



## WHITE COAL : BEST FROM WASTE

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### ABSTRACT

Bio-Coal Briquetting is the process of converting agro waste into high density and energy concentrated fuel briquettes also called as White Coal. It seems to be very good renewable fuel substitute. This is particularly useful in regions where ample agro-waste is generated and enough fresh grass, feeders etc for animals are available. This also helps farmers to get additional income from their agro-waste.

**Key words:** Bio-coal, White-coal, Coal-briquettes, Agro-waste, Biomass.

### INTRODUCTION

Bio-coal development is becoming important due to many factors including the rising cost of oil, natural gas and electricity and the scarcity of fossil fuels. The need to find alternatives to fossil fuels and reduce Greenhouse Gas emissions has prompted interest in Bio-coals by energy specialists around the world. Bio Coal Briquetting is the process of converting solid agricultural waste into high density and energy concentrated fuel briquettes. These Briquettes also called as White Coal are ready substitute of Coal/wood in industrial boiler and brick kiln for thermal application. Bio-Coal Briquetting plants are of various sizes which converts agricultural waste into solid fuels. Briquettes are ready substitute of Coal/wood in industrial boiler and brick kiln for thermal application. This development can significantly reduce greenhouse gases and heating costs and sustainably assist the development of rural communities.

Groundnut Shell is identified as ideal biomass for Bio-coal production due to low moisture contents, high net energy yield per hectare and low cost of production. These types of Shells are most favorably viewed, as it easily adapts to marginal soils and arid climates with minimal fertility and management requirements. Crushed Ground Nut Shells have a high Calorific value, hence, they are in most demand nowadays in the market. Ramit Bio-Coal ([www.biocoalindia.com](http://www.biocoalindia.com)) having factories at Mumbai, Ahamadabad and Rajkot is specialized in making Bio-Coal from Ground Nut Shells. Bio-Coal made from

Ground Nut Shells by Ramit Bio Coal is a viable energy option suitable for widespread application as it is energetically efficient, economical, convenient and user friendly.

### Raw materials of bio-coal

The cost-effectiveness of Bio-Coal Briquettes as a fuel results from following raw materials: Cotton plants, Forest Leaves, Groundnut Shells, Caster Seed Shells, Cotton Flower, Wood chips, Baggasse, Rice husk, Mustard waste, Arhar stalks, Pine needles Sarkanda, Coffee husk, Sunflower waste, Sugarcane leaves & trash, maize stalks, Bajra cobs, Coir dust, Tree bark, Saw dust, Bamboo leaves, Wild grasses, Shrubs etc.

Above raw material can be briquettes without using any binder. After making Briquettes from above materials it contains calorific value of 3500-4800 k.cal/kg. By applying Bio-Coal, it would help to diversify the economy, as well as allow us to increase energy self-reliance and control the energy costs.

Bio-Coal briquettes are Non conventional Source of energy, renewable in nature, Eco friendly, non polluting and economical. Process of converting agricultural waste to solid fuel is also non-polluting. It does not need to add any binder/chemicals so it is 100% natural. Every year millions of tons of agricultural waste are generated. These are either not used or burnt inefficiently in their loose form causing air pollution. Handling and transportation of these materials is difficult due to their low bulk density. These wastes can provide a renewable source of energy by converting into high- density fuel briquettes without addition of any binder.

Briquettes have high specific density ( $1200 \text{ Kg/m}^3$ ) and bulk density ( $800 \text{ Kg/m}^3$ ) compared to just 60-180  $\text{Kg/m}^3$  of loose Bio-Coal. Photograph of Bio-coal and Briquetting machine are shown below.



**Fig. 1: Briquettes of bio-coal**



**Fig. 2: Briquetting machine**

### Advantages of Bio-coal

Briquettes produced from briquetting of Bio-Coal are fairly good substitute for coal, lignite, firewood and offer numerous advantages:

- Bio Coal Briquettes are cheaper than coal.
- Oil, coal or lignite, once used, cannot be replaced.
- High sulfur content of oil and coal, when burnt, pollutes the environment.
- There is no sulfur in Briquettes.

- Bio Coal briquettes have a higher practical thermal value and much lower ash content (2-10% as compared to 20-40% in coal).
- There is no fly ash when burning Bio Coal Briquettes.
- Combustion is more uniform compared to coal and boiler response to changes in steam requirements is faster due to higher quantity of volatile matter in Bio Coal Briquettes.

### **Applications of Bio-coal**

Bio Coal replaces the following conventional fuels that are used in mass quantities.

- |                |             |
|----------------|-------------|
| 1. Diesel      | 4. Firewood |
| 2. Kerosene    | 5. Coal     |
| 3. Furnace Oil | 6. Lignite  |

Various Industries requiring heating applications in making their products, can make maximum use of Bio-Coal and also save nations foreign exchange, which is used to purchase conventional fuels.

Some industries that are using Bio Coal as a Fuel Source are:

- |                             |  |
|-----------------------------|--|
| 1. Ceramic and refractory   | 8. Brick making units                    |
| 2. Spinning Mill            | 9. Milk plant                            |
| 3. Solvent Extraction Plant | 10. Other Industries of heat application |
| 4. Lamination Industries    | 11. Food processing                      |
| 5. Chemical Units           | 12. Gasifier Systems                     |
| 6. Leather industries       | 13. Vegetable plants                     |
| 7. Dyeing Plants            | 14. Textile Unit                         |

### **Salient features of Bio-coal**

- Easy to burn - lower ignition temperature compared to coal.
- Smokeless burning and sustained combustion and the temperature requirement are achieved due to very efficient combustion.
- Leaves only white ash without any fixed carbon.
- Full heat value is utilized.
- Easy to handle and 1000 kgs of briquettes per cubic meter can be stored and transported against 50 kgs of agro-waste.
- No pollution to the environment and no toxic gas and sulphur emission.
- Very low ash content as low as 2 to 5% compared to 30 to 49% in coal.
- The natural polymer lignin acts as a binder & provides mechanical support, resistance to decay, repels water.
- Due to efficient utilization of agro-waste, agriculturists will get income from their agro-waste.

**Table 1: Comparative cost of steam generation**

<b>Item</b>	<b>Bio-coal</b>	<b>Wood</b>	<b>Imported coal</b>	<b>Lignite</b>	<b>Natural gas</b>	<b>Furnace oil</b>
<b>Calorific value Kcal/Kg</b>	3500-4800	2500	4500	3000-3500	8500	9650

### **CONCLUSION**

Briquetted Bio-coal which is also called as white coal seems to be very good renewable fuel substitute. This is particularly useful in regions where ample agro-waste is generated and enough fresh grass, feeders etc for animals are available. This also helps farmers to get additional income from their agro-waste.

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