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RESEARCH ARTICLE

DESIGN AND FABRICATION OF PEPPER SEPARATOR MACHINE

***Dr. Hemaraju, Pallavi, K., Shivaprasad, M., Madhu, K.M. and Sandesh, B.S.**

Dept of Mech Engg, BGSIT, BG Nagara, Karnataka, India

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ABSTRACT

Agriculture is the backbone of India's economy. Application of technological innovation to improve the productivity in agricultural activities is a continuous process. Nowadays, agriculture related engineering projects have gained a lot of scope because of the need and usefulness in uplifting the quality of work. Pepper separator machine is an agriculture related project for facilitating efficient separation of pepper berries from its spikes. There are many problems associated with existing design of pepper separator machine like high cost, low efficiency, low capacity, and more processing time. One of the main disadvantages of the existing machine is that they damage the berries because of the use big metallic parts in them. To address this problem an attempt was made to replace some of the big metallic parts by small metallic parts and automate separation of pepper. Thus, pepper would get threshed between the stationary and rotary conveyer and get separated without damage.

Key words: Pepper, Machine, Shaft etc.

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INTRODUCTION

Pepper has been used as a spice since prehistoric times is popularly known as "King of All Spices". It is the whole Dried fruit of the vine *Piper nigrum,* a native crop of tropical region. In India, it is extensively cultivated in the Western Ghatsregion and has always reigned supreme in the production and export of this most exotic and sought-after spice. The crop is harvested mainly in the months of December and January at proper maturity of the berries, as it greatly influences the quality of the final product. Harvesting is followed by threshing for separation of the berries from spikes. The traditional method used for this has been by trampling with legs, which is crude, tedious, laborintensive and unhygienic. To overcome this problem several types of mechanical pepper threshers have been designed and developed. Over the past few years, many individual plantations have developed varieties of pepper threshers for their usage and most of these machines make use of rotating metallic drum technique of threshing. The disadvantage of this technique is that the usage of heavy metallic parts causes damage to the berries. Therefore, it is necessary to develop a pepper thresher and separator which would overcome all the drawbacks mentioned above.

Objective and Working Principle

The current project was carried out with the objective of designing and fabricating a cost effective mechanical Pepper separator machine which would reduce the berry damage during threshing process and automate the separation process.

The set up consists of a shaft covered

With conveyer with Mesh plate on its periphery and powered by an electric Motor. Surrounded by a stationary electric motor which also had an hopper. Pepper spikes with berries were fed in into the machine through the hopper. Pepper would get threshed between the stationary and rotary conveyer there by separating the berries from spikes. The bottom of the machine is provide with the mesh plate through which only pepper seeds would pass and the spikes would come from the passage. After separation pepper seeds *would be collected from the two* outlets. One is pepper tray where the separated pepper will be out and another passage is used to take out the spikes.

Design and Fabrication

Shaft Speed

$D1 \times N1 = D2 \times N2$ (1)

$50 \times 1440 = 260 \times N2$

$N2 = 277$ rpm

Where D1, D2= Pulley diameters

N1, N2= Shaft speeds

Corresponding author: **Dr. Hemaraju,**
Dept of Mech Engg, BGSIT, BG Nagara, Karnataka, India.

Power Requirement

Depending on the free volume of space inside the drum, the weight of the pepper berries and spikes that can be fed into it at

a time was found to be = 1.5Kg*9.81= 14.715N

Maximum threshing force per spike = 0.735N

Average weight of conveyer = 2.6kg = 25.50N

Force required for threshing 1.5 kg of pepper stalk

$F = 0.735 \times 14.715/25.50 = 0.424N$

Torque produced

T = F ×R (2)

T= 0.424×160 = 67.86N-mm

Power required for threshing

P = T× NN/ (9.55×106) (3)

P = 67.862× 300/9.55 × 106 = 0.020 kW

Based on the power value, a 0.5HP electric motor was selected.

Selection of Belt Drive

V-belt drive was selected to transmit power from the motor to the machine shaft, Depending on the power from the motor two V-belts of type A were selected

CAD model and Assembly

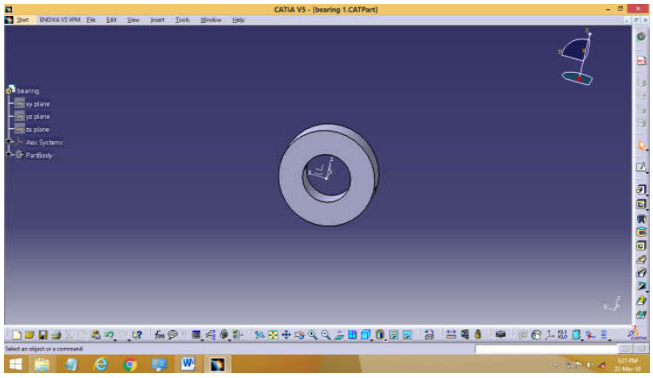

Figure 1. Bearing

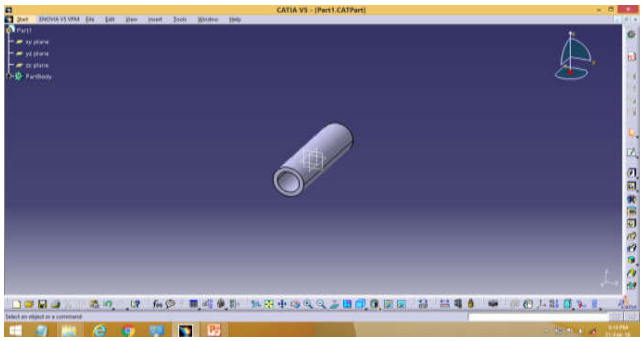

Figure 2. Conveyer

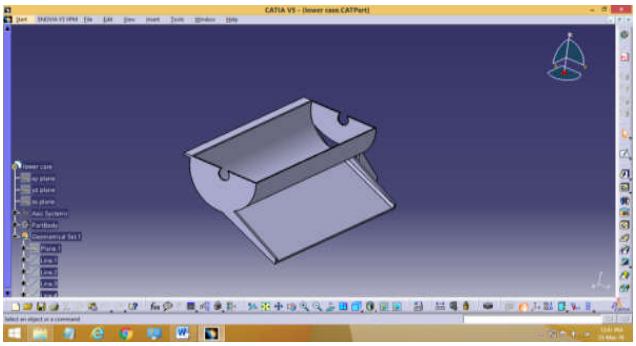

Figure 3. Lower case cover

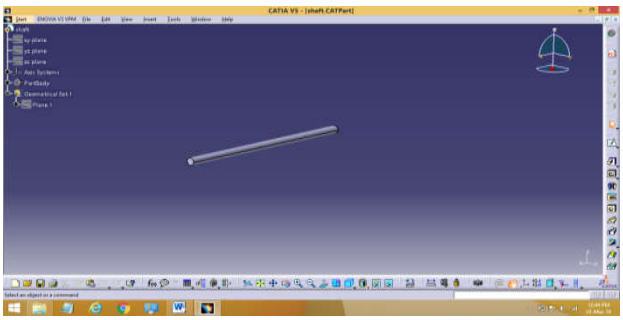

Figure 4. Shaft

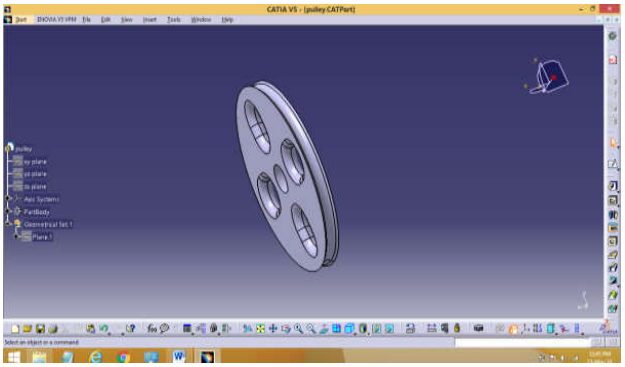

Figure 5. Pulley

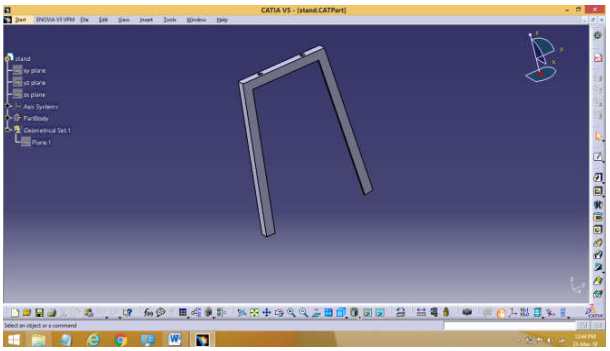

Figure 6. Stand

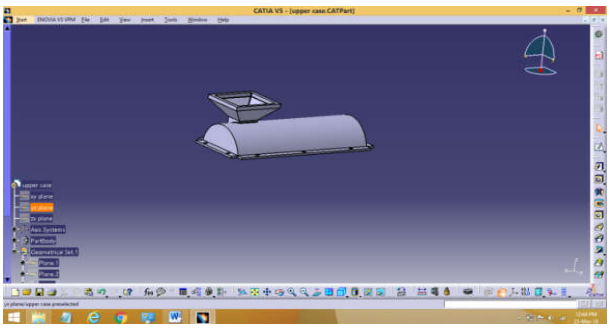

Figure 7. upper case cover

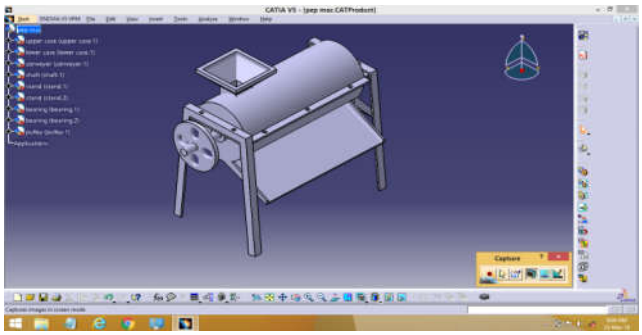

Figure 8. Assembled Model

Fabricated model

Figure 9. Fabricated Model

Testing for Efficiency

The fabricated model was tested for efficiency. It was found that during the test, on supplying 2 kg of pepper spikes into the machine which contained around half kg of pepper berries, an output of 470 grams was obtained which amounted to and efficiency 94%Similar results were obtained for different weights of pepper spikes fed into the hopper.

Conclusion

The fabricated model was found to be efficient upon testing. Also, it was possible to fabricate the machine at a reasonable cost which could further be reduced during mass production. Above all, the berries were not damaged during threshing which was the major objective of the project

REFERENCES

Design data hand book. K. Mahadevan and Balaveerrareddy. 4th Ed., CBS Publishers., 2017.

Heart win Amala Dhas, P. and Korikanthimath, V S. 2003. Processing and quality of black pepper- a review, *Journals ofspices and Auromatic crops*, Vol. 12(1), 1-13.

Khurmi, R S. and Gupta, J K. 1979. A textbook on Machine Design, 2nd ed., S. Chand publisher,

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