

Design and Fabrication of Corn Peeling and Cutter Machine

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Abstract – There are many maize threshing techniques in India which are used in day to day life. Maize is world's largest resourceful seed crop. The techniques used to separate seed in old days are removing the leaf by hand or by chopping the corn by wooden rod. The main problems with these machines are that they are not affordable to farmers who are having less acreage farms and which they do not require these big threshing machines. Also, in this process the kernels were getting damaged and the rate of production was less. Many farmers in India are not affordable to use these machine system can be established these machine provides simple mechanical design. The existing machine of corn de-seeding in agriculture industry consist of separation of grains only. But for making the past of corn another machine is required which is not affordable for farmers.so in this concept by keeping these things in mind we design the new concept which consist of three operation like seed separation, seed paste and cob crushing in single assembly. In this concept there is no need of any extra attachment. The concept model of machine was made by using AutoCAD software and required calculation were made .After freezing concept, later it was converted into 3D model using CATIA-software.

The fabrication of model was done and test was conducted.

Keywords – corn, peeling, cutter, combo.

I. INTRODUCTION

1.in India, corn is one of the most important crop and it has a source of large number of industrial products beside its use as human food and animal feed. Corn is also versatile crop, allowing it to grow across a range of agro-ecological zones. Every part of corn can be used to produce a large variety of food and non-food products. India is presently is in need of technology in agriculture field the farmers need to do all the segregation processes manually which is hard task far as far them and also this increase the cost of final products. To overcome this problem of removing its outer sheath and de-husking the cobs this machine which is affordable by farmers has been developed. The machine is basically compromise of separate shelling chamber, collecting tray and motor (2HP). The arrangement of these parts is connected by belt and pulley mechanism.



Fig. 1. Actual fabricated model of corn peeling and cutter machine.

II. LITERATURE REVIEW

1. Anant J. Ghadi et al [1]: This paper focuses on various corn de-husking methods. The Aztecs and Mayans made processes to cook or grind the corn which is cultivated in numerous varieties throughout central and southern Mexico. Due to these processes the crop spread to rest of the world. In agriculture industry the existing methods of corn de-husking was done manually with help of hands or by using large machinery for deseeding. So methods are not effective for a developing economy countries where farmers have little money for investment like India. Hence there is need for innovative idea or product that is feasible, safe, cost effective and productive for the India farmers.
2. Anirudha G. Darudkar et al [2]: This paper focuses on lack of corn processing machine like corn Sheller is major problem of corn production. In short this paper describe about design of various components of corn Sheller machine. It involves the process of design different part of this shelling machine by considering forces and ergonomic factor of people. This project is mainly about generating a new concept of corn shell with simple mechanism to bring anywhere and easier to thresh corn. We are trying to make innovative idea in machine which is power

operated through which we can improve productivity aids of profit of shelled corns and reduce effort.

3. J.N. Nwakaire et al [3]: This research is mainly focuses on various sources to increases the net profit of farmers. The objectives of work were to design, constructs and evaluate a low cost maize shelling machine for Nigeria farmers. In these method system collect opinion from farmers on their Sheller needs. Due to this communication methods, they also determine shelling problem from these appropriate material were selected, utilization of theories of failure that enable the determination of allowable shear stress on the bearing support. The system was made comparison between the machine performance and the human performance index for shelling, for example in commercial method human mechanical efficiency throughout put capacity and grain handing capacity is 45%. For machine indices, the capacity of grain handing is 86%.
4. Praveen Kiran Mali et al [4]: This research is mainly focuses on constraint and requirement of the Indian farmers. The threshing machine has been designed, in survey development and fabrication of this machine is useful and cost effective for Indian farmers. The machine designed as the sitting posture was comfortable which can easily operate by either male or female. This proposed machine has been designed to be fabricated with the use of local available materials.
5. Dr .C.N. Sakhale et al [5]: This review mainly focuses on human powered machine for rural farmers. Because in these developing world, maize threshing is done by various PTO operated machine which requires constant electricity as an energy source which is impossible for rural areas of India. The survey to system which shows cost effective and functional viable. In last two decades for rural application the pedal operated energized flywheel motor has been adopted for many designs. In recent past study the human pedal powered process machine has been developed for turning wood.

III. LITERATURE GAP

By referring to above various literature review we identify gap there is no any such machine available which both peeling and cutter operation are compact in size.

IV. CONSTRUCTION AND WORKING

Construction: The construction of corn de-seeding machine is simple in operation which is made up of mild steel angles bars and plate in order to resist the load of the machine. Both the mechanism are mounted on steel

frame. The peeling mechanism locate on the top of the frame. Whereas cutter mechanism locate at bottom of the frame. A hopper on the top of the safely feed the corn for peeling. The motor is attached with pulley where the motion from the motor is transmitted with help of belt to the Sheller shaft and the cutter shaft as a result the shaft and cutter mounted on its rotates. Firstly corn feed manually through the hopper at which corn grains are separated from the cob can be easily de-seeded. After that the separated seed are cut in small pieces to make paste of it.

After the peeling operation it is necessary the corn should be properly fed to cutter mechanism. The cob after deseeding of seed from corn it enters in to the cob cutter section where it broken into the small pieces. The seed cutter is made up of HSS plate strips. The strips having sharp edges and these strips are welded to the bush. The bush is fix on the shaft which is inside the cutter mechanism. Cob crusher having two types of blades that is moving blades and stable blades. Both blades having the same material.

Working: when machine is switched on, the rollers start rotating. Then the corn is fed through the hopper. This mechanism is simple as like thresher. The roller having Sheller line which acts shear force on seeds . Impact of force is very high due to high speed rotation the centre roller function as the feeding rollers as well as they help peeling of the shell by pushing the corn on adjacent spiked rollers.

It causes removal of seed from cob so these separate cobs are send to cob crusher and separated seed are allows inside cutter casing. When corn cutter machine is working, corn cob is fed through feeding hopper. Both operation carried out with each other. At the top of Sheller drum there is one adjuster mechanism which adjusts the size of casing according to the size of cob. There is different slot are provided on the adjuster casing to adjust the size of Sheller casing. Corn kernels drop through the sieve and corn kernels are discharged through the grain discharge outlet.

V. FUTURE SCOPE

The machine is beneficial for farmers and it has great future scope in any industry due to its moderate cost and simple design.

It is real work to develop the machine at low cost for small scale industry.

The machine is develop in such way that it eliminate the time consumption in separation of the corn.

Saving resulting from the use of this device will make it pay for itself with in the short period of time.

VI. CONCLUSION

Design and fabrication of corn peeling and cutter machine has been developed keeping in mind the constraints and

requirement of the Indian farmers. The corn peeling and cutter machine was tested in the machine shop and later taken to the field. This machine worked well in the field condition and gave output of 432kg/hour. It is multipurpose machine so it performs additional operation. Additionally, it can deseed various type of food item such as rice, chilly powdering, potato paste, corn de-husking. This additional operation can be done by changing the teeth and drum.

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