

A Review on Design and Fabrication of Cashew Fruit and Nut Separating Machine

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Abstract: Cashew is one of the important potential fruits. It takes a long time to separate cashew seeds from the fruit using the traditional approach. The cashew fruit is considered to be one of the most promising types of fruit, but the process of separating the fruit from the nut in large quantities is a difficult task. The cashew seed separating machine was created to make farming easier. With the current shortage of labour and the high cost of hiring workers, many farmers have turned to machines to carry out this task. The fatigue experienced during manual operation is also expected to be significantly reduced. Separating cashew fruit and nut has been the subject of literature. Only three different machines were developed to separate cashew fruit and nut, according to the literature review. Additionally, these machines produce very little output. Thus, there is a huge window of opportunity for the development of such machines. Additionally, a machine with high productivity and mass production must be developed.

Key Words- *Cashew fruit, cashew nut, machine, labour, productivity*

I. INTRODUCTION

Cashew is a crop that is highly valued for its ability to earn dollars and is therefore of significant importance to the Indian economy as a means of generating foreign exchange, employment opportunities, and income for farmers. Commercial cultivation of cashew is primarily carried out in eight states in India, namely Andhra Pradesh, Goa, Kerala, Karnataka, Orissa, Maharashtra, Gujarat, and Tamil Nadu. The cashew fruit is first formed on the tree as a drupe, after which the pedicel enlarges. Picking mature cashew nuts that have fallen to the ground after maturing constitutes cashew harvesting. However, the fruit needs to be picked before it naturally ripens if the apples are also going to be used to make jam, juice, syrup, Fenni, etc. The cashew apples are removed, and the nuts are then dried in the sun for a couple of days to reduce the moisture content from 25% to 9%. Currently, the process of collecting and separating cashews from their fruit is done manually, requiring a lot of manpower to twist the apple off the nut. With a minimum cultivation area of 2-3 meters for cashew trees, it is difficult for one or two persons to collect and separate them, making the process time-consuming. While it is possible to carry out this process manually in small cultivation areas, it becomes increasingly challenging with larger areas, where more manpower is required. Therefore, many researchers tried to find out a solution for this problem.

II. LITERATURE SURVEY

A literature review of articles about cashew fruit and nut separating machines is carried out is given below.

S A Wani et. al. [1] in their work attempts to partially replace human by semi-automated machine for collection and separation operations. These processes involve collection of Cashews from ground by roller type collector and after collecting it transfer to separator. So that separation of Cashew fruit from Cashew is done so an effort of collection and separation are reduced. This machine is simple to operate for single person by electrical power. The cashew seed, which contains the edible kernel or nut, is protected by a tough outer shell that is difficult to break by hand. The fruit attached to the cashew nut is juicy and soft. But the process of collection and separation is time-consuming and requires significant effort. To address this agricultural problem, a technical solution is needed. This paper introduces a machine that can perform the collection and separation process with minimal effort and in less time. This machine is user-friendly and can be operated by a single person. Developed machine is shown in figure 1.

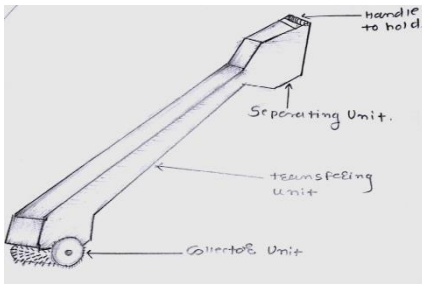


Fig -1: semi-automated machine

Harish Hadimani et. al. [2] their research work, the purpose of this paper is to introduce a technical solution to this problem. The machine described in this study is simple to handle and may be controlled by one person. It is a good option for cashew producers because it uses less energy than physical labour. The problems experienced by cashew farmers may have a technical solution with this machine. The technology described in this paragraph automates the process of sorting cashew nuts from cashew apples by using motors and a controlling unit. A lead acid battery powers the motor, which is coupled to a mild steel hopper. The cashew apples are kept in the hopper and are led one by one by a rotating plate through a sheet metal guide to a stopper. The cashew nut and cashew apple are now separated by a rack and pinion system that is turned on by a different motor. A third motor, likewise connected by rack and pinion, pushes the cashew apples to the opposite side while collecting the split cashew nuts on the bottom. A controller device that manages the operation's stages automates the entire system. Developed machine is shown in figure 2.

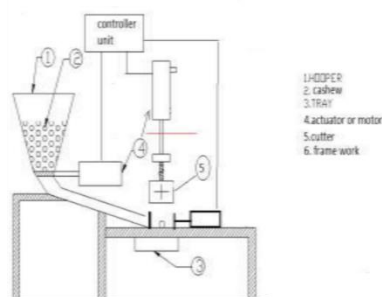


Fig -2: 2-D diagram of the machine

Vrijesh Rai et. al. [3] in their project work a cashew seed separator machine has been designed and fabricated. Their initiative aims to cut down on the time and labour required by the conventional approach. Large amounts of raw materials can be quickly transformed by the machine into usable final goods. It may be put together and maintained for comparatively little money because it was made with materials that were readily available locally. Two flat plates, one stationary and the other movable, are

joined to a rack and pinion mechanism that oscillates back and forth to form the machine's mechanism. Cashew nuts and cashew apples are separated by the knife edge on the moveable plate, with the cashew nuts being collected on the bottom of the mobile plate and the cashew apples being collected on the top surface of the fixed plate. With the use of this equipment, the task may be completed faster and with less labour while still protecting the cashew fruit. The separated fruit can be fed to animals as feed.

III. SUMMARY OF LITERATURE

Some researchers have developed devices using different ideas and designs. Each researcher used typical mechanisms in their device for separating cashew nut from cashew fruit. One of the researcher developed semi-automated machine for picking and separation of cashew nut. The machine is user-friendly and can be operated by a single person. Another researcher created a device that combines mechanical and electronic components. However, cashew nuts and fruit are taken out one at a time. Another researcher created a device that separates cashew fruit from cashew nut using two plates. 20 cashew fruits are maintained in a fixed dish here, and nuts are taken out at a time. Only three researchers worked on this topic hence there is a vast scope in the development of machine for separation of cashew nut from cashew fruit.

IV. CONCLUSIONS

Only three researchers made an effort to develop various machines using various concepts in order to address the problems related to the separation of cashew fruits from cashew nuts. The productivity and cost of the equipment and process vary depending on the design and concept. However, the productivity of every machine created up to this point is low. A machine that can separate cashew fruit and nut in large quantities must be designed and developed in order to boost the productivity of the device.

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