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Development of Hand Operated Coconut Shell Polisher

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Abstract: ***Coconut is integral component of our daily life. Various parts of coconut like copra is used as food, shell as fuel and coconut water as nutritious liquid. Green coconut contains water in the early stage of its maturity and afterwards there is a gradual development of meat. Both of the parts are full of nutrition but for the effective utilization of coconut, peeling is required. Sharp knife is being used as conventional method which is tiring, risky and time consuming and to overcome these types of conventional methods problems, motorized machines are introduced. With the size variation of coconuts, there is a need of adjustment in tools used in machine to avoid breakage of nut. Keywords: Coconut, coconut shell, hand operated coconut shell polisher , coconut ice cream***

I. INTRODUCTION

Coconut (cocos nucifera) is one of the most useful and important perennial crops in the world. Coconut plays an important part in the profitable, social and artistic conditioning of millions of people in our country. India is a major patron of coconut in the world. Coconut provides food, consumable oil , industrial purpose oil and health drink to humanity. All the parts of a coconut tree are useful in many ways. The crop deeply influences the socio- profitable security of millions of farmers and their families. Coconut oil, which falls under edible-industrial group, is used for cooking and for cosmetics like hair oil and massage oil and for industrial purposes. Coconut oil on blending with diesel can be used directly in adaptable engines or converted into bio-diesel. The coconut fruit is composed of three layers. A thin outer layer, a thick fibrous middle layer and a hard inner layer called exocarp, monocarp and endocarp respectively. The endocarp of coconut contains three germination pores at one end to allow the sprouting palm to grow. The seed is covered by an outer brown layer. This brown layer is called the testa or seed coat . This brown material sticks to the endosperm when it is removed from the endocarp shell. The coconut water is multinucleated liquid endosperm and has not been developed into solid tissue.

II. MATERIALS AND METHODS

The process of dehiscing in very simple, place the coconut in between the two rolling cylinders, rotating in the opposite directions and press it by operated manually mechanical linkage. When cylinder rotates, pegs provided on the periphery penetrate into the husk and remove it away. Or, the process of dehiscing can be done by manually. After the process of dehiscing of coconut, the outer shell of coconut appears rough surface hence by the coconut shell polishers machine this shell have polished and gives smooth surface.

Fig 1 ; coconut shell polisher

Steps

1) Rotating the handle of polisher machine by manually, when we rotates the handle then the Polishing unit also rotate.
2) When the polishing unit starts rotating, the coconut is held by hand and pressed hard on the polishing unit.
3) Sandpaper is used for scrubbing rough surfaces of coconut.
4) It is a thick paper with a rough and abrasive surface. And when the unit of polishing is rotates then it attached sand paper also rotates and remove the remaining husk from the shell.

The main purpose of polishing coconut shell is to make different types of accessories and decorative items.

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III. REVIEW OF LITERATURE

Indonesia is the largest producer of coconut in the world followed by Philippines and India. It also accounts fifty percent of coir business across the world (Danny Thomas, et.al.). The coir or the husk is the outer cover of the coconut. The husk or coir is removed manually or mechanically. In both the cases, skilled workers are required for removal of the coir or the husk. Efforts have been made by researchers to remove the coir by a developing a dehusking machine. The automated coconut de-husking machine consists of two rollers with spines mounted on a frame. The machine is powered with sprocket driven by chain drive (A. H. Ingle et al.). The motor used with worm and worm gear assembly drives the chain drive. The force to de-husk the coconut has been determine for immature and mature coconut. The machine is simple and efficient. Its maintenance cost is also low. It needs less skilled human power thereby reducing the cost of operation with increased productivity

IV. RESULTS AND DISCUSSION

The physical properties of coconut have been measured and record some of the coconut shell product available in the market such as spoons, forks, pen stand, grain. measuring vessels, cup, tea pots and plates have been reported here. the endosperm of the coconut studied have been used to make coconut ice cream.

Table 3.1 Properties of coconut

Sr. No.	Items	Dry coconut
1.	Shape	Ovoid
2.	Length, (mm)	210-270
3.	Diameter, (mm)	160-206
4.	Weight, (kg)	0.62-1.25
5.	Shell Diameter, (mm)	80-120
6.	Husk Thickness-at pedicel end, (mm)	62
7.	Husk Thickness-at apex end, (mm)	34
8.	Husk Thickness-1/4 distance from pedicel end, (mm)	32
9.	Husk Thickness-1/2 distance from pedicel end, (mm)	24

Table 3.2 Physical properties of coconut samples used in the experiment

Sr.		Coconut-1	Coconut-2	Coconut-3	Coconut- 4
1.	Weight of the coconut	569.6gm	536gm	549gm	551.3gm
2.	Removed the husk time noted.	04:40:83	03:47:51	04:49:49	3:53:18
3.	Weight of husk	70gm	135gm	120gm	94.6gm
4.	Weight of coconut without husk.	485gm	393.9gm	400.9gm	451.5gm
5.	Surface area.	341.5cm2	340.18cm2	342.18cm3	420.64cm2
6.	Roundness.	1.097	0.11	0.17	1.034
7.	Sphericity.	0.81	1.73	1.23	1.93
8.	Volume.	381.1cm3	322.24cm3	350.24cm3	589.05cm3

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V. CONCLUSION

It is concluded that this manually operated machine can polished the dry coconut shell efficiently. By the experimental results it is said to be the Polishing of coconut per 7 to 8 minute is one coconut. This project work is a good idea of solution to bridge the gap between institutions and industries. The shell polisher is performing satisfactorily under normal working conditions. This developed “coconut polisher machine” is a low-cost automation unit. The application of coconut polisher got smooth operation. By using some more innovations and techniques, it can be modified and developed according to the applications.

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Coconut shell is usually considered as a waste. After dehusking it can be used as a raw material for artistic product and food container. It is to be used as raw material for creating handicrafts for decorative and utility purposes and also food product.

The conclusions drawn from the study are:

1) The manually operated equipment can polish the four-coconut shell efficiently.
2) The times taken to polish one coconut shell in 7 minutes
3) Coconut shell usually thrown as a waste can in converted to wealth.
4) The product made from coconut shell are spoon, forks, cups, tea pots and plates can be made at home hold level thereby increasing the income of poor families.
5) Beautiful arts can be painted on the polished surface of the shell by painter artists for home/ office decoration.

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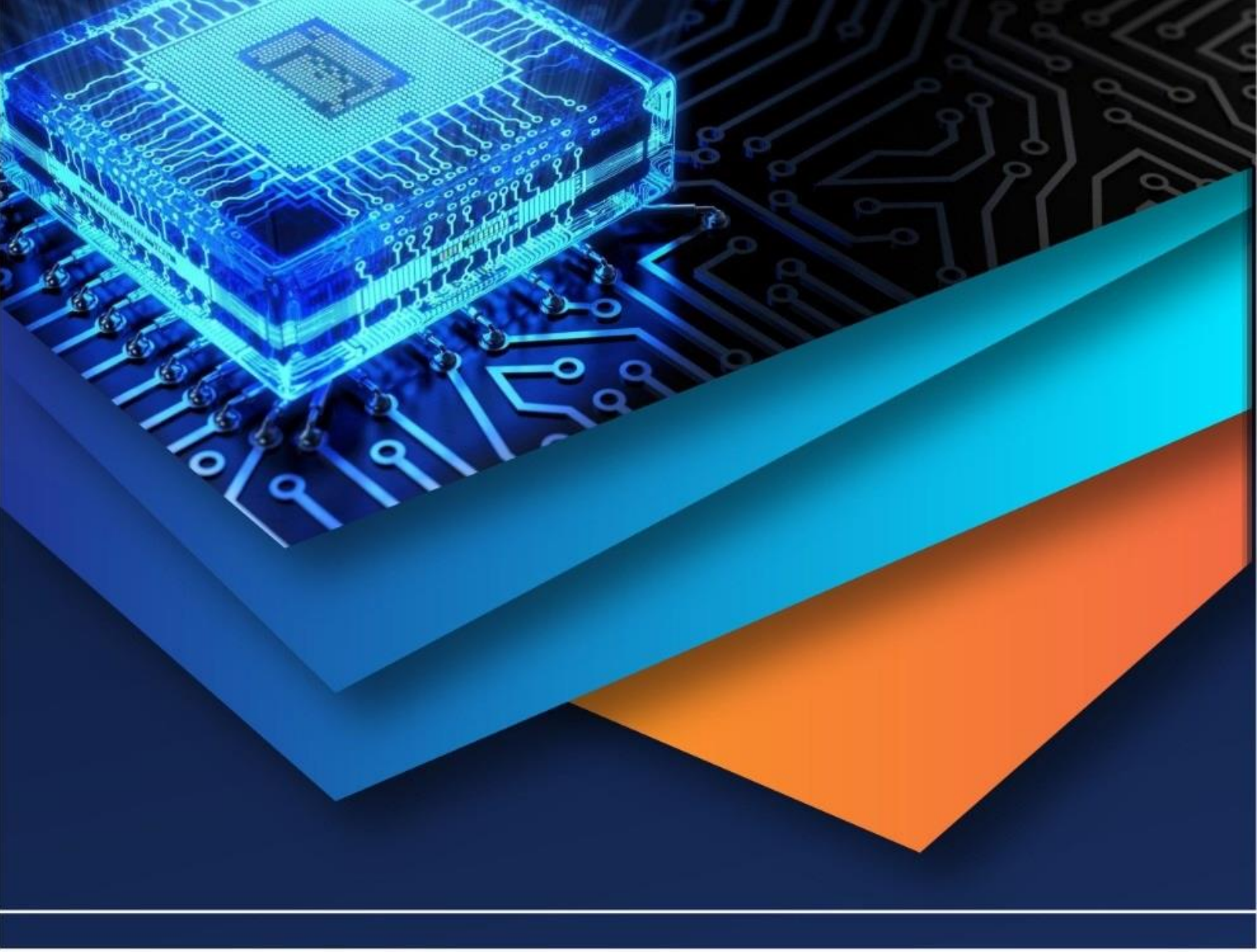

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