

# Working of Agriwaste Briquette Making Machine

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## ABSTRACT

An assembly of complete manually operated Agriwaste Briquette making Machine. The machine is operated by foot pedal. The operator will press the foot lever by using the foot. In this paper an attempt is made to describe a complete working principle of an agriwaste briquette making machine. The testing reports for calculating the calorific values of different agriwaste samples.

**Keywords :** Working Principle, Calorific Values.

## I. INTRODUCTION

Figure 1 shows the assembly of the complete agriwaste briquette making machine. In this machine operator will press the foot lever by using the foot. That foot force will transmit towards ratchet through the intermediate linkage that will convert the foot pressure into the rotation of shaft by using the ratchet mechanism.

On same shaft at opposite side small sprocket of chain drive will be mounted which will rotate the other shaft by using the chain drive. The second shaft will be mounted on quarterly threaded shaft which will convert the rotation of shaft in vertical motion of other shaft. That vertical motion will create the pressure on the die by using punch for creating the briquette.

Some testing reports of the different agriwaste samples for calculating their calorific values.

## II. NAME OF COMPONENT AND ASSEMBLY

**Hopper:** the hopper is used to feed the agriwaste in the die for a fine agriwaste briquette.

**Ratchet and Pawl:** is a very simple device to allow a vertical rack shaft of the machine to turn only in one way. The pawl and ratchet mechanism plays a vital role in providing one way transmission and safety against heavy loading conditions.

**Rack and Pinion Box:** is a device for converting rotary into linear motion and vice versa,

**Channel:** is used to mount the rack shaft assembly, rack and pinion assembly, ratchet and pawl assembly, chain drive and also the linkages and pedal mechanism.

**Die:** is used to get the fine square shaped agriwaste briquette. There is also a removable plate inserted to the die.

**Punch:** is used to compress the agriwaste material poured in the die plate with the help of pedal mechanism.

**Pedal Mechanism:** This mechanism consists of the parts like pes plate for keeping the foot on it and intermediate linkages to transmit the force applied by human foot to the ratchet and pawl mechanism. Pivot and restraining spring arrangement is used for bringing the intermediate linkages to its original position after removing the force applied on the pes plate.

**Hopper Base Plate:** is used for filling the agriwaste mixture into the die. It has two slots one for filling

the agriwaste mixture into the die and the other slot for covering the hopper hole so that the remaining mixture inside the hopper will not fall down and also it has one handle to pull and push the hopper base plate.

**Supporting Stand:** is used to mount the other assemblies of the agriwaste briquette making machine designed as per the standing position of the human ergonomics.

**Chain Drive:** is a way of transmitting mechanical power from one place to another. Most often, the power is conveyed by a roller chain, known as drive chain or transmission chain passing over a sprocket gear, with the teeth of the gear meshing with the holes in the links of the chain. The gear is turned, and this pulls the chain putting mechanical force into the system.

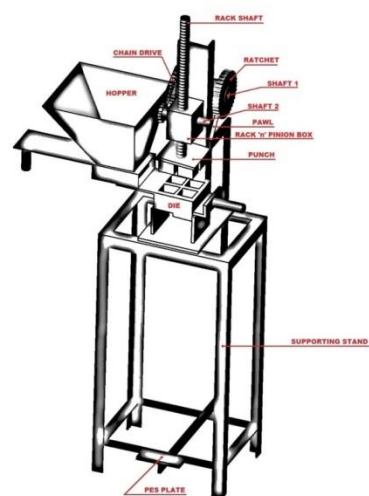
### III. WORKING PROCEDURE OF AGRIWASTE BRIQUETTE MAKING MACHINE

The figure 1 shows the assembly of Agriwaste Briquette Making Machine Operated by Foot Pedal. Means the machine has one pes pedal so that it can be operated manually. In Agriwaste Briquette Making Machine we require one operator to operate the machine. This machine can be placed in any place. In village, in the agriculture farm, in industrial area etc.

First we required some small size particles of the agriwastes material as per our die size is small. We also require some adatives for binding purpose such as gum of tress as it is easily available in villages and forests, we can also use wet cow dunk for binding the material or also the starch can be used for binding. The operator will make a mixture of agriwaste and the binding material in one pot. Then he will pour the mixture in the hopper, there is one hopper base plate to fed the mixture into the die. The operator will pull the hopper base plate with its left hand towards the die so that the mixture is filled into the die. Then he will push back the hopper base plate back to its original position with the help of a handle welded to the hopper base plate. Then he will rotate

the ratchet in clockwise direction to remove the locking plate of ratchet so that the rack shaft can come down to compress the mixture inside the die. He will turn the pawl for locking the ratchet so that it can transmit the motion only in one direction. After that he will press the foot lever by using the foot. That foot force will transmit towards ratchet through the intermediate linkage that will convert the foot pressure into the rotation of shaft by using the ratchet mechanism.

On same shaft at opposite side small sprocket of chain drive will be mounted which will rotate the



**Figure 1.** An Assembly Of Agriwaste Briquette

Making Machine Operated By Foot Pedal other shaft by using the chain drive. The second shaft will be mounted on quarter threaded shaft means the rack shaft which will convert the rotation of shaft in vertical motion of other shaft. That vertical motion will create the pressure on the die by using punch for developing the fine square shaped compressed agriwaste briquette. Then he will again unlock the ratchet and pawl so that the die punch can be pull up by giving anticlockwise rotation to the ratchet. Then he will remove the base plate of the die box with the help of the linkages handle. Then slowly press the pedal and the required agriwaste briquettes will fall down on the stand and our superb useful product is ready. Then simply dry it and store it as a fuel.



Figure 2. Actual Produced Agriwaste Briquette

#### IV. RESULTS OF TESTING OF AGRIWASTES

Some testings for calorific values of the actual produced agriwaste briquette of different agriwaste samples such as chana agriwaste, rice agriwaste and wheat agriwaste are done in the Anacon Laboratories PVT. LTD. ISO 9001:2008, OHSAS 18001 CERTIFIED ORGANISATION, Recognized By Ministry of Environment & Forests (MoEF), New Delhi Accredited by Quality Council of India By NABET-Environment Impact Assessment Studies Authorised by Food Safety & Standards Authority of India Under FSS Act Approved by Bureau of Indian Standards (BIS). Following are the test reports of the calorific values of the different agriwastes samples.

### 1. Calorific Value Of Chana Agriwaste



Figure 3. Briquette of Chana Agriwaste

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ANACON LABORATORIES PVT. LTD.  
ISO 9001:2008, ISO 14001:2004, OHSAS 18001 Certified Organization,  
Recognized By Ministry of Environment & Forests (MoEF), New Delhi  
Accredited By Quality Council of India By NABET - Environment Impact Assessment Studies  
Authorised by Food Safety & Standards Authority of India Under FSS Act  
Approved by Bureau of Indian Standards (BIS)

TEST REPORT

Page 1 of 1

|   |   |   |
|---|---|---|
| Issued To:<br>Ms Arpita Gulhane<br>P. No. 9, Sunvashi Layout,<br>Sarasahi Nagar,<br>Near Pank Pouch factory, Ghogali,<br>Besa, Nagpur-440034.<br>Attention: Ms Arpita Gulhane<br>Contact No. - 9881680288 | Sample Inward No. 1716N-88-1<br>Inward Date 21.07.2017<br>Reference Verbal Communication<br>Reference Date 21.07.2017 | Analysis Start 24.07.2017<br>Analysis End 25.07.2017<br>Sample Category General |
|---|---|---|

|  |  |                            |
|--|--|----------------------------|
| Sample Name<br>Agriculture waste Briquette | Description / Physical condition<br>Chana Agriwaste  | Quantity Received<br>100 g |
| Sample Collected By<br>Ms Arpita Gulhane   | Sample Preparation, if any<br>Representative sample was air-dried, pulverised & sieved through 0.212mm sieve |                            |

Tests Required : Gross calorific value

| S.N. | Test Parameter        | Measurement Unit | Test Method           | Test Result |
|------|-----------------------|------------------|-----------------------|-------------|
| 1    | Gross calorific value | Kcal/Kg          | IS 1350 (Part 2) 1970 | 3592        |

NOTES: \* Please see statement "Original Test Report" to confirm the authenticity of this report. \* Results shall be referred to tested samples and applicable to tested parameters only. \* Test report shall not be reproduced except in full without prior written approval of Anacon Labs. \* Liability of Anacon Labs is limited to involved amount only. \* Non-parametric and perishable samples shall be disposed off after 90 days and 15 days respectively from the date of issue of Test Report, unless specified otherwise. \* Result is on air-dried basis.

REMARKS: As requested by the client, sample was tested for above parameter only.

Verified By  
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Figure 4. Test Report of Chana Agriwaste

### 2. Calorific Value Of Rice Agriwaste



Figure 5. Briquette of Rice Agriwaste

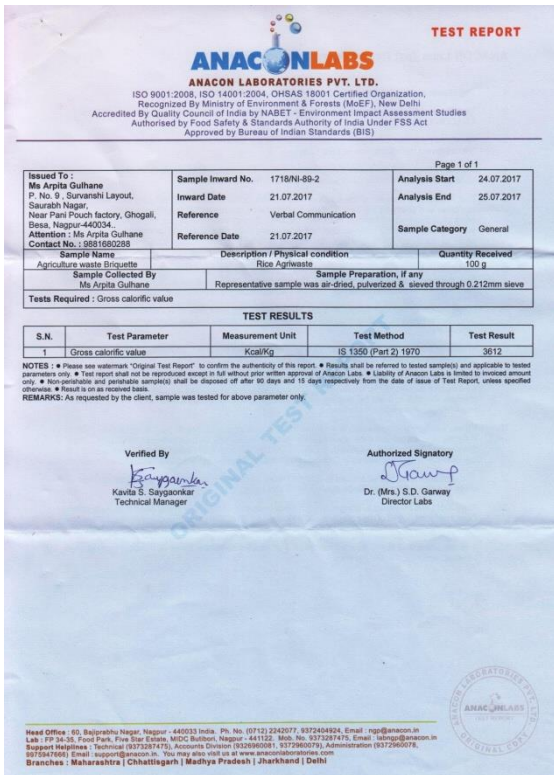


Figure 6. Test Report of Rice Agriwaste

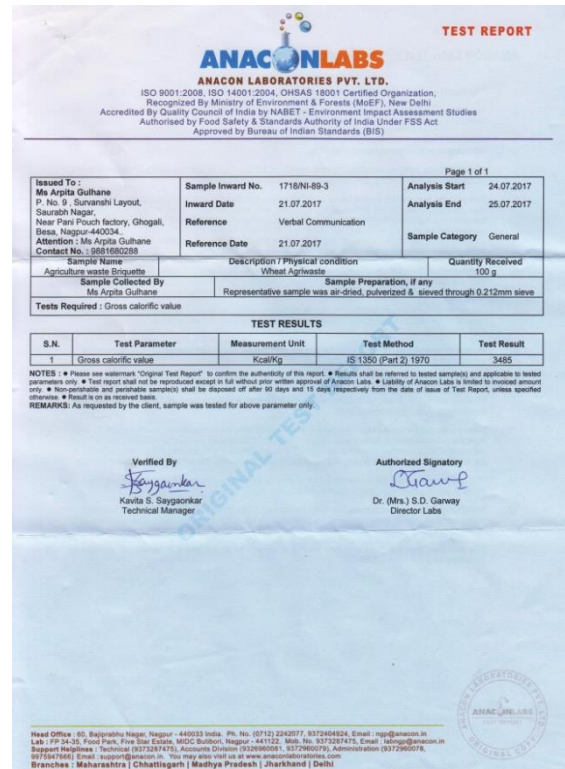


Figure 8. Test Report of Wheat Agriwaste

## V. CONCLUSION

### 3. Calorific Value of Wheat Agriwaste



Figure 7. Briquette of Wheat Agriwaste

From the above study, it is observed that by arranging different mechanical components along with different mechanisms, machine can be made efficient to making agriwaste briquette to control the pollution and fulfilling the energy demand. Thus human efforts to use and disposed the agriwaste can be reduced as well as pollution also, because using the agriwaste to make the fuel briquette as an effective energy source and way to earn money.

## VI. REFERENCES

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