e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:04/April-2025 Impact Factor- 8.187 www.irjmets.com

PINUT SHELL REMOVER MACHINE

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ABSTRACT

Groundnut product demand is on the increase and the application is largely dependent on the cleanness of the nuts. The separation process is usually an energy sapping task that requires a lot of time. In order to separate the nuts from its shell effectively a shelling machine was developed. The machine employs an auger screw as a means of breaking the groundnut pod. The machine basically comprises of shelling chamber, separating chamber and a motor (1HP). The arrangement of these parts is connected by a compound belt of type B standard V-belt of pitch length 1694mm. With the Von-mises equation, the material for the shelling shaft is taken to be mild steel. The materials used in the fabrication of the machine are sourced locally so as to ensure that it is cheap, affordable and easily maintained by the peasant farmers.

I. INTRODUCTION

Groundnut product demand is on the increase and the application is largely dependent on the cleanness of the nuts. The separation process is usually an energy sapping task that requires a lot of time. In order to separate the nuts from its shell effectively a shelling machine was developed. The machine employs an auger screw as a means of breaking the groundnut pod. The machine basically comprises of shelling chamber, separating chamber and a motor (1HP). The arrangement of these parts is connected by a compound belt of type B standard V-belt of pitch length 1694mm. With the Von-mises equation, the material for the shelling shaft is taken to be mild steel. The materials used in the fabrication of the machine are sourced locally so as to ensure that it is cheap, affordable and easily maintained by the peasant farmers. The shelling efficiency and material damage are 84% and 14% respectively for groundnut seeds of 86.5% dry.

II. METHODOLOGY

Methodology of the machine. The goal is to create a machine that efficiently removes peanut shells from peanuts without damaging the nuts. Review similar machines and technologies, study existing peanut shelling techniques, and gather knowledge on materials and machine design.

1: DATA GATHERING

In this phase, relevant information is collected to support the project concept. This data is obtained through direct industrial visits, where we assess real-world system dimensions, operational mechanisms, time efficiency, and identify existing shortcomings or inefficiencies in the current system.

2: SYSTEM DESIGN

The system design phase focuses on developing a mechanism capable of executing the intended function. It involves determining system components, their configurations, dimensions, and functional attributes. The parts required for this phase are listed accordingly.

3: MECHANICAL DESIGN

Each component is analyzed for stress and strain under the given load conditions, and precise dimensions are determined. Standard parts are selected based on reference data from the CBS design handbook to ensure compatibility and reliability.

4: CREATION OF PRODUCTION DRAWINGS

Detailed production drawings are generated using NX-CAD , incorporating dimensional accuracy and geometric tolerances. Additionally, raw material specifications for each part are established.

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5: MATERIAL ACQUISITION & PROCESS PLANNING

Raw materials are sourced based on predefined specifications and required quantities. A structured process plan is then developed to outline the manufacturing sequence and identify suitable machinery for production.

6: MANUFACTURING

The fabrication of components takes place as per the production drawings. Various machining processes, including turning on a lathe, drilling, and metal cutting, are carried out in the company workshop to produce the necessary parts.

III. MODELING AND ANALYSIS

Figure 1: fig. of model

IV. RESULTS AND DISCUSSION

The project aimed to the peanut shell remover machine serves the purpose of enhancing the efficiency, consistency, and quality of the peanut shelling process, making it vital for large-scale production in the food processing industry.

Key findings include:

1. **Efficiency of the Shelling Process :** The machine is able to significantly reduce the time it takes to shell peanuts compared to manual methods.
2. **Peanut Quality Preservation :** Well-designed machines minimize the physical damage to the peanut kernels, preserving their shape and quality.
3. **Impact on the Environment :** The use of automated peanut shellers reduces the environmental impact of manual shelling processes by reducing the need for human labor and waste.

V. CONCLUSION

The development of the peanut shell remover machine has proven to be an effective solution for automating the peanut shelling process, providing numerous benefits for both small and large-scale peanut processing operations. The key findings indicate that the machine offers enhanced efficiency, consistency, and quality in shelling peanuts compared to manual methods. By significantly reducing the time and labor required for shelling, the machine enables faster production and helps lower overall operational costs.

The **shelling accuracy** of the machine is essential in ensuring minimal damage to the peanuts, preserving their quality and making them suitable for further processing, such as roasting or packaging. Additionally, the **separation system**—using mechanisms like air blowers or vibrating sieves—efficiently separates shells from kernels, ensuring a clean final product. However, careful adjustments and fine-tuning are necessary to optimize the process and prevent any potential issues like peanut kernel breakage.

ACKNOWLEDGEMENTS

I acknowledge the significance of pinut shell remover machine in promoting sustainability through electric power, reducing emissions, noise, and maintenance costs. Their enhanced efficiency and reliability support modern food industry.

VI. REFERENCES

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