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A NEW INVENTION IN CONVERSATION OF COCONUT WASTE INTO ECO FRIENDLY FUEL

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ABSTRACT

India is known for its production in tender coconut. Crops laid throughout the year not like any other fruits or vegetables. The usage of coconut wastage is immense, in temples, homes, drinking purpose, etc., we can see lots of tender coconut wastage shells as waste after using in above places and found them near to street bins and road sides. Our paper is focusing on utilizing that waste into coconut wastage Briquettes. The tender coconut wastage will be mashed into pieces and then pressed by special pressing machine by supplying heat to remove unwanted coir .Briquettes produced by this procedure will be having hallow elliptical shape Thus the briquettes we are looking to replace fuel is formed. The main difference from normal coal to our paper is efficiency and also environment friendly . The solid briquettes can be burnt up to 3-4 hrs. Whereas normal one only light up to 20 minutes at the max . The normal coal produces carbon dioxide, sometimes carbon monoxide and sulphur oxides. But this coconut wastage shell brick lead to clean environment. our aim is to use the waste product into fuel as well as control the dieses which will cause by the wastage of tender coconut wastage in open places.

***Keywords: Briquettes ,Crops, Elliptical, Streets ,Temples, Vegetables,Coconut Wastage*.**

I INTRODUCTION

Coconut wastage once we heard this word, the first country to hit our minds is INDIA. Tender coconut are used on regular basis for several purposes like marriages, ceremonies, temples, drinking purpose, etc., everyone uses the water or white flesh inside it .After the usage it will be thrown out, as waste and this waste is enormous on roads of cities and in villages. Our focus is to utilize this waste into a form as a house hold product and fuel for neighbor villages.

The coconut shell is hard and tough in nature (outside) this coconut shell in villages will be used as fuel for campfires, cooking purposes. Looking deep in that application point of view, it can be utilized as a replacement for coal in villages and also in power plants. To form a raw coconut wastage as briquette, it needs to undergo different process.

II PROCESS FOLLOWED

Figure 1: Process Followed

Shells of tender coconut wastage are gathering and spread on a colander and then fed into a masher ,where all these coconut wastage shells will be cut into pieces of 50mm size. These sizes will be further cut down into 10 mm size. After finishing of sizing the next is separation chamber. The pieces will be collected and dried in sunlight for days and then grind it in powder form. The formed powder will be mixed with water and then compress will form a briquette.

In general coconut wastage shells has a concentration of about 1.2 g/cm3 and is five times harder than the hardest hardwood grown in the India mainly in the villages. The extremely high concentration and hardness make coconut wastage shell an excellent provide for stock for charcoal and activated carbon filters. While the shell is widely used for these applications, the price of charcoal is low and stipulate for activated carbon filters utilize only a small fraction of the coconut wastage shell that is available. The pith's other property, the chemical reactivity, is the subject of this study. Naturally[1] taking place chemicals in the pith allow it to be hot pressed into a binder less particle embark that may be used as a wood substitute in places where wood resources are scant and costly or where there are sell demands for green materials. It has been said that man has made everything from pith except money, but that notion is going to change. Coconut wastage[2] pith will quickly be formed into a viable construction product that will help elevate the value of coconut wastages and improve the profits of millions of coconut wastage farmers around the world. Coconut wastage shells are also used to make charcoal which is used as fuel and this coconut wastage charcoals are outlying better than other charcoals. Coconut wastage shell charcoal[23,24,25] is generally used to fabricate active carbon. Normally on the go carbon is known as the charcoal, which has treated with oxygen's. Active[3] carbon is used widely for removing impurities. This coconut wastage shell charcoals are widely used in purification industry[4] and other industries which active carbon is used.

Availability of source

Table:1.Production of Tender coconut wastage

S.No	Area	Production	Percentage
1	Andhra Pradesh	6.85	6
2	Karnataka	21.51	21
3	Tamilnadu	19.10	19
4	Kerala	50.56	50
5	Maharashtra	1.09	2
6	Pondicherry	0.89	1

These calculations taken depend on the seller in a respective state, the coconut wastage seller and distributors. These may vary from 2 to 3% in production.

In this paper, we are elaborating the machine parts and process to our desired output.

Figure 2: Tender coconut wastage

III LITERATURE REVIEW

As the availability of wood is increasing , most of the countries are turning towards re-usage of residual waste from agriculture or other parts[4] (Grover and Misra ,1996; Tripathi et al . 1998) The residue from the agricultural waste has many disadvantages like low calorific value , difficulty in burning , inventory control , transportation problems. These disadvantages with low density will be converted in to high density fuel in the form of briquettes. When we heard the word [10]Briquettes, which mean it as a replacement or form of coal. And these coal briquettes are commonly used for various purposes like campfire, household and for other purposes. Goldstein, 1981). The production of these residual briquettes has drastically increased with various technologies. On the other hand it is very easy for transportation. (Sugumaran and Seshadir 2009)

They are two types of residues 1. Crop residues 2. Agro industrial residues. Our paper is focusing on agro industrial residual waste , especially coconut wastage shell & coir. During our childhood, we saw dried coconut wastages were thrown in to campfire to prepare food along with this dung[5,6,7] cakes. Taking this into account researchers given a thought how we can make this in a better and that is where our briquettes are in to the picture. After world war II , as there was a scarcity in fuel resources people started using drenched waste paper along with other domestic waste which can be flammable . (Lardinois and Klundert ,1993) . Based on the equipment used to form a briquette , they are categorized into 5 types : manual press , roller press, screw press, piston press according to FAO(1990). A survey was conducted by FAO(1990) on briquette plants established in different parts of the world and the result was a huge failure, due to lack of knowledge on procedure, misusing of spares, implementation failure , lack of government support

Coconut wastage is a dry drupe the outer thin layer is named as exocarp and the middle layer is a mesocarp and a hard inner layer called an endocarp.

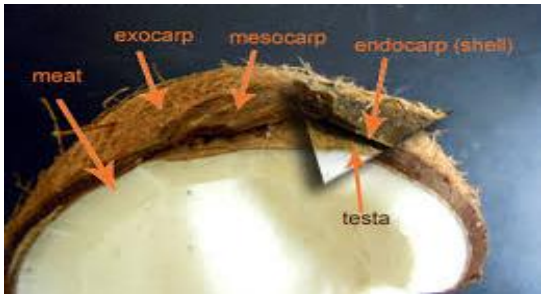

Figure 3: Nomenclature of Coconut wastage shell

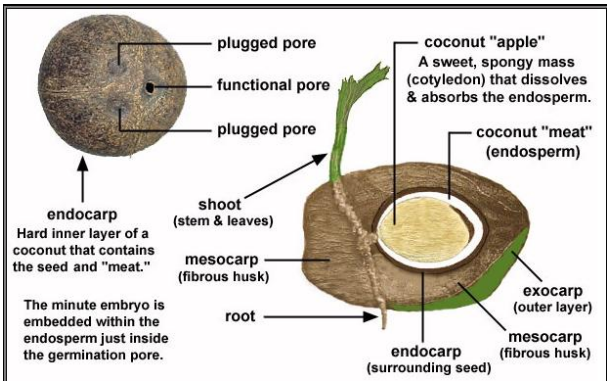

Figure 4 : Description of coconut nomenclature

The nut sizes vary from 147 to 196 mm in diameter and 245 to 294 mm long. The thickness of fleshy layer is about 12.25mm and is known as coconut wastage meat. Coming to cultivation aspect more than 90 countries cultivate the crops of coconut wastage throughout the world. 15.28% of the global area and 19.44% of global production is from India, next to India it is Indonesia.

The coconut wastage meat was chopped into fragments by back and forth rotation of a knife shaped shallow spoon Rey(1995). Mix (1957) designed a machine which removes the shell from the coconut wastage meat. With high pressure water the coconut wastage meat will be separated from its shell by Blandis and Glaser (1973).So far de-shelling machines[11,12,13] are not in to market, and our objective is make an attempt to achieve this.

Briquetting technology is classified into three forms one at high pressure, medium pressure and low pressure. For high pressure compaction is more than enough, in case of medium, compaction along with heating. Finally, for low pressure briquette will be formed by a binding agent.

In this paper , we are following medium pressure compaction to form briquette.

IV CUTTING MACHINE

The main components of the machine are as follows,

- Belt conveyer,
- Damper motor,
- Chopper blades,

The Frame is a structural component which can withstand all the load acting on it .The cutting machine comprises of two shafts intermediate shaft and cutter shaft made up of mild steel . These two shafts are ended by ball bearings. A 3 HP power motor is attached to base for transmitting power from motor shaft to cutting shaft through intermediate shaft. Low speed cutting is preferable as the strength of the coconut wastage shell is low.

The tender coconut wastages dumped in the funnel. A conveyor system connecting the damper and funnel. Th machine consist of Belt Conveyer, Damper Motors, Damper Pistons, and Chopper Blades. This cutting machine specially design for the coconut wastages it is more rigid. It has good material properties like stiffness ductility and corrosion resistant, this machine has more flexibility to operate, this is an operation[18,19] made with the help of motor the following details are given below

Table 2: Machine Specifications

S.No	Name of the component	Specifications
1	Belt Conveyer	8 meters length
2	Damper Motors	a) 5 H.P Motor b) 3 H.P motor
3	Damper Pistons	a) 50 mm Diameter
4	Chopper Blades	10+5

The chopper blades were shown in the figure below , The cutters are framed like mesh , when the coconut wastage from the source moves on to the mesh are , the damper will damp the coconut wastage into pieces , and further ramming will lead to desired output (here 50mm size). The material is mild steel for better accurate and reliable .

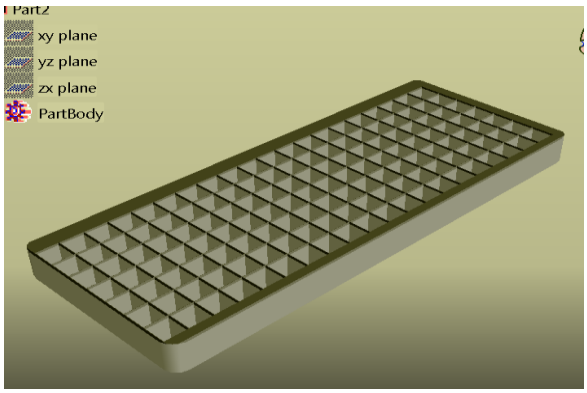

Figure 5: 50mm dia cutter

After shredding to 50 mm size , the pieces of shell are fed to another slicer mesh for further reduction in size i.e., from 50mm to 10mm .

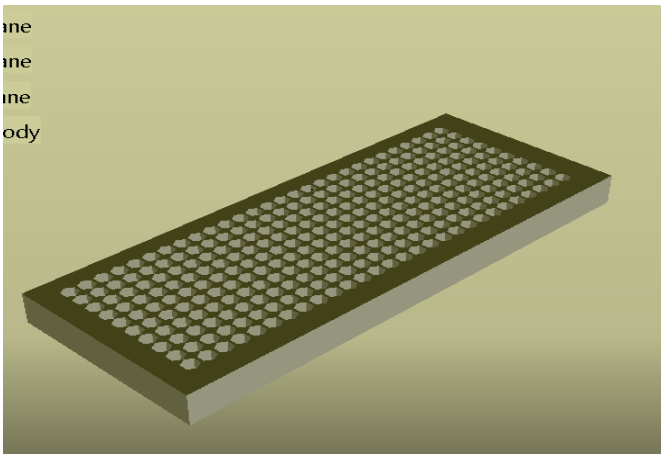

Figure 6 :10mm Dia cutter

4.1 Working Principle

The tender coconut wastage passes over the belt conveyer to major chopper machine. There are the pieces cut into 50 mm size slices or square pieces. The pieces collected in the bottom collector and again passes through the conveyor and rush in 5 mm size pieces in the minor chopper.

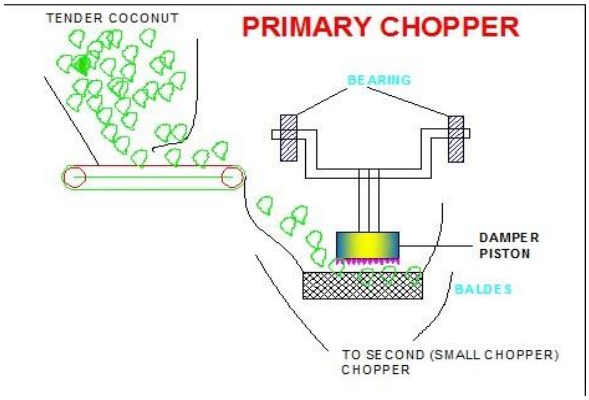

Figure 7:Primary Chopper

Fig:8. Primary Chopper Output

The rate of cutting is 5Kg/minute. Whereas major chopper speed is 12Kg/minute. The cutting pieces are going to kept in the presence of sunlight for 7 to 10 days depend on sun intensity.

Fig: 9 Secondary Chopper Output

V DRYING OF PIECES

The small size briquettes are kept in closed case and applying heat in the absence of oxygen for some time to remove moisture content. In this process, we are placing a vent hole to remove the gases which are going to generate in this process. Now those briquettes we can use like a fuel for small scale industries which are going to run by het applications. An industrial-scale bunch fluidized bed dryer was used to dry lightly chopped coconut wastage pieces. The effects of different operating parameters, i.e., the values and pattern of air velocity and temperature, on the drying kinetics and some selected quality attributes of dried coconut wastage viz. color and surface oil content were then examined. It was found that the color of the dried product was affected regularly by the air temperature, while the size of surface oil was affected regularly by the air velocity. The surface oil comfortable of the product dried by any tested conditions was still higher than that of the reference sample, which is accepted by the market.by sending the coconut wastages into a heating room then it is placed for some

time keep with warming in big quantities with in shells. the traditional method of reducing the moisture content of the coconut wastages is by open sun drying. During traditional open sun drying, the farmers spread coconut wastage on mats, cement floors, roof tops or even on soil along the roadsides so as to expose to solar intensity until the completion of drying. In this method the samples are exposed to direct sun light and as a result the coconut wastage pieces heat up and the internal temperature[15,16] rises without regulation which destroy color, vitamins and tang giving rise to low quality production that cannot compete with the mainland product thereby ensuring quicker drying of the products than the open sun drying method by sending to the heating room.

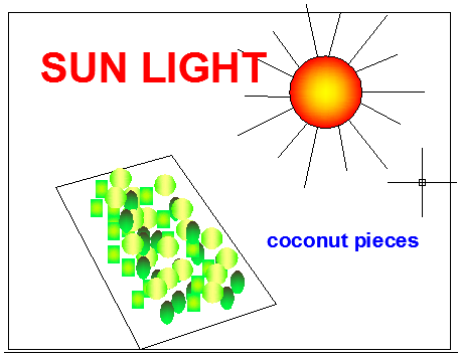

Fig: 10.Sun Light Application

VI RESULTS

Calorific values and other relevant information mentioned in the following table. These briquettes[20,21,22] can replace the coal usage and LPG usage in sun rising industries which are running on Thermal applications. Uses include domestic applications because of its less smoke and odor.

Table:3.Specifications of outputs

S.No	Name	Specification
1	Calorific value	2800-3600Kcal/Kg
2	Ash content	10.5%
3	Moisture content	8.5%
4	Volatile matter	17-20%
5	Fixed carbon	65%-73%
6	Foreign Matter	11-13%

6.1 Advantages

1. Freely available.
2. Control the growth of mosquitoes in urban areas.
3. Avoid normal wood with usage of this one.
4. Low emissions.
5. Good smell output.
6. Low ash content.
7. Easy to travel because of its cross section.

VII CONCLUSION

We framed hallow elliptical briquettes by using our machine. The calorific value of this briquettes is much higher than normal wood and easy to carry. The operational cost is less compared to bulk quantity. The fuel produced is a good replacement for coal applications.

Figure 11: Elliptical Briquettes

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