

# **Design and Fabrication of Dehusking Machine of Areca nut**

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**ABSTRACT:** In this paper we have presented the Design and Fabrication of Areca Nut Dehusking machine. However the peeling of areca nut is done manually by using sharp knife. By this method the production rate is low and the consumption of time is more. So it is necessary to develop a agri machine to increase the production rate and to decrease the consumption of time. The primary processing of Areca nut is peeling the outer shell completely. This project is aims at producing an efficient and more economical machine for areca nut industry. Currently there are more number of devices available for peeling the dry areca nut. But other machines are not suitable for peeling the fresh or green areca nut. But in this device will work for both dry and fresh or green areca Nut. The machine assembly consists of driving shaft, stationary rod, motor, pulley and blower. The Dehusking of areca nut is made by the rotating the driving shaft which consist blades on its periphery. The motor rotates the rotating shaft with the help of belt and pulley. The blades are attached on the driving shaft in a perfect angle for peeling the areca nut. This machine is designed to accommodate different sizes of areca nut that are cultivated anywhere in the world. This device is simple in design, portable, low cost and easy to operate, eliminating the need of skilled labour.

**KEYWORDS:** Areca nut, Dehusking.

## **I. INTRODUCTION**

Areca nut palm is an important commercial crop in India. It plays a prominent role in the social, cultural functions, religious and economic life of people in India. The crop is mainly grown in states of Kerala, Karnataka, Tamil Nadu, Assam, West Bengal, Meghalaya, Maharashtra and Andaman and Nicobar group of Island.

In India, areca nut was grown on 3.81 lakh with production of 4.83 lakh MT and productivity of 1409 kg/ha during the year

2006-07. After drying areca nut are dehusked at small scale processing unit by manual labour using sharp edge knife. By this method the production rate is low and the consumption of time is more. So it is necessary to develop agri machine to increase the production rate and to decrease the consumption of time. The primary processing of Areca nut is peeling the outer shell completely.

## **II. CHARECTERISTICS OF ARECA NUT**

There are two varieties of Areca nut, called WhiteSupari and Red Supari. White variety supari is prepared by harvesting fully ripe Areca nut and by sun drying for 40 to 50 days. After drying the nut, the shell of the nut has to be removed by hand/machine.

### **2.1INDIAN SCENARIO:**

The current world productivity of Areca nut is 1.287 tonnes/ha. India is the largest producer of Areca nut in the world. India ranks first in both area (58%) and production (53%) of Areca nut. Besides India, China, Bangladesh, Indonesia, Myanmar, Thailand are the other important Areca nut producers. It is estimated that more than 10 million people depending on this crop for their livelihood

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Fig 2.1.1

. The main pockets of production of Areca nut in India are distributed in the states of Karnataka (42% of area and 45% of production), Kerala (28% of area and 24% of production), and Assam (20% of area and 16% of production). Tamil Nadu, Maharashtra Andhra Pradesh, West Bengal and Orissa are the other important producing states. Mumbai, Ahmadabad, Indore, Jaipur, Delhi, Nagpur, Patna, Calcutta, Cuttack, Mangalore, Bangalore, Rajkot, and Chennai are the important marketing centers of Areca nut in India. Total consumption in India is estimated to be 330,000 ton per year. India also exports limited quantity mainly in the form of pan masala, scented supari and gutkha.

## 2.2 STATUS IN KARNATAKA:

Karnataka is the major producing state in India. In Karnataka, Areca nut is cultivated as a garden crop. Areca nut is mainly produced in Shimoga, North Canara, Dakshina Kannada, Udupi, and Chikmagalore districts. In four decades area under Areca nut was tremendously increased that is nearly 400 times. More than 2 lakh farmer families are involved in the Areca nut cultivation. Areca nut could provide an assured employment to the extent of one crore man days annually.

## III. PROBLEM DEFINITION

Cost of processing of Areca nut to remove the nuts has revealed that about 35-40 per cent of the total cost of processing is spent for husking Areca nut alone. Peeling of Areca nut is one of the labour intensive processes. This task is mainly carried out by ladies and children in the village. Peeling of Areca nut is difficult by hand. Presently it is being done manually by using a sharp knife with a production rate of 3kg/hr. and normally one will do about 24 kg in a day. This work is done by skilled labours only. Shortage of labour is a major problem which almost every village and farmer faces, especially during the harvest season. Therefore it is essential to develop a machine which will enhance the ease of production & eliminate the risk of labour injury involved in the traditional manual peeling process. Under these circumstances, there is enough scope to develop a suitable machine to peel the Areca nut of different sizes completely and efficiently. The machine should be simple in design, easy to operate, portable, low cost and easy to operate by unskilled person.

## IV. OBJECTIVE

The objective of the project is to develop a machine for husking of Arecanuts. These problems can be overcome by developing a machine which can efficiently and economically husking the Areca nuts. The machine should be able to accommodate different sizes of Areca nut and it must also be easy to operate, eliminating the need of skilled labour.

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## V. DEVELOPMENT OF ARECA NUT HUSKING MACHINE

The machine consists of electric motor, belt pulley, and 2 rotating shafts with blades, rough surfaced shaft, hopper, blower, frame.

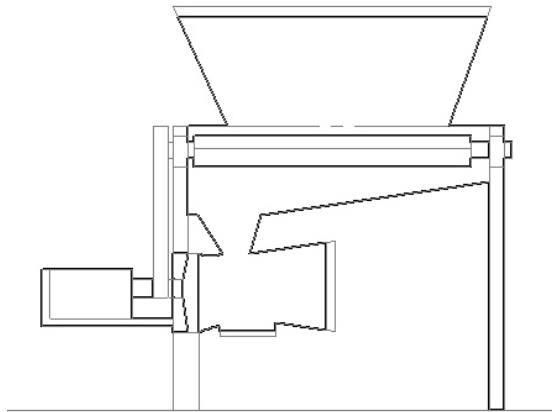


Fig 5.1.1 Conceptual design

### 5.1 DESIGN OF BLADE:

The blade is an important part of our mechanism with sharp edge to cut the areca nut. The material used is tempered steel for withstanding different load condition. The blades are placed on the periphery of the 2 rotor shaft at an angle  $60^\circ$ .

Specification of blade:

1. Axial length: 850mm
2. Thickness: 1.5mm
3. Material: treated steel

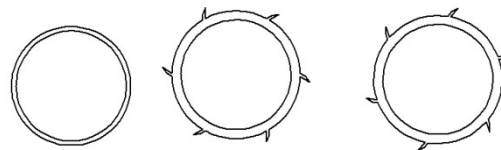


Fig 5.1.2

## VI. WORKING PRINCIPLE

The machine consists of 3 active shafts or live shafts, one of the shafts is rough surfaced and other two shafts consists 6 blades each. The feed is provided at horizontal position of shaft. The shafts get power from electric motor through belt and pulleys. The shafts are rotates in opposite direction to each other.

The areca nut is fed through hopper, the smaller grade (size) areca nut is fed at position [1] as shown in fig. As the shafts rotate in opposite direction, the patterned shaft grips the areca nut and the bladed shaft peels husk from the nut.

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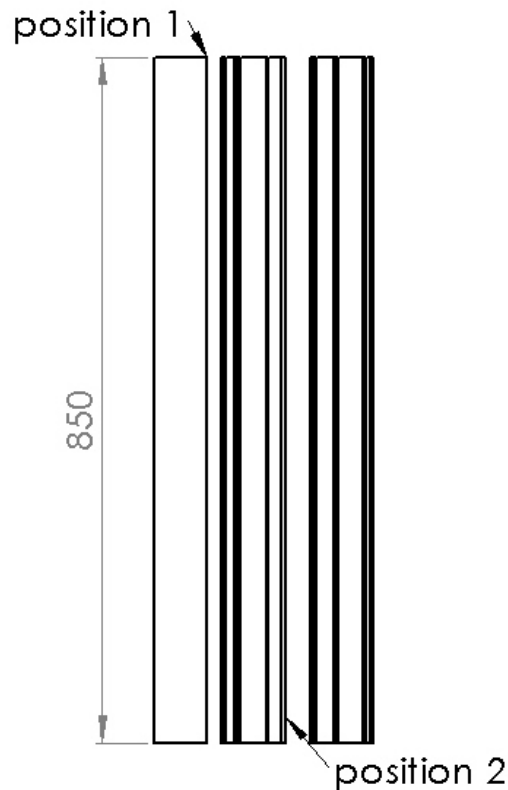


Fig 6.1.1

The bigger grade areca nut is fed in position [2]. Now with these opposite rotating blades pierce on both direction of areca nut. The husking will on the basis of the moment action of force. When both the shafts rotate further the twist action of blades inside the husk half width will peel the husk.

### VII. SCOPE OF PROJECT

In our country the people are looking for a job that has to be done in easier way. This machine reduces the human effort and also saves time to great extent. It is possible for us to obtain the more output. In many industries labours are used for processing of arecanuts, it is both costly and time consuming. Our proposal reduces the cost and time, as the machine is fixed once. By implementing this human effort will get reduced. Chances of accidents in manual method is more, we can overcome in this design. Efficiency of machine will be maximum, if proper care and service is carried out once in a week. The production rate will get increases, as the time required by this machine is less. It is not huge, so less space is required.

### VIII. APPLICATION

1. Industrial canteens.
2. Agriculture purpose.

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## IX. CONCLUSION

The areca nut Dehusking machine is in development stage. This machine is compact in design making it portable .this machine is cost effective compare to the other existing machines. It can be operated by semiskilled personnel also. This machine has three active shafts to dehusk the areca nut. It could help a large number of farmers to overcome their various Dehusking problem.

## REFERENCES

- [1] Aaron Hegde, John Deal (2014), "Areca Nut Farming in Southern India A Case Study" International Journal of Business and Social Science.
- [2] Baboo B (1981), "A device for dehuskingarecanut". Journal of Agricultural Engineering (ISAE).
- [3] Balasubramanian M, Panwar J S (2000), "Mechanical properties of arecanut related to dehusking". Journal of Agricultural Engineering (ISAE).
- [4] Kiran K, Arun Kumar Govin, ManjunathBandi, "Design, Development and Testing of an Areca nut Dehusking Agrimachine" Int. Journal of Engineering Research and Applications,4(7),2014,109-115.
- [5] Niamhom S; Jarimopas B (2005). Some physical and mechanical properties of sun-dry betel nut. Proceedings of the 6th National Seminar on "Towards a Kitchen of the World by Agricultural Engineering", organized by Thai Society of Agricultural Engineering and Faculty of Engineering and Agricultural Technology, Rachamangkala University of Technology, Tany.
- [6] R Gunaseelan, SankaralingamShanthi, Ramesh Sowmya, ManjulaDatta, 2007 Areca nut use among rural residents of SriperambudurTaluk: A qualitative study, Indian Journal of Dental Research, Volume : 18 Issue : 1 Page : 11-14.
- [7]Varghese, F. and Jakob, J. (1998). Design fabrication and testing of arecanutdehusker. Agric. Mechanization Asia, Africa & Latin America (AMA), 29(1): 27.