



DESIGN AND FABRICATION OF GROUNDNUT SHELL REMOVE

T.V.B.Babu, M.Keerthick raja, B.Dhanush. V.Vikash

Department of Mechanical Engineering, VelTech HighTech Dr.Rangarajan

Dr.Sakunthala Engineering College, Chennai, Tamilnadu, India

ABSTRACT

Demand for groundnut products is rising, and applications heavily rely on how clean the nuts are. The separation procedure is typically a time-consuming, energy-draining task. A shelling machine was created to efficiently extract the nuts from their shell. The groundnut pod is broken open by the machine using an auger screw. Farmers in poor nations like India cultivate peanuts on a modest scale. One of the biggest issues with groundnut production is the lack of economical machines for processing peanuts, particularly peanut peelers. The commercially available peanut peeling machines are huge, pricey, and unsuitable for residential use. The machine is constructed using components sourced locally. Hopper, crushing chamber, and separating chamber make up the majority of the machine. The project's procedures include the design, manufacture, and assembly of several components.

KEYWORDS: groundnut crushing

1.INTRODUCTION

The sixth-most significant oilseed crop in the world is groundnut. It has a protein content of 26-28%, a fat content of 48-50%, and a high concentration of vitamins, minerals, and dietary fibre. It thrives on loosely textured, well-drained soils that are rich in calcium, potassium, and phosphorus. Worldwide, groundnut is grown in more than 100 nations. 97% of the world's area and 94% of the crop's production are in developing nations. Asia and Africa account for 56% and 40% of the global area and 25% and 68% of the global production, respectively, of groundnuts. Grain shelling, also known as the removal of grains from their stalk, pod, or cub, can be done by rubbing, impact action, or any combination of these. The process of crushing or pressing the pods between the thumb and finger to break off the pods and release the seed is the most common shelling technique that is still commonly practised in the northern portion of Nigeria. This approach requires a lot of energy, is time-consuming, and has low efficiency.



Additionally, only 1-2 kg of groundnuts are produced every worker hour. Different shelling techniques and machinery have been developed and used to shell a wide range of crops under various circumstances. Due of their high cost and complexity in usage and maintenance, peasant farmers cannot afford these devices. Additional requirements included training the operator and importing spare parts. These elements raise the total cost of production, which is unjustified from the farmer's perspective. Locally, a concave or semi-rotary hand-operated shelling machine is extensively utilised. Since it lacked an expelling unit, separation was only possible through winnowing. A simple hand-operated groundnut sheller has a screen that is closed on both sides of a semi-cylindrical shape. In the middle of the semi-cylinder is a fixed shaft with a lever at one end.

A pair of plates with shoes or beater bars that have blunts on the bottom are attached to the lever. The operator must stand by the side of the machine, hold the working lever (handle), and swing it back and forth to exert shelling pressure on the shoes assembly. The shoes' semi-rotary motion shells the pods against the monitor. This machine's main flaw is that it requires a lot of labour and takes a long time. 60 to 80 kilogramme are produced every hour. All of those flaws are fixed by this particular design, which is also more effective. hopper, crushing chamber, separating chamber, and the the blower apparatus. Additionally, it is electrically operated, which saves time and has a much improved shelling capacity. Additionally lightweight, simple to use and maintain, the machine also has nearby access to spare components.

2.COMPONENTS

- Square tube
- Ms sheet
- Roller
- Motor
- Plastic pipe
- 12v battery

3. SPECIFICATION AND DESIGN CALCULATION

The shelling machine takes about 6 to 7 kgs seeds/hr. It has 75.65 of shelling efficiency and 73.25 of separating efficiency. Vibrator set up is used for better separating efficiency. A 12w battery is connected with the motor. The motor runs up to 600 revolution / min. For a complete shelling of ground nut seeds, the ground nut should be dried and put in the hopper two to three times. The machine space is less time consumption is less by the machine.

4.FABRICATION

A manufactured, readily transportable groundnut shelling equipment. Hopper, base, gear, and shaft make up the machine. Hopper is constructed out of a thin metal sheet. MS steel bolts are utilised to construct gear. It is constructed to vibrate. MS steel was used to create the base. There are two motors installed, and they are linked to the two shafts that rotate counterclockwise. For maximum speed and effectiveness, the motor uses a gear. It is nicely welded and constructed of MS steel. Cutting and bending the sheets is how hoppers are manufactured. About 6 to 7 kilogramme of seeds are taken every hour by the shelling machine. Its shelling and separating productivity are both 75.65 and 73.25 respectively. . For greater separation effectiveness, a vibratory setup is used. The motor is coupled to a 12w battery. The motor is capable of 600 revolutions per minute.



FIG(Fabricated model.

5.BENIFITS

- To make crushing or shelling ground nuts as labor-, time-, and resource-efficient as possible.
 - To change the beater design in order to make the procedure simpler and increase shelling productivity.
 - A machine should not be too expensive for farmers to purchase.
 - A machine that is easier to transport, takes up less room, and is lighter.

6. RESULTS AND DISCUSSION

The design of an electrically powered groundnut shelling machine is presented in this study. Locally obtained materials were used to construct the machine. It can be applied to both household and commercial settings. The benefit of using this device outweighs its drawbacks by a wide margin. According to the test results, the device can shell 400 kg of groundnuts in an hour. Additionally, groundnuts with one seed per pod and those with two tiny seeds in each pod were found to have unshelled or partially shelled nuts when they were harvested.

1. A large portion of the people worldwide makes their living through agriculture. This machine may be modified, and it will be employed on a large scale.
2. This equipment offers farmers better assistance so they can profit appropriately from their crop. The agricultural industry has a vast scope.
3. It will undoubtedly take a lot of work to reduce labour requirements, increase operational effectiveness, save costs, and ease effort.

8.REFERENCES

- 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
- F.A. Oluwole*, A.T. Abdulrahim, and M.B. Oumarou, “Development and performance evaluation of impact bambara groundnut Sheller”
- Shelling Equipment for sample of Peanut, by James dickens, Agricultural Engineer U.S. Department of Agricultural
- Santosh Mangave and Bhagyesh Deshmukh, "Design of a Portable Groundnut Sheller Machine," International Journal of Mechanical Engineering and Information Technology, Vol. 3, No. 4, April, Pages 1125–1129, ISSN-2348–196x.
- In their article "Design and Fabrication of Groundnut Sheller Machine" published in the International Journal for Innovative Research in Science & Technology, Ashish S. Raghtate and Dr. C. C. Handa
- N. Gitau, P. Mboya, B. N. K. Njoroge, M. Mburu, “Optimizing the Performance of a Manually Operated Groundnut (*Arachis hypogaea*) Decorticator”, scientific research, Open Journal of Optimization, 2013, pp. 26-32.
- M. A. Helmy, A. Mitroi, S. E. Abdallah, Mohamed A. Basiouny, “Modification and Evaluation of a Reciprocating Machine for Shelling Peanut”, FARM MACHINERY AND POWER, Misr J. Ag. Eng., 24(2), pp. 283-298.
- Abubakar Mohammed and Abdulkadir B. Hassan, “Design and Evaluation of a Motorized and Manually Operated Groundnut Shelling Machine”, Department of Mechanical engineering, Federal University of Technology, Minna, Nigeria. International Journal of Emerging trends in Engineering and development, Issue 2, Vol. 4, (May 2012), ISSN 2249-6149, pp. 673-674
- Ikechukwu Celestine Ugwuoke, Olawale James Okegbile, Ibukun Blessing Ikechukwu “Design and Fabrication of Groundnut Shelling and Separating Machine” Department of Mechanical Engineering, Federal University of Technology Minna, Niger State, Nigeria. International Journal of Engineering Science Invention ISSN (Online): 2319 – 6734, ISSN (Print): 2319 – 6726 www.ijesi.org Volume 3 Issue 4, April 2014, pp.60-66.
- “Philippine Agricultural Engineering Standard” PAES 220: 2004Agricultural Machinery - Peanut Sheller – Specifications.
- “Peanut and the Thai Food System: a Macro Perspective” Peanut in Local and Global Food Systems Series Report No. 8, Robert E. Rhoades, PI/Virginia Nazarea, Co PI, Department of Anthropology, University of Georgia 2003.
- Del Hagen, Shaheer Hussam, Rafiq Mohdramli, and Alexander Yip “A Low-Cost Peanut Sheller for Use in Developing Nations” Final Application for IDEAS April 10, 2003.
- Santosh Mangave and Bhagyesh Deshmukh, “Design of Portable Groundnut Sheller Machine”. Department of mechanical engineering, WIT, Solapur. International Journal of Mechanical Engineering and Information Technology// Vol.03 Issue 04// April//Page No: 1125-1129//ISSN-2348- 196x