

Design OF PORTABLE DE-HUSKING MACHINE FOR MILLETS USING SOLAR ENERGY

VISHWAS S¹, VISHNU TEJA C², CHETAN S.K³, VINAYAK BUDIHAL⁴

^{1,2,3,4} students, B.E Mechanical, New Horizon College of Engineering, Bangalore, India

Abstract - An Millets contain a external cover called husk. Removal of the husk is named De-husking. Manually De-husking is sort of difficult and also requires lot of human efforts and there'll be damage to the crops. to beat the problem , machines are developed. Existing/Conventional machines have the drawbacks like Expensive, Bulky, Maintenance & Heavy in size, different machines are to be used for various sorts of crops, wastage of millets, etc. Hence an effort is formed to beat all the difficulties by developing a machine which is employed to separate millets from its era and also De-husk all kinds of millets belonging to a family.

Key Words: DEHUSKING MACHINE, MILLETS

1. INTRODUCTION

A dehusking a dehusking machine is an agricultural machine. It's used to automate the method of removing of millet husk from millets.

By this machine millets were completely separates with none damage of millets and it can provide faster work rate. And it's very helpful for former [millet growers] .this de husking machine doesnt need skilled labors.

Millets are highly variable small-seeded grasses, widely grown around the world as cereal crops or grains for fodder and human food. Millets are important crops within the semiarid tropics of Asia and Africa (especially in India, Mali, Nigeria, and Niger), with 97% of millet production in developing countries. The crop is favored because of its productivity and short season under dry, high-temperature condition

Origin of the Millets, Millet crops are indigenous to several parts of the planet. But, the evolution of this sort of staple crop had its origin in Africa. This is often evident from the huge number of untamed and cultivated kinds of the plants found within the country. History is additionally replete with the recognition of those food items, because it has been seen that the millets had existed since thousands of years ago as staple food of individuals. It's considered that millets had been in cultivation in East Asia for quite 10,000 years now

Millet formed important at prehistoric diet in India, China, and Korean societies. Foxtail millets were important crops beginning within the first Neolithic of china. variety of earliest evidence of millet was found in north China

Millet Production in India, India is that the most dominating nation when it involves agriculture. millets require little or no water, Indian subcontinent is documented for the vast

amounts of areas under production of millets of various types like paddy, ragi , etc. They typically require dry high temperatures, in order that there's good production of the plant.

IIMR coordinates and facilitates millets research at national level through All India Coordinated Research Projects on Sorghum, pearl millet and tiny Millets and provides linkages with various national and international agencies

2. LITERATURE SURVEY

Rice-Huller or Rice De-husking machine It's first introduced by Germany Based Brazilian Originated Engineer Evaristo Comrade in 1885.Its uses steel roller to remove the husk.

Advance technology type of rice huller. Other sorts of huller includes the disk or cone huller which uses an abrasive rotating disk to first remove the husk before passing the grain to conical rollers which polish it. Rubber rollers could also be wont to reduce the quantity of breakage of the grains. So increasing the yield of highest quality head rice, but the rubber rollers tend to need frequent replacement, which may be a big drawback.

Corn De-husking machine A corn de-husker may be a machine that husks corn to reveal the Kernels (central part) earlier this process is completed by manually People rotate the wheel and removes corn to reveal the central part. This is a mechanical type corn De-husking machine.

Millet de-husking machine Millet de-husking machine de-husk the outer layer of millets. They use roller, blower, separator then the polishing of millets is completed.

Small millets comprising six species are grown in India over 2mil. Mostly in semi-arid, hilly and mountainous regions. India has the third largest area under small millets cultivation within the world. TN and Orissa are the one among the leading producer of millets in India .A case study have been developed for these two states.

Millets are water saving, drought tolerant crops. This quality makes them India's food farming future. Millets are often cultivated without using groundwater or surface irrigation. Most millets edible stalks which are the foremost favored fodder for cattle. Many a times, crops such as sorghum and pearl millet are grown only for their fodder value, Initial surveys in kolli hills showed that the millet has been under increasing threat from tropica. The production of millet gives great strength in TN and Orissa. About 11% millets are

produced in these two regions of India. These both states produce mainly finger and tiny millet in great strength. They have great sites for the assembly of millet in great deal. It has great facility and areas to supply millet in huge quantity.

Yield enhancement from improved practices Grain and yield results from all the 87 demonstrate are quite encouraging majority of the demonstrates (11%) used intercrops while the rest pure crops of each of three millets. The yield from improved practices was consistently and significantly above that from the normal practices of cultivation. The increase in individual's trails ranged from 11.77 with mean increase of 39%.

INCREASE IN INCOME GENERATED FROM IMPROVED. Increase in productivity achieved over by traditional practices which used local varieties by improved agronomic practices using farmer selected varieties. A comparison among demonstrations using pure crop of millet and millet based-intercrops showed that they supply higher income about 12-23%. In actual terms, the extra income generated, on a mean was INR 4.5/ha within the case of ragi based-intercrops and 2733 within the case of pure ragi crop.

3. OBJECTIVES

- a) Enhancing the merchandise and productivity through the utilization of higher seeds and improved cultivation practices.
- b) Strengthen local capability for product.
- c) Introducing drudgery-free grain process technology.
- d) Creating the awareness on importance of millet for food and nutrition security.
- e) it's free from pest infestation.
- f) it's fully digestible.
- g) It stabilizes food quality, uniform, sized quality.
- h) Currently in rural places there's a serious issue with availability of laborers. This machine will help farmers to attenuate the dependency on laborers for millets de-husking which is time consuming and a labor intensive process.

4. MAIN COMPONENTS OF MILLET SEPARATING AND DE-HUSKING MACHINE

a) Hopper -Hopper Hopper is the upper part of the machine and it is made up of mild steel where millet spike is feed through the hopper, through hopper it will reach to roller



Figure 1: hopper

b) Rollers -It is an tool. In which cylindrical in shape, that rotates about central axis and is employed in various machine and devices to maneuver, flatten, or spread something. This tool is employed to separate the millet from spike within the millet separating chamber.

In which one side of roller face is covered by rubber, that helps to smoothly remove of spike from the millets by using rubbered surface separation of millets from spikes without damaging the millets can be done easily

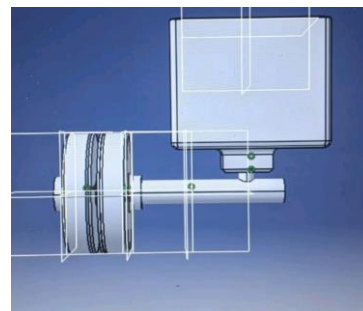


Figure 2: Roller

c) Mesh – The welded wire mesh may be a metal screen that's made from low steel wire or chrome steel wire. It is available in various sizes and shapes. It is widely used in agricultural, horticultural and food procuring sector

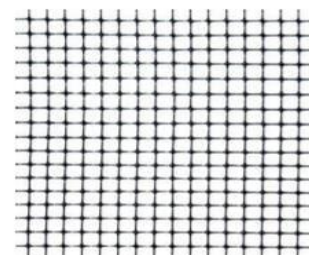


Figure3: Mesh

d) Vibrator-Vibrator is a mechanical device to generate vibrations. The vibration is often generated by an electric motor with an unbalanced mass on its driveshaft and its placed below the mess



Figure4: mechanical vibrator

e) **Solar panel** – solar panel are the device which are absorb the suns ray and convert into the electricity and the electricity stores in solar batteries which are attached to the panels..



Figure 5: solar panel

5. CONSTRUCTION AND WORKING

In dehusking machine, hopper is the upper part and rollers are present in face to face direction and mesh is present below the rollers , vibrator is attached to mesh and solar battery are attached to 1hp motor and 1kw of solar panel is attached to solar batteries

In working operation, firstly the millet spike is to fed the hopper. The hopper is aligned with the rollers. There are sets of roller are used with rubber padding to separate the millet from spike. The roller is driven through belt which is connected to the motor and the motor was connected to battery and battery to solar panel. when the solar panel absorbs the sunlight as a source of energy to generate direct electricity and the electricity was stored in solar battery through the batteries to motor is connected and rollers are connected to motors through belt when the motor starts rotate set of roller will completely remove the millet from the spike. In next stage, the millet will come to manually vibrating meshes. There are 3 different sizes of meshes are used here. The size of upper mesh is going to be coarser than other two. The different size of millets were separated in several mesh and thus the husk is collected on mesh which is manually removed. In next stage, the millets come to the De-husking drum which is mounted on the lower part of the machine. By the acceptable mechanical movement of De-husking drum the millet husk is totally faraway from millet and therefore the De-husking process is completed.

6) DESIGN

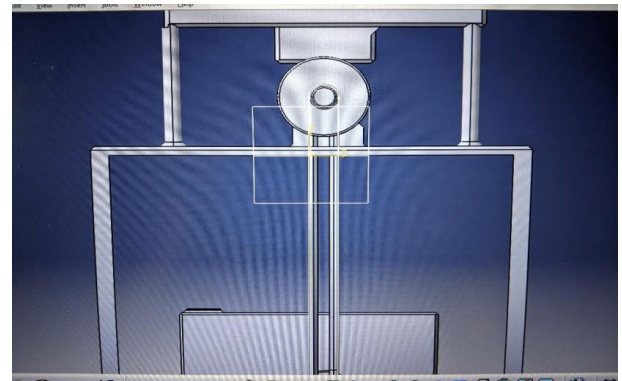


Figure6 : catia model roller attached to motor through belt

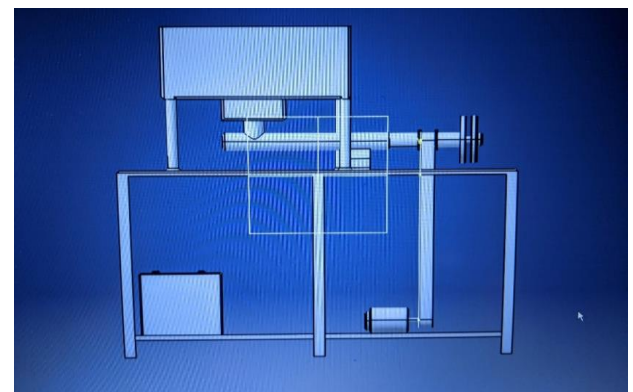


Figure7: Catia model of dehusking machine

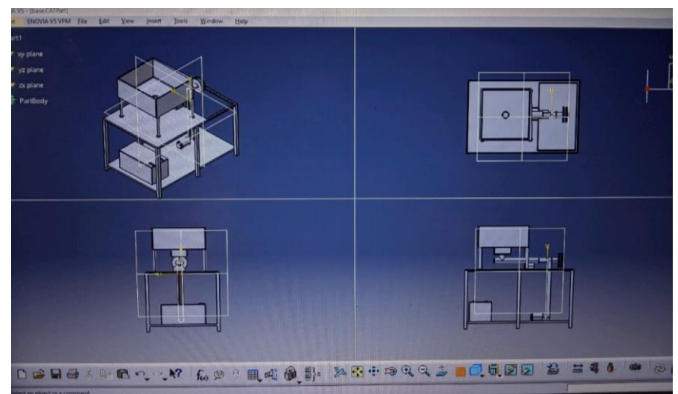


Figure8: different view of dehusking machine

CALCULATION

The device is incorporate with 1 HP motor, then

$$1HP = 0.735KW$$

$$= 0.735 \times 1000 \text{ w}$$

$$1 HP = 735 \text{ w}$$

Using motors catalog for 1 HP motor,

$$N = 1440 \text{ rpm}$$

$$P = 2\pi NT / 60$$

$$0.735 \times 1000 = (2\pi \times 1440 \times T) / 60$$

$$T = (0.735 \times 1000 \times 60) / (2\pi \times 1440)$$

$$T = 4.874 \text{ N-m}$$

$$T = 4.874 \times 1000 \text{ N-mm}$$

$$T = 4874.12 \text{ N-mm}$$

7. CONCLUSIONS

Since there is a abundance of millet which isn't getting used, by the principle of millet De-husking the millet being wasted are often utilized which may be used as food. Millets like rice, wheat which get deplete in coming decades due to heating. So there's huge demand for Millet De-husking machine. This machine can provide faster work rate and fewer human interaction. This machine is predicted to extend the millet production, hence a further income to millet growers. It is useful to millet growers in some ways it doesnt need skilled labor, rapid, safe operation and straightforward maintenance. It are often easily assembled and disassembled and it are often carried from one place to a different.

8. ACKNOWLEDGEMENT

We wish to express our sincere gratitude to "Dr. MS Ganesh Prasad, Dean, Prof. & HOD-Mechanical Engineering" for his constant encouragement and cooperation. We extend our deep sense of gratitude to our teacher and guide "Mr. Nagabhushana Narasappa, Assistant Professor, in the Department of Mechanical Engineering" NHCE, for his valuable suggestions, guidance, care & attention shown during the planning, conduction stages of this work. We thank all the teaching and non-teaching staffs, our classmates and friends for sharing their knowledge and valuable suggestions.

9. REFERENCES

- [1] Based farming system a case study. Women in Agriculture - Technology Perspective. Prasad, C. and Shri Ram, eds. International
- [2] Federation for Women in Agriculture (IFWA), Krishi Anusandhan Bhawan (ICAR), Dr. K. S. Krishnan Marg, New Delhi-110 012, India.
- [3] Nyanteng, V.K. (1990). Women in West African Rice production Systems-issues for research and development. Women in Agriculture -Technology Perspective. Prasad, C. and Shri Ram, eds. International Federation for Women in Agriculture (IFWA), KrishiAnusandhan Bhawan (ICAR), Dr. K. S. Krishnan Marg, New Delhi-110 012, India

10. BIOGRAPHIES



VISHWAS S
Studying Mechanical Engineering in NHCE, Bangalore, Karnataka.



VISHNU TEJA C
Studying Mechanical Engineering in NHCE, Bangalore, Karnataka.



S.K.CHETAN NAIK
Studying Mechanical Engineering in NHCE, Bangalore, Karnataka.



VINAYAK BUDI HAL
Studying Mechanical Engineering in NHCE, Bangalore, Karnataka.