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Design and Fabrication of Tomato Seed Removing Machine (A Review)

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ABSTRACT: This paper presents the methodology for design and fabrication of tomato seed removing machine to obtain seeds with related research. The study specifies the factors influencing the tomato seed removing process and recommends a number of design options for seed removing machine. These are based on systematic study of tomato seed removing process and testing of a new model of seed removing machine. For which we considered literature reviews & some of them are explained.

KEYWORDS: Tomato seed, Seed removing machine, Agriculture.

I. INTRODUCTION

The seed quality of tomato is affected by factors such as seed extraction method, duration and fermentation temperature for seed extraction and fruit maturity. Tomato seed extraction involves a treatment to remove the gelatinous coating around the seeds. Processing of tomato seeds that includes several steps is accomplished by pulping by machine or hand followed by removal of the gel surrounding the seeds by fermentation, chemicals or by mechanical means. Advantages and disadvantages of each technique depends on temperature, application period and concentration. In fermentation methods, the selected ripe fruits are harvested, crushed and allowed for fermentation in non-metallic containers at room temperature for two to three days. The pulps remain in the extract until the gel surrounding the seeds has been degraded by microorganisms. The mixture should be stirred at once or twice a day to maintain a uniform rate of fermentation, also to release the seeds entrapped in the floating pulp and to prevent a fungal growth from starting at the surface of the mass, which can injure or discolour seeds. When fermentation is complete, the good seeds settle down at the bottom and much of the pulp floats at the top, leaving a layer of clear liquid in between. Fermentation should take place long enough for the sufficient disintegration mucilaginous material adhering to the seed. The speed or duration of fermentation process is largely dependent on the temperature. If it remains between 24 to 27°C, satisfactory separation of seed and pulp may be achieved within 48 to 72h. In relatively high temperatures (25-30°C) the fermentation is complete in approximately 24 h. Excessive fermentation reduces seed quality. Usually the longer the fermentation time and the higher the temperature resulted in the greater reduction in germination. Fermentation should be a controlled process because if continued too long, it creates heat and mechanical injury to the seeds. Also long fermentation can cause premature sprouting. Supplying of high quality seeds is the basic requirement and it contributes greatly to the success any crop. Because of the importance of tomato, large quantities of high quality tomato seeds are

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required worldwide, absence of suitable varieties and poor post harvest seed handling resulted in the unavailability of good quality seed became a major problem.

II. EXISTING MACHINES

One of the best tomato seed extraction machine in market online tomato seed remover machine model FQS-1 by Zhengzhou Pasen Machinery Co

Production Capacity: 1.2T/h

Breaking Rate: 2%

Seed Removing Rate: 92%

Power: 2.2 Kw

Outline Dimension: 1900*670*1695mm



Fig1: Tomato seed remover FQS-1

III. CONCEPT

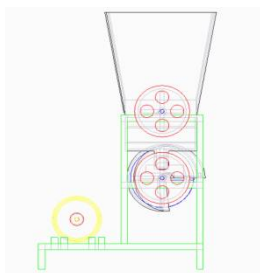


Fig1

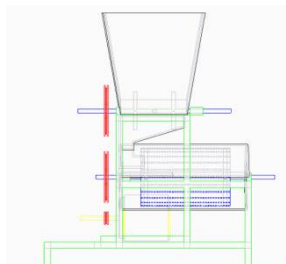


Fig 2

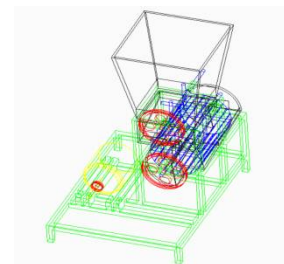


Fig 3

The machine would consist of a pulley drive for two shaft driven by a single motor as shown in the above fig1. The schematic views of the proposed working machine is shown below in fig 2. The isometric view of the proposed machine is as shown in the fig 3

IV. MACHINE DISCRIPTION

After tomatoes are prepared for operation they are fed to the hopper from where they pass through the slicing mechanism.

Tomatoes are sliced by the rotary slicing mechanism. These sliced tomatoes then fall on a mesh which will have through ways plates as obstruction and with holes at alternate intervals. This mesh then separates out seeds and also moves the tomato slices towards a temporary storage. The motion of the tomatoes is obtained by tilting the base support of the sieve drum.

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V. LITERATURE REVIEW

“Rotary slicing machine” by URSCHER LABORATORIES IN EUROPEAN PATENT OFFICE,DT:02/11/88. This paper was basically based on slicing of tomatoes for preparation of various bakery products .We observed that by slicing a tomato we get a ring of pulp with seeds at its core which could be easily separated .This device was made for dairy products which are flexible in nature which has a resemblance with our motive .In this design the shaft does not go in cutting area but as in our model we have provided support for both shaft and hopper outlet we can achieve similar motive.

“Machine for cold pulping of tomatoes ” khawajaAltafHussain, Muhammad ShafiSabir and Muhammad Iqbal IN PAK.J.AGRI .SCI,VOL47(4)2010.This paper was basically based on pulp removal of tomatoes which is basis of present tomato seed removing machine .We observed that both rate of operation and efficiency in terms of power and work are low. As for pulping whole (assumed spherical body) of tomato provides more resistance than while slicing.

“Juice extractor” S.KHolems, ptc office,DT20/08/72.In this machine the juice extraction process of tomato takes place. But some seeds may also get crushed while extraction of juice. In our machine we used the centrifugal separation process but without the threaded plunger arrangement.

“Seed Production of open pollinated Tomato lines”.R.T.Opeña, J.T. Chen, T. Kalb and P. Hanson Tomato is a very popular vegetable in the tropics. Open-pollinated (non-hybrid) tomato seed is easy to produce.Isolation of plants is usually not needed and each plant can produce thousands of seeds. This publication shows how to produce seeds from open-pollinated lines and varieties.In these process the seeds are removed by two methods. Manual extraction and mechanical extraction so we use mechanical extraction process. Remove the pulp from seeds we use centrifugal force in place of HCL acid.

“Design and Fabrication of an Electrically Powered Rotary Slicer for Raw Plantain Chips Production”. By- Ikechukwu CelestineUgwuokeIbukun Blessing Ikechukwu and ZubairOmuyaMuazu Department of Mechanical Engineering, Federal University of Technology, P.M.B. 65, Minna, Niger State,Nigeria .This work focused on the design and fabrication of an electrically powered rotary slicer for raw plantain chips production.The machine was designed for medium scale industries but can also be used for domestic purposes which also include the slicing of cucumbers. The machine works on shear cutting principle and has the capacity to produce raw plantain chips of uniform sizes in lesser time and can slice up to a maximum of 70mm diameter finger of raw plantain.Plantain is a type of banana which is common in tropical regions. It is starchier and less sweet when compared to bananas. n just 2-3 seconds.

VI. RESEARCH METHODOLOGY

- 1) Gathering information of the necessity of the Seed Removing Machine.
- 2) Collecting the data from the literature review for development of specific mechanism.
- 3) Existing seed removing machines to be studied & various modifications required in them are to be focused.
- 4) Identification of mechanisms to be attached & their role in seed removing machine to get the desired outputs.
- 5) Fabricating the seed removing machine to overcome various problems in the existing seed removing machines.
- 6) Verification of the design of fabricated tomato seed removing machine.
- 7) To obtain the final results

VII. CONCLUSION

The main conclusion will be drawn find out whether it is possible to automate a skilled manual process which would avoid worker fatigue. Also the future scope for developing the generalized mechanism for any profile can be identified.

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