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Development of Multipurpose Coconut Cutting Machine.

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Abstract: This research work includes the study of problems that were faced during the cutting of young coconut in commercial purpose. By studying such problem the need of efficient coconut cutting machine was developed. If the developed machine is commercialize the problem of use of coconut water at hotels and restaurants will get benefited. The purpose of this research is to develop, test, and evaluate the young coconut fruit cutting machine. This research work include the description of such a machine which will not only used to cut the coconut but also can be used to drink coconut water at parks and beaches. The application of screw jack for the development of this machine reduces the cost of fabrication.

Keywords : young coconut, coconut cutting machine, screw jack

1. INTRODUCTION

The concept behind this paper is to improve efficiency of cutting of coconut with less efforts and less man power and to increase the rate of cutting the coconuts. This project reduces the chance of any hazard while cutting the coconut along with this. This machine is the portable device, due to its less weight it can be easily portable. The life of this machine is very long. Only the changing of cutting blades and drill tool have to be required after a certain cutting coconut frequently. Other than this the screw jack has an long life. It required less maintenances as compare to other cutting process of coconuts. There is only need of checking the sharpness of blades. This paper will provide a brief idea in designing a new machine with these instruments.

Coconut is one of the important nut crops in Bangladesh. Its production in Bangladesh is 907255 Metric tons from 12825 acres of land in 2004-2005 (BBS, 2005). It is mostly grown in the southern part of the country. The liquid endosperm inside a young coconut is known as coconut water. It is fat free and low in calories. Sodium, potassium, phosphorus, chloride and magnesium are the main minerals found in coconut water, besides vitamin C and sugars (Magda, 1992; Campos et al., 1996; Nadanasabapathy and Kumar, 1999). Coconut water presents anticarcinogenic properties (Sylianco et al., 1992) and can be used as dehydrating solution administrated in oral and intravenous form, the later incase of severe dehydration (Magat and Agustin 1997; Falck et al., 2000). It has a great demand especially during the hot season. It is very effective especially for diarrhoea attacked people and excellent tonic for old and sick[3].

The processed green coconut water increased the availability of coconut water and the producers sell it at reasonable price. The present investigation was undertaken with a view to preserve green coconut water which will be easily transported and increase availability all over the country. Producers cultivate the coconut (Cocos nucifera L.) for its kernel of water and soft jelly; both these have health and nutritional benefits which consumers like. The water and kernel are known to build body muscles of thin and emaciated individuals, cure sore throats and relieve stomach ulcers. Consumption of coconuts helps diabetic sufferers and those with kidney ailments [3].

The water serves as a refreshing drink or it may be added to cocktails. The dwarf coconut plant has economic value and importance. This factsheet will provide producers and potential producers with the essential requirements to cultivate the crop.

2. MATERIALS AND METHODS.

Design parameters for a cutting machine consist of the size of young fresh coconut and the maximum compressive force used for cutting the coconut in half by a sharp knife.

Three different samples of different sizes are selected for the experimentation. The 3-dimensional size of the fruit was 19.22±0.88 mm, 15.91±0.58 mm and 15.2±0.47 mm, with an average weight of 2.04 ±0.15 kg [1]. The fruit was placed between the knife edge and the cross head of the universal testing machine which was attached to a 12 kN load cell. The highest cutting force at each loading speed was recorded. Results showed that the higher the speed of cutting, the lower was the compressive force. However, the maximum force of 2535 N at 25 cm/min of loading speed was selected for the design of the machine. Variation of the cutting force happened due to the shell strength, which depended further on the fruit maturity[1].

Fig -1: Size of Young Coconut

The machine was fabricated as shown in fig.2. consist of following parts.1) the screw jack with a coconut holder arrangement 2) the removable cutting blade 3) pointed type of tools with a nut arrangement. The tools are categories as cutting blade and pointed tool are kept at constant fixed position. The coconut cutting machine is has following dimensions. Its height is about 38 cm and the width is 30 cm with a platform and the threads of jack is BSW 38(it is the standard screw jack available in market, the threads of cutting tool blade holding nut is BSW 12 mm and the hole making tool is of 10mm as shown in fig.2.

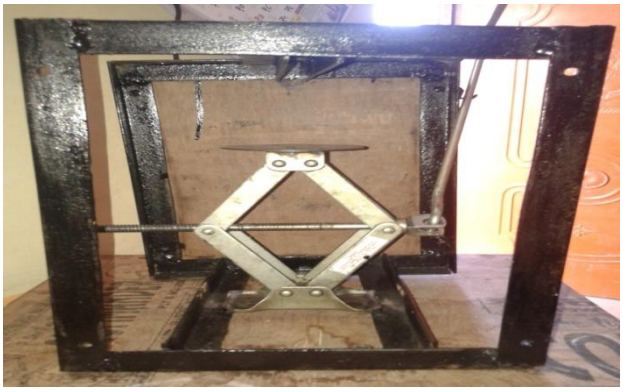

Fig -2: Frame of machine with screw jack.

The cutting tools are made up of blades are made up of stainless steel. The blade size is 17 cm in length and the thickness 5 mm. It is provided with threaded bolt to hold that blade in fixed position. In addition to that a drill bit is also provided so that coconut water can drawn with the help of straw. It is also made up of stainless steel.

Fig -3: Cutting tool and blade.

3. OPERATION

- The young coconut is hold in position on the top face of screw jack. The drill tool is fixed on the top of the frame.
- Next the screw jack is lifted up with the help of handle. It will move the jack in upward direction. the threads are strong enough to lift the coconut even after tool restrict the motion.
- Due to the lifting force of screw jack the hole will get drilled in the young coconut and water will be ready to use.
- After this if we change the dill with blade and repeat the same procedure we will get cut that young coconut in to two halves.
- The procedure is simple enough that we can commercialize the process.

3. INNOVATIVE IDEA

1. The innovation in such types of new thinking is that, it increase the level of easily work doing by adding the various mechanism and the engineering techniques.
2. In the old cutting process or the work for cutting the coconut is too hard and so more energy is required, to improve the working condition this type of idea is developed.
3. It will really helpful for human being or the person who wants to open this own business related to coconut juice centers. This ideas being going to improve his business speed with high earning, also with the high improved the quality of juice i.e. coconut water.
4. An important object of the present invention is to provide a machine for cutting the one coconut immediately after the other, to the end that one machine can cuts coconut rapidly to supply a number of workman who have to job of removing the coconut.

Fig -4: Appearance of young coconut fruit after cutting

Fig -4: Image of coconut cutting machine.

There are various application of this machine which make it multipurpose, these application includes [2]

1. For cutting an coconut with an less efforts.
2. For the cutting or making the hole in an coconut.
3. It requires less time than any other coconut cutting tool.
4. There is no any human hazard occurred while cutting the coconut or it reduces the chances of any human hazard.
5. Watermelon, pineapples, and various fruits can be cut out with this machine.

The proposed machine is advantageous in following manner.

1. It reduces time to cut the coconut.
2. It improved the quality cutting of the coconut.
3. Number of coconuts can be cuts and hole out with this machine at time.
4. Less space is required due to its compact size.
5. It is a portable machine.

4. CONCLUSION

This machine is mainly design to cut the coconut and to make the hole in coconut with the help of various tools like cutting blade, hole making tool. The important thing about this machine is that it reduces the time of cutting the coconut, along with the coconut the various fruits can be cut out on these machines.

The two operations can be done simultaneously there is no any extra attachment is required for performing the operations. The cost of the developed machine is very less so that it can be used in small restaurants and shops. This will definitely improve the productivity of coconut in all parts of the country and various new applications can be generated in future.

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