



Groundnut Peeling Shelling Machine

A.Mani¹, P.Manishkumar², M.Krishna³, U.Karthick⁴

^{1,2,3}UG Scholar, Department of Mechanical Engineering, SNS College of Technology, Coimbatore, India.

⁴Assistant Professor, Department of Mechanical Engineering, SNS College of Technology, Coimbatore, India.

ukarthick17@gmail.com⁴

Abstract

In India, most land is used for agricultural purposes which produces semi- finished products or goods. Groundnut is also one of the agricultural semi- finished goods. Groundnut is grown on small scale farmers in developing countries like India. The average kernel price is approximately twice the price of pod. . Lack of groundnut processing machines, especially groundnut Sheller, is a major problem of groundnut production, especially in our country India. In the beginning the peanuts were separated from its shells by the workers. They simply decoct the groundnut by their hands and separate the peanuts from its shell. The output from this method was very low and it does not fulfill the market demand because it was a very time-consuming process. Regression models that could be used to express the relationship existing between the Sheller performance indices, pod moisture content and feed rate were established. This paper describes the design and fabrication of various components of groundnut Sheller machines. Hence in this design of various parts are necessary, and design of various parts due to which the design quality of those parts will be improved. Overall, this project involves processes like design, fabrication and assembling of different components etc.

Keywords: Groundnut, Sheller Machine, Efficiency, Design, Calculations, Fabrication, Assembling, Evaluation.

1. Introduction

Today India is positioning second worldwide in the horticultural field. A significant number of the oilseeds utilized in Indian agribusiness. Groundnuts or peanuts are the most significant oilseed from that. [1] A groundnut was first brought into India by the Magellan campaign around 1519, as the assessment of Badami in 1936 years. The groundnut is one of the most significant and the significant oilseed crop on the planet. It contains for the most part 48-half oil and 25.33% protein, 10.2% sugar, 500-600 calorific worth and 40.5% fat. [9] Groundnuts are the most remarkable and significant nutrient, completely ailing in others. Therefore, this item is developed in rich amounts. There is such huge numbers of time west in customary groundnut isolating

techniques. Typically, the case was isolated from groundnut by the laborers. [2] This task is mostly about creating another idea of groundnut shell (pound) that would make it simpler to bring anyplace and simpler to pulverize groundnut. After the structure has finished, it was changed to its genuine item where the plan is utilized for rules.

2.Literature Survey

Research approach manages structure &fabricated all of segment which are to be utilized in the machine with required adjustment. [3] Right off the bat amalgamation the all the difficult which are talk with venture. [8] After that plan total atomize machine, at that point with respect to advancement done on shelling machine. Parameters will be chosen by objectives.2D and 3D outlines of segments and gathered machine and line graphs

with marking. The different instruments utilized for manufacture of machine. As seen on last undertaking, [4] it depends on physically worked (paddle worked). Existing task will be changed by making mechanized (semi-automize). Another issue is that nuts and husk is blended coming subsequent to shelling activity, [7] this difficult will be expelled by utilizing blower or other instrument to isolate nuts and husk (external making of a progress nut). By making mechanization (semi-atomizing) profitability improve with limiting tedious and harms of nuts, limit likewise improve. [5] The methodology will be blend, structure, improvement and testing of the machine. By keeping the point in our psyche, we believe that we should make such a machine, whose creation limit is more and machine gets worked on 1 H.P. electric engine rather than manual work. [6] The new and little previous or businessperson can begin their business by contributing less capital. As last framework is physically worked it is currently altered via programmed one.

3.Existing System:

The aim is to design & develop a low cost groundnut shelling machine which will help farmer to sell finished (shelled groundnut) instead of unshelled groundnut. Considering the above problems we are going to design and fabricate such a machine that will eliminate most of the problems from previous available manually shelling machine, so human effort is reduced and getting more productivity, earn more profit to former. The machine shown in fig.1. is the modeling of groundnut Sheller machine

3.1 Concept A:

Introducing low cost automation was to overcome problems with the current manual traditional method. The concept of the work is,

- (1) Observe the manual methods to identify the important process variables.
- (2) Quantify the important method.
- (3) Develop a prototype automation system which could control over all of the process.
- (4) Investigate all areas of automated forming.
- (5) Produce a specification for a low cost automated system.
- (6) Refined design of the machine & fabricate the machine, as this plays a major role in rural area.

The above considering point we design the semi-automated machine which replaces manual process.

3.2 Concept B:

The main aim of this project is to overcome the traditional method.

- (1) To reduce wastage due to crack or crushed groundnut.
- (2) To increase the efficiency.
- (3) To reduce the hard work and to reduced time to shell the groundnut.
- (4) To develop a low-cost machine which can be used by farmers to convert their semi-finished (shell groundnut) into finished product (groundnut).
- (5) It satisfies the need of village people to earn more money.

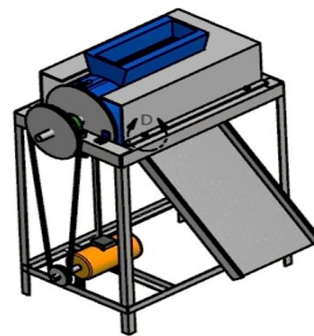


Fig.1. New model

4.Proposed System

Aim of our project is to design & develop a groundnut stripper which will help farmer to reduce human efforts and reduce cost of production of ground nut stripping. Which will be available to them at low cost.

1. To reduce labour efforts.
2. To increase profit.
3. To reduce time.
4. By using modern cultivation progress agriculture.
5. To reduce labour cost.
6. To achieve better efficiency or performance.

4.1 Working principle

In our machine stripping is done by holding the pod portion of a bunch over the rotor of the stripper. The vines along with the groundnuts are held over the rods of the rotor and the pods get removed. After pod removal, the bunch is dried and used as fodder for the animals. Though there are several models of groundnut pod

stripper available in various research institutes, this machine is compact and portable which can be transported to the farms easily. By using an electrical motor, the rotating moment is transferred with the help of a belt to the rotor. Rotor is like cage type structure which is mounted horizontally by means of pedestal bearing on two supporting members. The portable groundnut stripper will help to improve stripping efficiency of large scale production of groundnuts. It also helps to reduce human effort. The groundnut stripper is useful for farmers in stripping groundnuts pods in most convenient methods with time and cost efficiency. Requirement of more number of workers will be eliminated as only one worker can carry out the complete threshing operation.

In comparison these “groundnut shellers” are very cheap. We have selected the “groundnut sheller machine” as our project work. the “groundnut sheller machine” is the ideal equipment for the decorticating process. in the process of completion of the project work our ideas and thought are developed towards the mechanisms and technologies of the equipment. We also visualized that this “groundnut sheller machine” is the most critical equipment for the future growth and development of cottage sector projects.

Similarly we can say that for the purpose of decorticating the groundnut this is economical and ideal in case of cottage sector projects. The “groundnut sheller machine” can be used in cottage industry or even a farmer can also take benefit from this machine. The decorticating process of groundnut by this machine is more economical and faster than manual process or any other processes. Therefore on the completion of this project, we conclude that the “groundnut sheller machine” will save the tremendous time, energy manpower and save financial input of the project, reducing the cost and time considerably which is the backbone of the present world economy.

The weight of the machine is low it is handy to use and easy to move anywhere at the farms. Also its cost is low and affordable for the farmers.

$$(1) \quad \text{Shelling efficiency (\%)} = [Q_s / Q_t] \times 100$$

$$= 81.2 \%$$

$$\text{Design and Material efficiency (\%)} = [Q_u / (Q_u + Q_d)] \times 100$$

$$= 79.93 \%$$

$$(2) \quad \text{Mechanical damage (\%)} = [Q_d / (Q_u + Q_d)] \times 100$$

$$= 20.07 \%$$

$$(3) \quad \text{Throughput capacity (kg/h)} = [Q_s / T_m]$$

$$= 130.5 \text{ kg/hrs.}$$

Above results can show that our project can shell 81.2% groundnut with 20.07% damage. Groundnut Sheller machine capacity 130.5 kg per 1 hrs.

Conclusion:

The main importance of this project is as this machine is battery operated it can be directly transported to the groundnut farms and can be operated without an external electric supply which is not available at most of the farms.

- Proper evaluation of the design will be performed and created something even better instead of simply manually operated operations.
- Finally we conclude that atomizing machines is a better option to use farmer instead of manually operated. The demands atomize shelling machine of farmers & other customers will be also considered while designing machine.

References:

- [1].Rajasekar. M, Arunkumar. S, Design fabrication and performance analysis of groundnut thresher, International Research Journal of Engineering and Technology, 04 (02), 2017, 2395 -0056.
- [2].Ashok. S. Andhale, Sayed Wajahat, Design and development of groundnut pod separating machine, International Journal of Latest Engineering and Management Research, 02 (04), 2017, 455-4847.
- [3].Deshmukh Shubham, Giramkar Harshawardhan, Design and fabrication of groundnut pod separating machine, International Journal of Recent Research in Civil and Mechanical Engineering, 02 (02), 147-150.
- [4].Ghatage J. S., Bandagar, Development and performance evaluation of pedal operated ground nut pod stripping machine, International Journal of Agricultural Engineering, 07 (01), 2014, 217-220.

- [5].Ikechukwu Celestine Ugwuoke. Olawale James Okegbile, Design and Fabrication of Groundnut Shelling and Separating Machine, International Journal of Engineering Science Invention, 03 (04), 2014,
- [6].J. N. MADUAKO and M. HAMMAN “Determination of Some Physical Properties of Three Groundnut Varieties”.
- [7]. A.Mishra, R. Soni and J. Mangla, “development of a low cost peanut decorticator for use in Developing countries” Synergy and Technical Development (Synergy2009) Gödöll, Hungary, 30. August – 02. September 2009.
- [8].A.A. Atiku, N.A. Aviara and M.A. Haque, “performance evaluation of a bambara ground nut Sheller,” Agricultural Engineering International: the CIGR Journal of Scientific Research and Development. Manuscript PM 04 002.Vol. VI. July, 2004
- [9].F.A. Oluwole*, A.T. Abdulrahim, and M.B. Oumarou,““ Development and performance evaluation of impact bambara groundnut .