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Electrically Operated Raw Mango Cutting Machine

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ABSTRACT

Mango is used to make mango juice, mango cucumber, mango murabba, mango jelly, mango jam, etc. The processing of mango cucumbers and chutney is done by cutting mangoes into cubes, most of which the process of cutting mangoes is done by hand or by expensive machinery by inserting a large number of workers. It requires up to 20-25 jobs per plant with a capacity of 400-500 kg per hour. Industrial power is usually limited by the availability of green mangoes. Manual processing is also unclean. The main objective of this project is to facilitate the acquisition of raw mango cutting machine in homes and small industries with low machine cost and high production capacity and low labor.

Keywords:Machine, Processing, Green Mango, Staff Powers, Low Cost, High Production, etc.

1. Introduction

Most of the green mango industries in Maharashtra perform basic tasks such as trimming, cutting, cutting, chopping, and dialing. All of these tasks are tedious and very difficult, as they involve manual labor. And these tasks are performed under unhygienic conditions. The production rate at which the pieces are obtained is very low. and pickle buyers.The development of a new machine will also lead to a reduction in stress and workload. The traditional mango cutting process also results in non-uniform pieces that may alter the taste of the final pickle product. and plays a vital role in maintaining the flavor.
Traditional built machinery is very large and time consuming, so it is necessary to build a compact and compact machine. However, only a small amount of work has been done and published in the development of green mango cutting machines. Therefore, research is currently underway for the purpose of developing a suitable, efficient green mango cutting machine.

1.1. Necessity

Ability to reduce management time, work and energy expenditure. You should be ready to cut a large amount and cut the fruit into a cube. Ability to provide accurate cutting and cutting. Be flexible with regard to the variety and variety of fruits. The cutting and cutting capacity of the cube should be higher compared to hand-cutting and mango cutting.Cheap compared to hand cutting and cube cutting. Fruits should be cut neatly with minimal damage to increase Value and the use of pieces and cube in making pickle. It needs a little human energy to function. Minor boredom should be minimized.

1.2. Objective

Determination of selected physical and engineering structures of green mango.
Construction of suitable cutting and cutting machines for raw mangoes.
Read machine performance tests.
Calculate the economic cost of upgraded equipment.

2. Literature Review

Prote and Bedekar (1963) studied the physico-chemical properties and suitability of different cultivated mango varieties Beenj, Amlet and Aminivarieties and found that Amlet scored high on fruit weight (466 g) and the discovery of mango fragments. Ascorbic acid, dehydro-ascorbic acid and ascorbigencontent ranged from 69.6 to 86.2, 0 to 61 and 1.4 to 2.1 mg / 100g respectively, and all three variants were found to be selectively selected. . Sastry and Krishnamurthy (1975) conducted a study of physico-chemical variations on other important species of mango, namely, Bogadi, Sakkalli, AmletandSuvarnarekha and reported that small size mangoes are approximately 6-8 cm long, weighing 120 g and has about 70% meat, while large. mango size measures over 10-13 cm in height, weighs 400-600 g and has about 70-80% meat.

Narayana (1976) observed the apparent growth of fungi in a waterlogged environment. Mashytexture, a foul-smelling or other unpleasant odor, sour, questionable colors are all common mistakes a person encounters because the struggle does not understand the need for cleanliness and cleanliness. The large number of small-scale jobs makes this situation unsafe. As there is no pasteurization or heat treatment involved so one should take care of hygiene while preparing cucumbers. In order to maintain a hygienic condition there is a need to develop suitable equipment and machinery and it must be made of such synthetic materials that are fully compatible with the product in order to reduce metal contamination. Stainless steel vessels can be used for all purposes up to the ingredient mixing stage including mango pieces.

Mandhar and Kumaran (1999) conducted research by processing raw mangoes for stimulated production and chutney by cutting mangoes into cubes or by peeling and rubbing them. All cutting, peeling and grating processes are done by hand. It needs about 2000 workers to get the industry up to 20 tons per day. Industrial strength is usually determined by the availability of workers and the limited time available for access to green mangoes. Manual processing is also unclean. The range of green mango, slicer and cube embalmer, plate and grater for chutney making and powder making were improved. The capacity of the machines is - grader 2 tonne per hour, slicer 0.8 tonne per hour, cube cutter 0.5 tonne per hour, peeler and grater 1 tonne per hour. The demand for machinery is only 16 percent compared to manual labor. The cost of cutting cubes and grating is also 55 percent compared to manual labor.

Bunditet al. (2009) developed, tested and evaluated a new model coconut cutting machine. The method used, it has a sharp inclined knife that works in translation into a straight plane to cut the fruit, which is firmly attached and around a straight axis. Parts of the machine include a main frame, a body cutter, a shoulder cutter, a base cutter, an arotary base, three fruit handles, an electrical connection slip, an electric drive and an electronic control system. In the experiments, the raw fruit was regularly served with three different fruit pickers. This also transmits the coconut through body cutting channels, shoulder cuts and base cutting. The fruit stewards went on a continuous cycle that covered all the channels in a row. Appropriate arrangements included (a) a fruit feed 86 h-1, (b) a 300-rpm rotation of the cut fruit, and (c) 180 mm shoulder blade length. The average loss rate was 0.35% in the fibrous region, 2.5% fruit damage and 14.5% in the uncut green area.

3. Research Methodology

1) Literature review- Among all the research work done on our project, little work has been done on the development of the mango cutting machine. Traditionally this work was only localized in making cucumbers but due to the increasing demand and availability of machinery (equipment) it has now been developed in the field of small houses and small houses. With the growth of cities and industries the consumer's need to cut vegetables has increased day by day. , so new technologies have been developed to meet the demand for a product that is easy to produce and save.

2) Problem Identification- The cost of current equipment is too high to be affordable in small industries and domestic production.The size of the machine is large, It is impossible to do complete work and not produce pieces of the same size.

3) Troubleshooting-Designing a compact machine than current machines, takes less input power, has lower costs than the machines currently available in the market, eliminates manual labor, reducing human effort.

4) Construction - Contains a power supply modifier, air cylinder, air compressor, die and punch set, actuator and cutting tools.

5) Performance-First insert the mango into the hopper.Then press the forward button on the remote control.Then the actuator will provide forward movement and as a result the forward piston, the mango will reach near the 9-box cube shaped die. Then press hit. remote control button.The piston that was in the first position is driven down by the air force received by the compressor.The piston has a straight blade attached to it and due to the force of the wind the straight door goes down and cuts the mango into cube-shaped pieces. .

6) Conclusion- In this way the research work is complete and should be done.

4. Working

First insert the mango into the hopper and then the mango hopper into the cylinder near the cutting point.Then press the forward button on the remote control.The actuator will then provide a forward movement to insert the mango and as a result the forward piston the mango will reach close to 9 cube-shaped boxes.Then press the remote-control button.The piston that was in the first position lowers the air pressure received by the compressor.The piston has a straight blade attached to it and with the help of a straight pneumatic force blade it moves upside down and will cut the mango into the required cube-shaped pieces.Number. the pieces will be one stroke of a straight blade into 9 because there are 9 cube-shaped boxes that are the result of the machine.If the need for no. Pieces with a single stroke of a straight blade are 12 and there should be a 12box cube shaped die.

4.1 Construction

Mechanical activator-

A line actuator is an actuator that performs a line-by-line movement, in contrast to the circular motion of a conventional electric motor. Actuators are used in machinery and industrial equipment, on computer peripherals such as disk drives and printers, valves and dampers, and in many other areas where linear movement is required. Hydraulic or pneumatic cylinders produce direct movement. Many other methods are used to produce direct movement from a rotating engine.

Air Compressor -

An air compressor is a device that converts energy (usually from an electric motor, diesel engine or gasoline engine) into kinetic energy by compressing and compressing the air, which, when charged, is released at a rapid explosion. There are many types of air pressure, differentiated into positive or negative migration types.

Pneumatic Cylinder-

Air cylinders (sometimes called wind cylinders) are mechanical devices that use compressed air power to produce dynamic linear motion.

Like water cylinders, there is something that forces the piston to go where it wants. The piston is a disk or cylinder, and the piston rod transmits the developing energy to the object to be removed. Engineers sometimes prefer to use pneumatics because it is quiet, clean, and does not require much storage space.

5. Advantages

Increased Production Rates. Eliminates Tedious Work and Risk of Injury by Hand Cuts. Provides The Uniformity and Condition of The Mango Cubes. Eliminates Manual Operation by Automatic Cutting. Requires One Operator to Operate a Machine That Reduces Staffing.

6. Applications

This machine can be used to cut raw mangoes, which are used for cucumbers in the embalming industry.

This machine can be used to cut potatoes, brinjals, uniform onions and cube shape.

It also has its own cutting programs for other fruits such as apples, guavas, alphasus.

7. Result and Analysis

Size of mango (kg)	Time (sec)	No. of stroke	No. of pieces
0.125	12	3	27
0.120	10.8	3	27
0.100	9.96	2	18

1 Kg of Mango Contains 8 Mangoes and One Mango Is 125 Gm (0.125 Kg) So the Total Cut of One Mango Required Is 0.2 Min (12 Sec). So, In One Minute 3 The Mangoes Will Be Cut.

After Conducting Market Research, It Is Found That the Weight of Mangoes Usually Varies
0.100 To 0.125 Kg Above the Table Indicates That Small Size Mango (0.100 Kg) Requires 2 No.Of Stroke of Straight Blade and Large Size Mango Requires 3 No. Of Lashes.

With One Stroke of Straight Blade the Sum Of 9 No. Pieces Will Be Formed & 0.083 Min (4.98 Sec) Time Required, So That Complete Cut of Small Size Mango Number 2 No. Of Stroke And 0.166 Min (9.96 Sec) Time Required and With Large Size of Mango 3 No. Lashes And 0.18min (10.8 Sec) To 0.2min (12 Sec) Time Required And 27 No. Pieces Will Be Made.

8. Conclusion

In this project we have concluded that as day by day there is more requirement of skilled labor because of faster rate of development in mango pickle industry. Hence to reduce human effort and increased production rate working time for mango cutting operation, we have developed simple cost-effective Raw mango cutting machine for production of mango pickle which plays an important role in middle class people business. Our machine cuts raw mangoes with the help of cutting blades attached to the piston obtaining force from pneumatic compressor and the machine is electrically operated.

The use of this machine will also lead to hygienic production of pickle from mangoes. It will be beneficial to both workers and pickle consumers. Development of new machine will also lead to reduction in labor's mental stress and strain also. Mechanical operation of cutting of raw mango is advantageous as it involves more precise cube cutting than the manual cutting. Uniformity in pieces obtained after cutting also plays an important role in maintaining taste of pickle.

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