

Design of machine for onion leaf cutting.

Akshay P. Kolekar¹, Harshal P. Deshmukh², Mayur R. Lagad³, Rahul D. Dumbare⁴, Mr. Rahul T. Bhole⁵

^{1,2, 3 4} Student, Department of Mechanical Engineering, SVIT, Nashik, Maharashtra, India

⁵ Assistant Professor, Department of Mechanical Engineering, SVIT, Nashik, Maharashtra, India

ABSTRACT

In a field harvester and trimmer for root crops having foliage superior growing from the crowns of the crop to be harvested and cut, like giant bulbous onions, turnips, parsnips and rutabagas. This project is meant to debate the look leaf cutting machine. This machine is used for the agricultural purpose and it is 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 when harvest to get rid of 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 economical methodology for harvest to cut back human effort while not damaging the onion, 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. An epitome aims at cutting leaf of onion victimization conveyer and cutters to cut onions which can be collected in trays for further processing or packaging.

Keyword: - Agricultural machinery, onion stem cutting, conveyer, pulley, cutter, belt

1. Introduction:-

Onion is a very vital vegetable crop in Asian country not just for internal consumption however conjointly highest exchange wage earner among the fruits and vegetable. Being an important food things, Asian country ranks second in world onion production when China associate degreed with an annual production of sixteen to seventeen million tons accounts for around 2 hundredth of global production. Annual turnover on Indian onion market in more than 10,000 corers and Maharashtra contributes nearly 30% in it. At this times onion are processed by hand labor when harvest to get rid of leaves and roots. This operation is referred as topping. Hand topping has obvious disadvantages including both cost and UN clue length of time necessary to process a large quantity of onions. However, in recent times it's changing into more and tougher to seek out enough labor to try to the task. As the result the sodbuster cannot continuously depend on harvest home his entire crop once it's ripe for harvest. Further, what labor there's out there is unskilled associate degreed bored with doing an economical job.

A fair proportion of the onions that are hand lidded with this labor are non-uniform and plenty of are broken to the extent of being unmarketable. The inherent lower productivity in sub-tropical countries vis-à-vis European counties, shortage and high prices of quality seeds, high incidence of pests and diseases typical under tropical conditions, moisture stress or excess rains during critical growth stages are factors constraining yield. Wide worth fluctuations create it a risky crop discouraging massive scale adoption of input intensive production techniques and smart management practices by farmers. In Asian country onion is grownup in 3 crop seasons, namely kharif (harvested in October-November), late kharif (January- February) and rabi (April – May).Rabi season crop is that the largest accounting for concerning sixty p.c of annual production with kharif and late kharif accounting for concerning twenty p.c every. Major manufacturing states are geographic area, Karnataka, Madhya Pradesh, Andhra Pradesh, Bihar, Gujarat, Rajasthan and Haryana, that along account for eighty five p.c of total production.

1.1 Problem statement:

At this times onion square measure processed by hand labor when harvest to get rid of leaves and roots. This operation is referred as topping. Hand topping has obvious disadvantages as well as each value and unequal length of your time necessary to method an oversized amount of onions. However, in recent times it's turning into

progressively troublesome to search out spare labor to try to the duty. Because the result the husbandman cannot perpetually rely on gathering his entire crop once it's ripe for harvest. Further, what labor there's accessible is unskilled and tired of doing an economical job. a good proportion of the onions that world organization square measure } hand topped with this labor square measure non-uniform and lots of square measure broken to the extent of being unmarketable. Thus we tend to are attempting to try to the "Design and fabrication of onion leaf cutting machine".

1.2 Objectives:

The given objectives square measure to be foreseen whereas doing this project work square measure given below,

- 1) To cut back human effort and labor value.
- 2) To switch ancient methodology with economical one.
- 3) To cut back fundamental measure between gathering and packaging of onion.
- 4) To go away onion unscathed throughout method with safety to operator.
- 5) To style and fabricate semi-automated machine which can facilitate the farmers in searching for the onion effectively.
- 6) It'll cut back the yielding value of farmers increase his profit in trading.

2. Process Flow & Methodology:

Methodology is the Systematic, Theoretical analysis of the methods applied to a field of study or the theoretical analysis of the body of methods and principles associated with a branch of study. The below flow chart shows the sequential operation/steps that will be performed during the project process.



Chart -1: Methodology

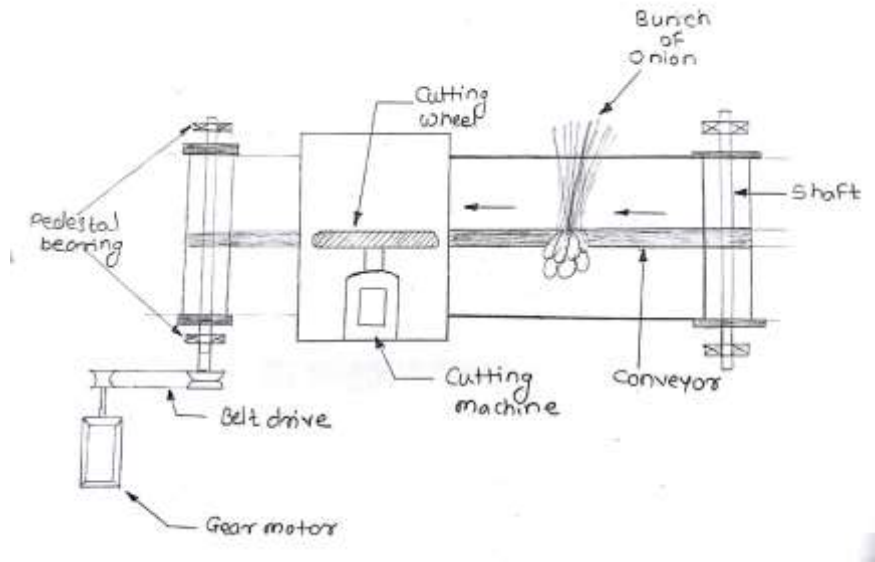


Fig -1: figure of onion leaf cutter

2.1 LITERATURE REVIEW:-

Mr. Nikhil O. Singh, Mr. Siddhesh A. Waman, Mr. Hitesh S. Yadav ,Mr.Bikaschandra R. Yadav Prof. Ashish Chaudhari done the work on Tomato Sorting Machine (TSM) is a machine used to effectively sort the tomatoes on Size based sorting.

This machine will be used for the agricultural purpose and it will be extensively utilized within the food industries. TSM can kind the tomatoes in 3 grades supported their size i.e. Small, Medium and Large. TSM works on belt and pulley arrangement. Tomatoes square measure fed through feeding receptacle into the machine.

Abd El-Rahman, Magda M. Agric. Eng. Res. Inst. (AERI); 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 enclosed, 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 sort of eminent for grading onion sets. The best result was obtained at fifty five revolutions per minute riddles revolving speeds and one hundred twenty five 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 proven that, the proper operating parameters corresponded with theoretical considerations as the relevant for machine operation.

Dattatraya Londhe, Sachin Nalawade, Ganesh Pawar, Vinod Atkari, Sachin Wandkar done the work on grading of agricultural produce especially the fruits and vegetables has become a perquisite of trading across borders. In Asian nation largely fruit growers grade the fruit manually. Manual grading was disbursed by trained operators World Health Organization thought of variety of grading factors and fruit were separated in step with their physical quality. Manually grading was expensive and grading operation was affected because of shortage of labor in peak seasons. Human operations may be inconsistent, less efficient and time consuming. New trends in selling as such by World Trade Organization (WTO) demand top quality hierarchal merchandise.

Farmer's square measure trying forward to having associate applicable agricultural produce-grading machine so as to alleviate the labor shortage, save time and improve graded product's quality. Grading of

fruits may be a vital operation because it fetches high worth to the agriculturist and improves packaging, handling and brings an overall improvement in marketing system. The fruits square measure typically hierarchal on basis of size and hierarchal fruits square measure a lot of welcome in export market.

Grading could reduce handling losses during transportation.

2.2 Working:-

This project consists of cutter & belt conveyer assembly which is mounted on end side of movable platform on M.S. frame. The rotary cutters are mounted at the bottom side of the belt conveyer system. When we required operating the onion leaf cutter/remover, we can push the onion in conveyer which will move in forward direction. When there is approach of onion to cutter due electric cutter it will cut the leaf of onion. Belt conveyer system can be supported by support of eight pedestal bearings, operated by using electric gear motor. After cutting of onion & leaf are separated & collected in tray. Fig.4.1. shows the onion leaf cutting machine.

3. ADVANTAGES:-

- 1) To reduce Human effort and Labor cost.
- 2) To replace traditional method with efficient one.
- 3) To reduce time period between harvesting and packaging.
- 4) To leave onion unharmed during process with safety to operator.
- 5) To design and fabricate semi-automated machine which will help the farmers in sorting out the onion effectively.
- 6) It will reduce the yielding cost of farmers & it will increase his profit in trading.
- 7) The operation of the pneumatic Weeding machine is well controlled.
- 8) Well balanced system.
- 9) It approximately having higher efficiency that of old system.
- 10) Only simple support structures are required Design & fabrication is easy.
- 11) More accurate and economical in large scale cutting operations.
- 12) Faster cutting speed than conventional methods.
- 13) It increases the safety and working condition during cutting.
- 14) Effective for longer period cutting Operations.
- 15) Material is easily available for spear parts.

3.1 APPLICATIONS:-

It is generally use for cutting of onion, beat, garlic leaf & vegetables.



Fig -2: onion leaves



4. CONCLUSIONS

As demand of atomization is increasing at each moment, it'll prove an excellent bone of the planet, since it'll save heap of temporal order furthermore as demand of Workers which are specially recommended for cutting of onion leaf. This is today's real condition in some process industries. Sometimes accidents are happen with worker who is cutting onion leaf. By victimization knife furthermore as alternative cutting devices while not victimization hand gloves. To eliminate this type of state of affairs, we've got to use Associate in Nursing final manner for cutting with none injury to the employee and to extend worker's safety.

We designed cutting of onion leaf machine for save time; improve safety, continuous flow of material etc. Our machine is working on electricity energy so it requires power for working but it successfully complete our requirements. In this project we have seen the simplest method of onion stem cutting process. In conventional way of cutting stem we require more time and manpower comparatively & this method is fully based on the work of human effort hence more time consuming so it requires more workers and other cost is also very high. So we are going to invent a machine which will minimize that cost and time for onion leaf & stem cutting and the process is also simple. Also we will succeed to make it very small and affordable to all farmers and it increases the speed of work so our objective will fulfilled in this project.

5. REFERENCES

- [1].Khurmi R.S.,Gupta J.K.,A textbook of machine design, first edition, S. Chand Publication,1979.
- [2] Ballany P. L.,Theory of machines &mechanisms, Twentyforth edition, Khanna publishers,2005.
- [3] Bhandari V.B., Design of machine elements eighteenth edition, MC graw-hill companies,2003.
- [4]PSG college of Technology, Coimbatore design data, first edition Kalaikaikathir Achchagam, 2003.
- [5] Joseph E. Shigley, Mechanical engineering design, sixth edition, Tata Mc graw hill,2005.

BIOGRAPHIES (Not Essential)

	<p>Akshay P. Kolekar Mechanical Engineering ,Mechanical Department, SVIT, Nashik</p>
	<p>Harshal P. Deshmukh Mechanical Engineering ,Mechanical Department, SVIT, Nashik</p>
	<p>Mayur R. Lagad Mechanical Engineering ,Mechanical Department, SVIT, Nashik</p>



Rahul D. Dumbare
Mechanical Engineering ,Mechanical Department, SVIT,
Nashik

