

# DESIGN AND FABRICATION OF ONION CUTTING MACHINE

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## ABSTRACT

Onion cutting machine is based on reduction in effort required for cutting of onion as well as for saving cost required in cutting, specially for small scale farming. There purpose of designing and fabrication of such small equipment is that it fulfill requirements of cutting and reduce the cost of it. Onion cutting machine contains simple mechanisms with effective manually handling system that need only human efforts for operations. The purpose behind this is to just reduce production cost of onion manufacturing . By that farmer can get more output & income specially considering small scale farming. s. This project is intended to discuss the design leaf cutting machine. This machine can be used for the agricultural purpose and it can be also employed in the food industries. Leaf cutting machine works on conveyer belt and cutter arrangement. Onions are fed through feeding conveyer belt into the machine. India is world's second largest Onion harvested. But yet Farmers processes onion by hand labor after harvest to remove the leaves and roots. This operation is referred to as topping which is time consuming and They Can't afford New Techniques Because of the cost of Appraisal Our Motive is to supply them with effective and efficient method for harvesting to reduce human effort Efforts to date have all been in the direction of large and expensive machinery and none of these has as yet been perfected so as to reach the market.

**Keywords:** Agriculture, Agro-Machinery, Internet of Things, Efficiency.

## INTRODUCTION

Onion (*Allium cepa* L.) growing is a quite widespread, albeit uneven, farming practice on the entire Italian territory. As shown by official statistics [Istat 2001], the regions where this crop is mostly concentrated are Emilia-Romagna (with about 3,000 hectares of onion crops), and Veneto (with about 2,000 hectares of onion crops). In fact, these two regions account for a total of about 48% of the entire national onion growing area. In 2001 the total national farming land destined to onion cropping was about 13,761 hectares, with an overall yield of about 430,000 tons [Istat 2001]. In the 1992-2001 period the productivity of this crop on the whole national territory was quite variable reaching about 40 t/ha in some Northern Italy late varieties and about 20 t/ha in some Southern Italy early varieties. The national average was therefore 31 t/ha, which is remarkably lower than the European average, which amounts to 55 t/ha. Such a gap can be mainly ascribed to the peculiar

pedoclimatic conditions of the areas destined to the crop in question which do not lend themselves to the diffusion of hybrid varieties coming from other environments (Japan, etc.).

## LITERATURE SURVEY

1. Mr. Nikhil O. Singh et.al. [2016] done the work on Tomato Sorting Machine (TSM) is a machine used to effectively sort the tomatoes on Size based sorting. This machine can be used for the agricultural purpose and it can be also employed in the food industries. TSM will sort the tomatoes in three grades based on their size i.e. Small, Medium and Large. TSM works on belt and pulley arrangement. Tomatoes are fed through feeding tray into the machine.[1]
2. Abd El-Rahman, et.al [2017] describe that from Magda M. Agric. Eng. Res. Inst. (AEnRI); Agric. Res. Center (ARC), Dokki, Giza. Egypt. done the work on develop a small cylinder type grading machine to suit grading of onion sets crop. Two operating parameters each of four levels were studied. The studied parameters included, riddle revolving speed 35, 45, 55 and 65 rpm (0.366, 0.471, 0.576, and 0.680 m/s), and riddles feeding rates (75, 100, 125 and 150 kg/h). The effect of machine parameters on grading efficiency (%), grading productivity (kg/h) and the mechanical damage percentage, were also considered. Results showed that the machine is quite successful for grading onion sets. The best result was obtained at 55 rpm riddles revolving speeds and 125 kg/h riddles feeding rate. At these values, maximum grading efficiency of 94.34% and permissible mechanical damage of onion sets 4.66% were obtained. These results proved that, the proper operating parameters corresponded with theoretical considerations as the relevant for machine operation.[2]
3. Dattatraya Londhe et.al.[2006] done the work on grading of agricultural produce especially the fruits and vegetables has become a prerequisite of trading across borders. In India mostly fruit growers grade the fruit manually. [3]
4. 2.1 Literature survey Maurya and Lami (2019) discussed in detail about peanut peeling machine. The machine has crushing, roller and separation mechanism. It peels the dry peanut and separates the waste. Narayanan and Jagadeesh (2017) have developed automatic vegetable cutting machine. They used the slidercrank mechanism to cut the vegetables. The system is powered by the AC motor. The rotary is converted into reciprocating motion and it presses the vegetable and cuts the vegetables by blades. Balavignesh and Karthikeyan (2016). [4]
5. ]DattatrayaLondhe1, Sachin Nalawade1,Ganesh Pawar2, Vinod Atkari3\*,Sachin Wandkar Grading of agricultural produce especially the fruits and vegetables has become a prerequisite of trading across borders. In India mostly fruit growers grade the fruit manually.[5]

## 3. MATERIALS AND METHODS

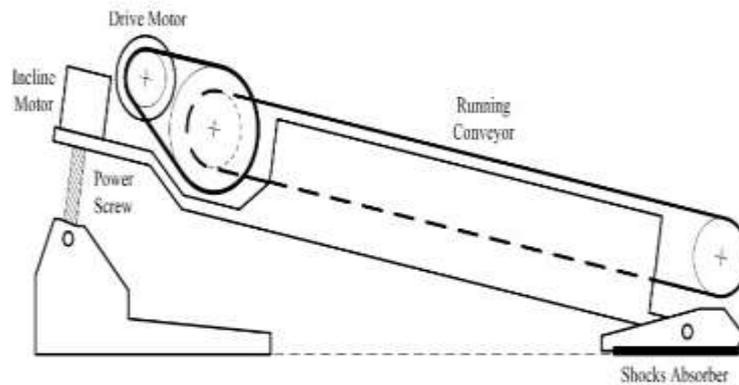
### Problem Identification

Automation plays an important role in industrial and domestic applications. The purpose of automation is to get higher production rates, efficient utilization of materials, better quality, reduce time consumption and to improve safety. In present days, automation is not only implemented in industrial problems but also in domestic

applications. This paper describes the application of automation in one of the works in kitchen called onion peeling and cutting. Onion peeling and cutting is one of the fatigues and time-consuming job for preparation of food and it is everyday activity in all food processing system.

### Components of Machine

The following components are mainly used in Onion cutting machine



### CONVEYOR

A conveyor belt is the carrying medium of a belt conveyor system (often shortened to belt conveyor). A belt conveyor system is one of many types of conveyor systems. A belt conveyor system consists of two or more pulleys (sometimes referred to as drums), with an endless loop of carrying medium—the conveyor belt—that rotates about them.

### STAND FILTER

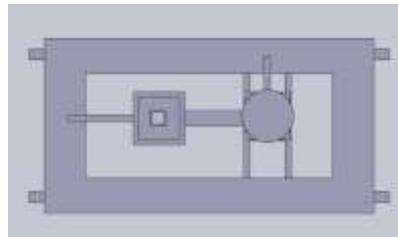
Sand filters are used as a step in the water treatment process of water purification. There are three main types; rapid (gravity) sand filters, upward flow sand filters and slow sand filters. All three methods are used extensively in the water industry throughout the world. The first two require the use of flocculant chemicals to work effectively while slow sand filters can produce very high quality water with pathogens removal from 90% to >99% (depending on the strains), taste and odour without the need for chemical aids.

### BATTERY



An electric battery is a collection of one or more electrochemical cells in which stored chemical energy is converted into electrical energy. The principles of operation haven't changed much since the time of Volta. Each cell consists of two half cells connected in series through an electrolytic solution.

DESIGN



3D-view of the machine

**Pneumatic Systems**



1 Pneumatic system

A pneumatic system is a system that uses compressed air to transmit and control energy.

Pneumatic systems are used in controlling train doors, automatic production lines, mechanical.

(a) Automobile production lines (b) Pneumatic system of an automatic machine Common pneumatic systems used in the industrial sector.

(a) The advantages of pneumatic systems

Pneumatic control systems are widely used in our society, especially in the industrial sectors for the driving of automatic machines. Pneumatic systems have a lot of advantages.

(i) High effectiveness

Many factories have equipped their production lines with compressed air supplies and compressors. There is an unlimited supply of air in our atmosphere to produce compressed air.

Moreover, the use of compressed air is not restricted by distance, as it can easily be transported through pipes. After use, compressed air can be released directly into the atmosphere without the need of processing.

(ii) High durability and reliability

Pneumatic components are extremely durable and can not be damaged easily. Compared to electromotive components, pneumatic components are more durable and reliable.

## **WORKING PROCEDURE**

The energy released during accepting an electron by a neutral atom is known as electron affinity. As the atomic structure for different materials are different, the electron affinity of different materials will differ. If two different kinds of metals or metallic compounds are immersed in the same electrolyte solution, one of them will gain electrons and the other will release electrons. Which metal (or metallic compound) will gain electrons and which will lose them depends upon the electron affinities of these metals or metallic compounds. The metal with low electron affinity will gain electrons from the negative ions of the electrolyte solution. On the other hand, the metal with high electron affinity will release electrons and these electrons come out into the electrolyte solution and are added to the positive ions of the solution. In this way, one of these metals or compounds gains electrons and another one loses electrons. As a result, there will be a difference in electron concentration between these two metals. This difference of electron concentration causes an electrical potential difference to develop between the metals. This electrical potential difference or emf can be utilized as a source of voltage in any electronics or electrical circuit

## **CONCLUSIONS**

This paper presents theoretical aspects of onion cutting machine as conventional way of cutting and stem require more cost and manpower & method is fully based on the work of human hence more time consuming so it requires more and other cost is also very high. So we are going to invent a machine which minimize that cost and time for onion root and cutting and the process is also simple. Also we succeed to make it very small and to all farmers and it increases the speed of work so our objective is fulfilled in this project

## **ACKNOWLEDGEMENT**

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