

Review Paper on Semi Automatic Chips Machine

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Abstract - In the automation of the production process for food industry, especially for the potato chip manufacturing, the concept of potato chips cutter is used and utilized for the fulfilment of modern process. In the rural area specially in Maharashtra region where the production of potato is more, this depart the fact that, the small industries are based on such type of activities which requires some skill for increased rate of cutting of chips, with minimum effort, that can be reduce the chances of cutting by sharp edges of the cutter to the operator, which then passes for frying division and reduce the chance while burns with oils. This electrically operated device that cut potatoes into thin slices of thickness 2.0mm approximately, suitable for frying and baking as potato chips. The capacity of mechanism is 60 kg of potato per hour. Locally and easily available materials like cast iron, mild steel and stainless steel are used for the fabrication. This machine allows in its simplicity of design and modest cost with the ability to generate thin uniform slices of the potatoes.

Key Words: Cutting edges. Production rate of slices, potato chip

1.INTRODUCTION

Potato (*Solanum Tuberosum*) is starchy, tuberous crop of the solanaceas family, semi perishable in nature, contains about 80% water and 20% dry matter. Potato is popularly known as “the king of vegetable”, because the dry matter, edible protein content of potato makes it nutritionally superior vegetable as well as staple food not only in our country but also also throughout the world. It is cultivated in 23 states in India. During 1993-2020 demand for potato is expected to rise by 40 per cent worldwide. The indicates a clear opportunity to capture the huge domestic and international market of potato by producing value added potato product.

The chips and other snack foods in the world account for overall turnover of \$ 2.2 billion dollar considering 70 manufacturing and technology research center in the world. Also the quality of chips plays a vital role in the hotel management. Due to uneven thickness of the slices arising from improper tools a lot of wastage of vegetable is happening leading to loss of productivity and other

miscellaneous damages to vegetable. The production of potatoes in India was 40,476.30 thousand metric tonnes in 2010-2011 from a total area of 1893.90 thousand hectare India ranks fourth in area and third in global potato production. It produces around 8 % of the world's total produce.

The simplest mode of processing the potato is conversion into chips. Potato slicing machines are either manually or electrically powered. In any of the cases, the machine consists of a knife or set of knives arranged in a particular pattern to meet the need of the operations it is intended to perform. In the previous method (manual cutting), process is tedious and time consuming, while in the later method, equipments save cutting time but the cost of these equipments, the energy required for their operation & their large size makes them insignificant for their use in small scale industries. Improved processing requires use of tools and techniques that are reliable, efficient, labor saving, safe, simple, and cost effective. The potato slicing machine is simple workable and efficient machine, which can be adopted to reduce mechanical energy input in potato processing and also to improve product quality. The potato of size 2 to 3cm cut by the slicing wheel operated by electric motor when the force is applied on the potato.

2.LITERATURE REVIEW

Roshan M. Hatwar, Kunal T. Rahandale, Mohan G. Trivedi, “Concept, Design and Development of Semi Automated Potato Slicing Machine”

The design of the semi-automated potato chips machine is based on the technical idea of the combination of rotary and longitudinal motion produced by electric motor and leverage mechanism, blade angle and the rotation of the wheel provides required slices thickness. The machine is simple to operate and easy to fabricate. This machine allows in its simplicity of design and modest cost with the ability to generate thin uniform slices. The capacity of machine is 60kg/h and 2.0mm thickness of chips.

Atul Anand Mishra, Jyoti R.N.Shukla, Parvinder Kaur and Vivekananad, "Design and Fabrication of Twisted Potato Crisps Maker"

The design of the twisted potato crisps maker is based on the technical idea of the combination of rotary and longitudinal motion produced by handle, blade and the pitch of stud provides required slices thickness. The slicing efficiency obtained was 95.8-96.1% with average losses of 4.1%. Capacity of machine was 9.6kh/h and thickness of crisps, which meets the requirement of small scale processing unit.

Mr. Kartika S.B., Mr. Arahanth, "Design and Development of a Poato Slicer"

The devices have a simple construction and can be used for slicing in the range of (1.2mm). The slicer is safer, and productive. These devices are simple as there is no need of power source and there is no complex mechanism. The potato slicer can be used for slicing the vegetable like potato, carrot, onion, etc

Khan Chand, R.K. Pandey, N.C.Shahi, U.C. Lohani,

"Pedal Operated Integrated Potato Peeler and Slicer"

A pedal operated integrated potato peeler and slicer was designed and developed. The dimensions of the unit were 960*990*1.110mm and the weight of unit was 80kg. It could be operated by a single person. Its capacity and efficiency was 65kg/hr and 88.5%, respectively. The integrated unit saved 88% and 54% energy consumption as compared to manual peeling-slicing and the hand operated peeler-slicer unit, respectively.

Tony Thomas A., Muthukrishnan A., Sre Nandha Guhan K.S. "Design and Development of Automated Vegetable Cutting Machine"

Thus, this work provides an alternative to the existing automatic vegetable cutter, in terms of automating the vegetable entry into the cutting apparatus, eliminate power fluctuation and lesser initial investment time consumption is less when compared to manual cutting. This work provides the desired output and the variety of the cuts is done by use of different cutting grid.

3.METHOD AND MATERIAL

The semi automated potato slicing machine of 65kg/hr capacity is design and developed. The main component of unit are

- 1) 2 Cylinder section
- 2) V-belt mechanism
- 3) Slicing wheel
- 4) Power transmission system

The design of various component of the unit is mainly based on the functional and structural strength. Different types of potato of size 5 to 7cm put into the cylinder. Potatoes come sequentially from the 2-cylinder drop into the slicing wheel. Potatoes and slicing wheel having small clearance, slicing wheel mounted on the shaft which is rotated by electric motor of power 1/12th HP with help of belt pulley mechanism. When potatoes come in contact with cutting blade of slicing wheel and cut into thin slices of thickness 2.0mm approximately. Cutting involves principally the application of shearing force on potato with help of blade.

Sr.No.	Parts	Material Used
1	Cylinder	Stainless Steel
2	Slicing Wheel	Stainless Steel
3	Cutting Blade	Stainless Steel
4	Shaft	Mild Steel
5	Pulley	Cast Iron
6	Belt	Rubber

Table 1: Material of construction of different parts of machine

4.DIFFERENT PARTS OF MACHINE

Slicing wheel:

A circular plate is use as slicing wheel has three cutting blades use to cut the potato. It is powder coated for maintain hygiene and to avoid chemical reaction. Blade are mounted on the wheel at equally distance at an angle. The cutting edge of blade is sharp to reduce

shearing force. It cuts three slices of potato in single revolution. The material used in slicing machine is stainless steel. Slicing wheel is mounted on shaft with help of bush.

V-belt mechanism:

V-belt solved the slippage and alignment problem. It is now the basic belt for power transmission. They provide the best combination of traction, speed of movement, load of the bearings, and long service life. They are generally endless, and their general cross section shape is roughly trapezoidal (hence the name "V") The "V" shape of belt tracks in mating groove in pulley with result that the belt cannot slip off.

Motor:

The main source of power transmission system is electric motor, one pulley is mounted on motor shaft and another pulley is mounted on driven shaft i.e. a slicing wheel shaft. Driven shaft supported by two pedestal bearings on frame. Power is transmitted through electric motor by using V-belt from driving shaft to driven shaft.

5.CONCLUSION

At the end of the project, the semi automatic chip machine was a success. The design of the blades and motor are capable enough to cut the chip with uniform thickness and give the output.

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