

RAW MANGO CUTTING MACHINE

Mr. Shubham Sanghapal Ramteke¹, Dr. R. H. Parikh², Mrs. S. G. Bawane³

¹ Mtech Student, Dept. of Mechanical Engineering, K.D.K college of Engineering, Nagpur, Maharashtra, India

² Professor, Dept. of Mechanical Engineering, K.D.K college of Engineering, Nagpur, Maharashtra, India

³ Assistant Professor, Dept. of Mechanical Engineering, K.D.K college of Engineering, Nagpur, Maharashtra, India

Abstract - Mangoes are used for making mango juice, mango pickle, mango murabba, mango jelly, mango jam, etc. but basically raw mangoes pickle and chutney is mostly popular dish in India. The processing of mango for pickle and chutney making is done by cutting mango into cubes, most of the process of cutting mango are done by manually or by costly machines with the including of lot of manpower. It needs up to 20-25 labors for a 200-300 kg per day capacity plant. The capacity of the industry is usually limited period of raw mango availability. The manual processing is also unhygienic. The main aim of this project is to ease of availability of raw mango cutting machine to households and small scale industries with low cost of machine and high production capacity with low manpower.

Key Words: Machine, processing, Raw Mangoes, Manpower, low cost, High Production, etc...

1. INTRODUCTION

Mango is one of the most favorite fruit (scientific name is *Magnifera Indica*) and is cultivating in more than 120 countries especially in Southeast Asia and Asia. India could be a leading mango growing country and produces concerning 64% you look after the world's total mango created. It's thought of because the most significant fruit covering 34% you look after space and 27% you look after total production of fruits within the country. In Bharat the realm underneath mango cultivation was concerning 2500k angular distance and concerning 18002.4k metric plenty of mangos were created throughout the year 2012-13. The Gujarat contributed 5.7 per cent on mango cultivation (Anon, 2013). In Gujarat state, the realms underneath mango cultivation was concerning 141258 angular distances and concerning 1003706 metric plenty of mangos were created throughout the year 2012-13 (Anon, 2013).

The district wise space and production of mango in Gujarat throughout the year 2012- the key contributive districts of Gujarat area unit Valsad, Junagadh, Navsari, Surat, and Amreli (Anon, 2013). Mango is one among the foremost cherished fruits, not solely in flavor and style, however additionally for its biological process price. Leader et al,

(1994) reportable that mango could be a smart supply of A and C and made in carbohydrates, minerals metallic element, and phosphorus. Ripe mango is especially consumed as recent fruit however thanks to its putrefiable nature it can't be keep for long period and consequently, substantial amount of the crop is annually lost.

Therefore, Mango is being processed into several merchandise that embody mango juice, mango nectar, squash, mango concentrates and jam. Handling of mango is finished manually and in unsanitary ways that. Many of the mango pickle making business in Gujarat perform cutting of mango in cubes form area unit tedious, bulky and labor intensive, because it involves manual work. Thus it's essential to mechanize these operations by developing economical machines which might cut back the time interval yet as price of operation and create the method a lot of healthful. In this operation of slicing and cube cutting of raw mango is excellent as it involves a plenty of efficient slices and cube cutting as compared to knife cutting manually. It reduces fruit injury and improves the potency and accuracy. However, solely restricted work has been done and revealed on the event of slicing and cube cutting machines. Therefore, this study was undertaken with specific objectives to develop associate degree acceptable, economical raw mango slicer and cube cutter for mechanizing the pickle process business.

2. LITERATURE REVIEW

There are various raw mango cutting machines currently available in market, but these machines are not portable, bulky and of course of higher cost and takes much space. Also, the existing machines are designed for greater capacity and hence are expensive. After analyzing lots of research papers and machines, in that we found the rate of production capacity of raw mango cutting machines varies from 100kg-500kg per hr. or more but the price of that are also very expensive and the size of that also very bulky, which cannot affordable by small scale businesses and households.

Some researcher employs different stages operation by using different 1hp motors with 3 phase to every stage for only cutting the raw mangoes in cube slices, Due to that the size of machine is increases and looks very bulky in design.

3. PROBLEM IDENTIFICATION

- High cost of machine.
- High power consumption.
- Time consuming.
- Wastage of mango slices.
- Huge manpower required.
- Unhygienic.
- Not safe it leads to injuries while cutting manually.

4. OBJECTIVE

- To performed quickly and swish operation.
- To maintain hygiene.
- To cut the mangos into pieces, this could be used for creating mango pickles.
- To changing manual cutting system into machine driven cutting system.
- To increase the productivity.
- To overcome the time consumption.
- To scale back the labors uncertainty.

5. METHODOLOGY

This machine is essentially engaged on the principle of pneumatic cylinder; it converts the power of compressed gas into the reciprocating linear motion to chop the raw mango into equal no. of cubes.

Like hydraulic cylinders, some medium forces a piston to move in required direction. The piston is a cylinder and piston rod transfers the force required to cut the raw mango. Namely it consists of different components for performing the operation are as follows:-

- 1 Double acting pneumatic cylinder.
- 2 Air compressor.
- 3 5/2 solenoid valve,
- 4 Push buttons.
- 5 Hose pipes.
- 6 Nipples.
- 7 Filter.
- 8 Muffler.
- 9 Frame.

- 10 Head block.
- 11 6 blocks Cutting blade.

- In this machine, the frame holds the all components to perform the operation.
In which the cylinder is mounted vertically downward on middle of the frame and the cutting blade is mounted exactly below to the cylinder. After that 5/2 solenoid valve connect to the cylinder and 220v ac connection.
- The raw mango should be placed over the cutting blade by the operator after that the compressor will be started to compressed air and then air should be stored in tank, that stored air will be used in cylinder to forward stroke to cut that raw mango which is placed in cutting blade (6 blocks) by applying hammering effect on the mango by the help of push button which is operated by 5/2 solenoid valve due to that hammering effect the mango will cut into equal cube shape. And after forward stroke release that push button to backward stroke of cylinder to further operation.
- Engineers are basically prefer to use pneumatics as they are quieter, do not require large space to store fluid and cleaner.
- Because the working fluid gas, the problem of leakage from a pneumatic cylinder will be negligible.
- It should be used where cleanliness is required and for our process of operation hygiene is very important.

6. FUTURE SCOPE

- This machine also can be used as a punching and aluminum can crushing machine by the removal of only cutting blades.
- By the changing of cylinder we can also employ this for other fruit slicer machine.
- By the changing of cutting blade we can make it as a juicer also.
- Moreover, mango cutting machine also operated on solar energy.

6. CONCLUSION

By taking problems into consideration of the existing mango cutting machine, we need to design a machine that should not take lot of space in the sense compact, portable and

versatile, inexpensive so that small scale industrialist and households can afford it and capable of making pickle in huge quantity without compromising rate of production with low cost, hygiene and safety of workers.

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