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Fabrication of Vegetable and Fruit Washing Machine

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ABSTRACT: The first and most important step in producing and distributing fresh fruits and vegetables is washing. Before being transported from the farm to the market, fruits and vegetables including carrot, radish, ginger, tomato and mango need to be pre-cleaned. There isn't yet a primary, cost-effective processing plant for small farmers. A washing machine for fruits and vegetables is emerging. In order to create a safe and palatable crop for customers, it is necessary to clean crops like potatoes, carrots, radish, tomatoes, and mangoes after harvesting to remove soil, pesticides, clay particles, and other microbiological contaminants. Typically, Indian farmers use old-fashioned methods to clean their fruits and vegetables, which have been shown to be less efficient and time-consuming and require additional labour. Therefore, to avoid these issues and address the issue of small-scale farmers, our project could be the best option.

KEYWORDS: Washing machine, Conveyor, frame, Agricultural, Nozzles, Economical.

I. INTRODUCTION

India is the second-largest vegetable producer in the world. During the years 2021–2022, India will produce a total of 204.61 million metric tonnes of vegetables on an area of 11.28 million hectares and 107.10 million metric tonnes of fruits on an area of 7.09 million hectares. Fresh produce such as fruits and vegetables is an essential part of the human diet. Vegetables must be washed after being harvested from the field to prevent rotting. Before being transported from the farm to the market, they must be pre-cleaned. Prior to sorting, grading, weighing, and market sale, it is required to wash fruits and vegetables to eliminate soil and other foreign matter. At the moment, the grower brings the fruit to the market either unwashed or just partially washed in unhygienic ways, such as washing with dirty feet and dirty hands using polluted water from ponds, sewers, streams, etc.

The main reason for developing an fruit and vegetable washer is to improve the quality of the produce, save time and money on labour, and increase the speed and efficiency of sample handling. This article discusses the requirement for, design factors for, and performance assessment of a small-scale automated fruits and vegetable washer.

II. LITERATURE REVIEW

The following details were offered in the few research studies that were published on the idea of fabrication vegetable washing machine.

Ms. Anjali Meshram et.al. prepared on a Design and Development of Rotary Type Vegetable Cleaner. This includes design calculations and the creation of a machine to clean vegetables using CAD software techniques. The project entails a thorough analysis of the machine and gathering data from the sources that are available on vegetable cleaner machines. According to the needs of the business, a CAD model of a vegetable cleaner was created for the current study. then a vegetable cleaner machine finite element analysis.

Ganesh M R et.al. have presented the Fabrication of Root Vegetable Washer. This machine came to the conclusion that it was more effective than the conventional method, saving money on labour costs and time. The amount of material to be washed, the depth of the water, and the machine's capacity, efficiency, and performance index all varied. This machine's design resembles a barrel.

Dang Hoang Minh et.al. presented a paper on Design, development and performance evaluation of a new-type fruit vegetable washer. In this work, a brand-new type of fruit and vegetable washer was introduced. The way that this washer differs from other commercial models is that it uses a slider-crank mechanism with a spring to cause the drum

to shake horizontally while still rotating. Following a number of kinematic, dynamic, and structural analyses, the first washer prototype was created and manufactured successfully.

Mohammed Daniyal Shariff et.al. presented a paper on Design and Fabrication of Root Vegetable Washer. They came to the conclusion that because the root vegetables, such as carrots and radish, grow in heavy, coarse soil that increases the risk of physical damage such as bruising, cracking, and cuts, as well as the potential for serving as a haven for impurities, they must be thoroughly washed and cleaned using equipment that is specifically made for the job. Small-scale farmers can use it because it is affordable and requires little upkeep.

III. METHODOLOGY

Farmers' crops of fruits and vegetables are washed using a vegetable and fruit washing machine. Farmers can quickly wash their product with this machine without having to use their hands. The process of making a washing machine begins with a careful examination of the properties of vegetables and the requirements for the washer. the analysis of academic articles to get data. from the data to create a CAD model (fig.1). as a model's requirement to gather raw materials for a washing machine. A washing machine is made using materials that have been collected; following manufacture, testing is done, and the results are recorded.

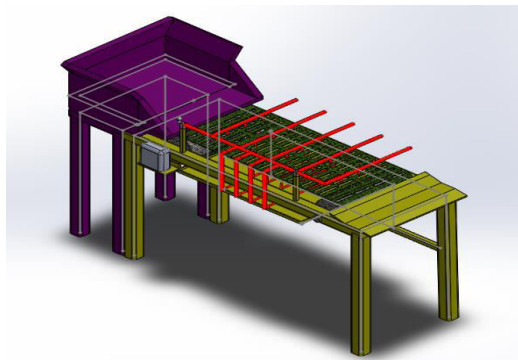


Fig.1 CAD model

IV. CONSTRUCTION AND WORKING

The main components of the manufactured washing machine are the frame, conveyor, geared motor, hopper, SMPS, nozzles, and pressure gauge. these are used to build a machine.

The 42×24×28 inch (L×W×H) steel square tube and L angle frame is constructed of. which support the other washing machine components. the conveyor that transports fruits and vegetables from the hopper to the collection chamber. The conveyor made with steel mesh. The instrument used to measure pressure, the pressure gauge. The water droplets were sprayed using nozzles with a 1mm diameter. These nozzles are situated in the middle and above the conveyor. As a result, the conveyor rotates slowly thanks to the geared motor, which has a 60 rpm speed. This machine is mostly used to wash produce before it is sold.



Fig.2 working model



V. RESULT

Various fruits and vegetables were used in atest of the washing machine, with the following results:

Vegetable and fruits	Pressure (Bar)
Tomato	7
Carrot	15
Apple	10
Mango	10
Cucumber	8
Radish	13
Beetroot	15

VI. CONCLUSION

The root vegetables, such as carrots and radish, grow in heavy soil that is coarser and rougher; as they develop beneath the soil, the likelihood of physical damage, such as bruising, cracking, cuts, etc., also increases and can serve as an important haven for impurities; as a result, it is extremely important to perform intense washing and cleaning with equipment specifically made for this purpose.

The thin shell fruits and vegetables as tomato, cabbage, apple etc. it can be wash by the machine. Which can be reduce the pesticides, small particles would be washed.

The fabricated vegetable and fruit washing machine’s overall washing effectiveness was found to be similar to the average of 90% when tested for several veggies and fruits including carrots, radish, potato, tomato, apple and ginger.

Small-scale farmers can use it because it is affordable and requires little upkeep. So it increase the productivity of the agricultural product.

REFERENCES

- [1] Ms. Anjali Meshram, Dr. S. R. Ikharr, “Design and Development of Rotary Type Vegetable Cleaner”, International Journal for Scientific Research & Development (IJSRD), Vol. 6, Issue 03, 2018.
- [2] Ganesh M R, Akhil V B, Hareesh V P, Harish M U, Mallikarjun C G, “Fabrication of Root Vegetable Washer, International Journal of Information And Computing Science, Volume 5, Issue 5, May 2018.
- [3] Dang Hoang Minh, Bui Van Phuong, Phung Van Binh, Nguyen Viet Duc, “Design, development and performance evaluation of a new-type fruit vegetable washer”, Journal of Mechanical Engineering Research and Developments, ISSN: 1024-1752, Vol. 43, No. 4, Published Year 2020.
- [4] Mohammed Daniyal Shariff, Ifraz Ur Rahman, Manish M, Pavan Singh, Prof. Abhilash M, “Design and Fabrication of Root Vegetable Washer”, International Journal for Research in Applied Science & Engineering Technology (IJRASET), ISSN: 2321-9653, Volume 10 Issue VIII August 2022.
- [5] Mohtasim Abdul Latif Kanoje, Himanshu S. Dhandre, “3D Modeling of vegetable and fruit washing machine”, International Journal of Creative Research Thoughts (IJCRT), Volume 8, Issue 7 July 2020.
- [6] Pranita Joshi, Dr K. S. Zakiuddin, Dr.V.M.Sonde, “Review on Design and Development of Vegetable Cleaning Machine”, International Journal of Innovations in Engineering and Science, Vol 5, No.10, 2020.
- [7] R. N. Kenghe, A. P. Magar and K. R. Kenghe., “Design, Development and Testing of Small Scale Mechanical Fruit Washer”, International Journal of Trend in Research and Development, Volume 2(4), ISSN 2394-9333.
- [8] Md. Nurul Amin, Md. Ayub Hossain, “Development and evaluation of a mechanical carrot washing machine”, AgricEngInt: CIGR Journal, Vol. 23, No.3, September, 2021.
- [9] Emmanuel Olatunji Olutomilola, “Washing of Agricultural Produce: A Review”, ARPN Journal of Engineering and Applied Sciences, Vol. 16, NO. 12, June 2021, ISSN 1819-660.



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