high temperature to complete combustion they releases mostly carbon dioxide and water same as burning other organic matter. So inorganic in shell go towards ash.

Peanut shell are made up of lignin, cellulose and proteins and carbohydrates

**Percentage Composition:-**

While the percentage composition of the component are as follows :

% composition	Component
8.2%	Protein
28.8%	Lignin
37.0%	Cellulose
2.5%	carbohydrate

The mixture of different types of peanuts make as a disguise, which can use as a fuel for feed production.

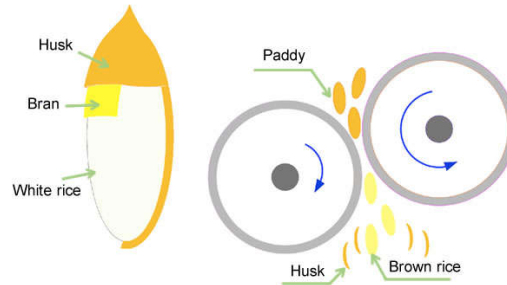


Peanut shell can be compressed into fuel pellets to make best use as a energy source.



### Rice Husk:-

Rice husk is the another name is rice hulls. Rice hulls are the hard protecting covering of grains of rice. Rice hulls can be use as building material ,fertilizer ,insulation material or fuels



Rice husk is mostly use for energy production EX: combustion and gasification

#### A) Combustion :

In this process of burning carbon in rice husk.  
 In this process  $CO_2$  and heat energy are further use  
 In the combustion process without the need for heat exchanger .  
 In this process heat is generated .

#### B) Gasification

In the gasification rice husk convert to synthesis gas  
 Synthesis gas are used to fuel for drying or cooking .  
 And generate the electricity .

#### Rice husk briquettes:

*In the combustion performance use the densification to increasing the density of material .  
 It is use for industrial boiler for fossil fuel .*





### Characteristic of Rice Husk :

Rice husk is major product of milling industry .Rice husk is highly pure , small particle size and high surface area prepare from rice husk using the alkali extraction by acid precipitation method .High purity nano silica powder was obtain by sodium hydroxide (NaOH)



### Quality factors of briquettes

It is very essential to check the quality of Briquettes. The amount of energy released is totally depend on how good the Briquettes are. Hence the factors that are affecting the quality of Briquettes are as follows:-

#### 1) Calorific value :-

Calorific value is one of the crucial factors to briquettes burning. More the calorific value, they will burn easily and that with more extent. Calorific values of some materials are given below.

**Each Raw Material has Different Calorific Value:**

Biomass	Calorific Value
Castor stick	4300
Corn cobs	4150
Cotton pods	4200
Saw dust	4400
Straw	3700
Bagasse	4200
Coir pith	4100
Ground nut shell	4500
Tea waste	4000
Rice husk	4000

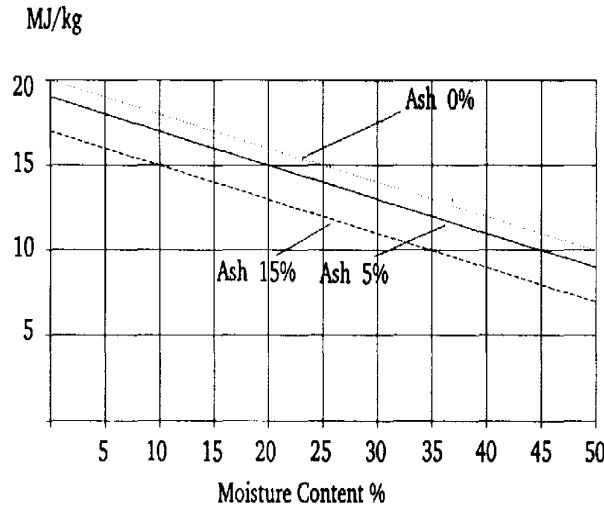
So, if want more heat energy from briquettes it's calorific value should be more.

#### 2) Density:-

Briquettes burning is also influenced by briquettes density.

Briquettes with high density would have longer burning time i.e they will last for more time. Such briquettes will also release more heat as compare to those with less density.

Density of briquettes depends on quality of raw materials and moisture content. Small particle size is preferred for increasing the density of briquettes. Moisture content should be less as it acts as an obstacle for briquettes compression and consequently decreases apparent density.



3) Resistance to humidity:-

Briquettes should be resistant to humidity. They may get damage if they get contact with humidity. At high temperature, during combustion, water vapors released may form undesirable climate which may not support proper burning of briquettes.

Majority of the ingredients in the briquettes are water soluble. During combustion if the briquettes crumble then loose particles may remain unburned or will block the flow of air.

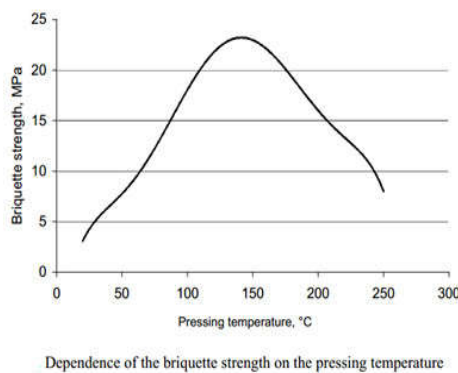
**Factors influencing briquettes quality**

Burning of briquettes is greatly influenced by quality of briquettes. Factors that affect briquettes quality during their productions are given below :-

1) Pressing temperature:-

Briquettes quality and strength are affected by pressing temperature. Pressing temperature impact the soften and excretion of lignin which will function as natural binders to join the fibers of the feestocks to form solid high density briquettes.

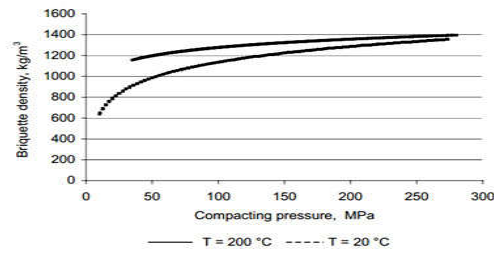
The graph of briquettes strength vs pressing temperature is given below.



Maximum strength is achieved at some temperature nearly to 150 degree Celsius. At low temperature they are weak and may crumble during burning and has shorter burning time and produces less heat.

2) Compacting pressure:-

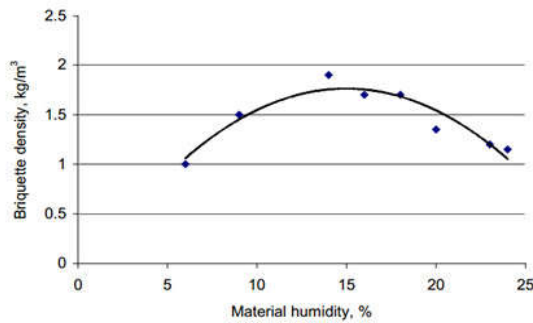
Briquettes strength increases with increasing compacting pressure within a limit. With increase in pressure atmospheric humidity in them decreases and their durability increases with their lifespan. The graph for briquette density vs compacting factor is given below :-



Dependence of the briquette density on the compacting pressure and temperature

3) Moisture content:-

Amount of moisture in the briquettes is very specific that is it should be in some range. Generally moisture content should be in the range of 10-18%. If it exceed the range there are chances of briquettes to get into pieces. Following graph shows briquette density vs material humidity



Dependence of the briquette density on the humidity

## External factors

Besides production factors that are mentioned above there are some other external factors that affect the burning of briquettes. Hence they too play an important role in burning of briquettes. They are as follows:-

### 1) Airflow:

Airflow is the essential need for burning of any substance. Good airflow means good supply of oxygen. It can increase the rate of combustion. Smoky fire or incomplete combustion can take place due to insufficient supply of air.

If there is good supply of air they will burn completely and hence air pollution may reduce to some extent.



Hence good airflow is an essential need for proper burning of briquettes.

### 2) Ash removal:-

After the briquettes are burnt there is the formation of ash. This ash may block the air holes and thus reduces the supply of oxygen. It is necessary to choose briquettes of good quality with low ash content. Even though the briquettes are of high quality ash is formed and it is necessary to remove this ash at proper time and ensure that there is proper supply of oxygen needed for combustion.

Here is a picture showing the ash formed and the oxygen supply hole.



### 3) Briquettes positioning:-

For burning purpose briquettes should be kept in a proper manner. It is the factor that influences air flow and other burning characteristics. The main reason behind its positioning is to meet the need for the supply of air. There should be a path for air passage. Briquettes should be kept in vertical position that is upright position which makes air to pass easily through them. This also increases the surfaces of air and briquettes and also increases the burning efficiency.

**Analysis:-**

It is observed that briquettes are of great use to us. They are less pollutant as compare to other sources of energy. They are good enough as compare to economical sector. Briquettes costs very low that is a negligible amount but coal costs a little higher.

Proximate analysis involves the use of tests, that are aimed on the quality of products. Our analysis shows that

- 1) It causes less pollution than other sources of energy.
- 2) Briquettes should have less moisture content.
- 3) For better quality of briquettes volatile matter content should be less.
- 4) Harmful gases are not released as burning of coal does.
- 5) They are more economical source of energy.
- 6) Any person can have access to it.
- 7) Amount of carbon and hydrogen content is quite satisfactory.
- 8) Neem leaves that are used has other uses besides generation of electricity.
- 9) Rice husk, peanuts, bagasse, has increased the calorific value of briquettes.
- 10) Briquettes can be of small size so can be stored easily.
- 11) Due to less weight they are easy to transport.

**References:-**

Books: - Fuel Briquettes

Using the agriculture residues as biomass briquettes

Guidance of parents, farmers and teachers.