

Fabrication of Coconut Water Extraction Machine for Delicate Coconuts

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Abstract:- Coconut water could be a well known and nutritious refreshment delighted in around the world for its common sweetness and reviving properties. Aseptic extraction of coconut water from delicate coconuts is basic to preserve its quality, flavour, and security. This unique presents the advancement and plan of a specialized machine for the aseptic extraction of coconut Water from delicate coconuts. The essential objective of this venture is to form a user-friendly and productive machine that can extricate coconut water from delicate coconuts whereas guaranteeing the product's aseptic quality. The plan of the machine joins highlights to protect the wholesome substance, and upgrade the generally productivity of the extraction process. The improvement and plan of an aseptic coconut water extraction machine for delicate coconuts speak to a noteworthy progression within the coconut refreshment industry, advertising a dependable and proficient arrangement for creating high-quality coconut water that meets the requests of health-conscious buyers.

Keywords:- Delicate Coconut, Extraction Machine, Aseptic Quality.

I. INTRODUCTION

Coconut water, frequently alluded to as "nature's sports drink," has picked up colossal notoriety for its reviving taste and various wellbeing benefits, counting characteristic hydration, electrolyte renewal, and a wealthy source of basic vitamins and minerals. The request for coconut water in both residential and worldwide markets has surged, and makers are looking for more productive and sterile ways to meet this request whereas protecting the coconut water's normal freshness and virtue. Coconut water, eminent for its characteristic sweetness and revitalizing traits, has picked up worldwide ubiquity as a nutritious refreshment. The aseptic extraction of coconut water from youthful, delicate coconuts is of fundamental significance in protecting its quality, flavour, and security. In reaction to this basic, this composition presents a spearheading endeavour within the improvement and plan of a specialized machine custom-made for the aseptic extraction of coconut water from delicate coconuts. The main objective of this extend is to form a user-friendly and proficient device competent of extricating coconut water from youthful coconuts whereas guaranteeing the most extreme aseptic quality. Machine's

plan consolidates highlights pointed at defending the dietary composition of the fluid whereas optimizing the generally effectiveness of the extraction handle. The development and plan of an aseptic coconut water extraction machine for youthful coconuts speak to a critical progression within the coconut refreshment industry, advertising a dependable and compelling arrangement for creating high-quality coconut water that adjusts with the inclinations of health-conscious shoppers. In this composition, we dive into the intricate points of interest of this surprising mechanical accomplishment, shedding light on its noteworthiness within the ever-evolving scene of the refreshment industry.

➤ India Ranks:

Third on the world coconut map and recently became the largest coconut producer with 16.9 billion nuts from about 1.89 million planted area hectares. Although India is one of the largest producers coconut with the distinction of having the tallest Productivity is 7,779 nuts per hectare, compared to 3,630 nuts per hectare. hectare in Indonesia and 3,859 nuts per hectare in the Philippines, estimated annual per capita availability of coconut there were only 10 nuts, which is quite a lot compared to 222 nuts Philippines, 145 from Sri Lanka and 55 nuts from Indonesia.(Scholar, n.d.)

II. LITERATURE REVIEW

The coconut is renowned for its remarkable adaptability, which is shown in the varied uses for which its diverse components are put across the jungle and subtropical region. Coconuts are essential for many people who need to consume less calories on a daily basis. Because of their high "water" content and reputation as delicate or jam nuts when they were young, coconuts are not exactly the same as some other organic goods. They may even be gathered for drinking. Once When fully grown, they do contain a small amount of water and may be used as seed nuts or processed to extract oil from the part, make charcoal from the hard shell, and produce coir from the husk of sinew. Initially, the endosperm is suspended inside the coconut water during its atomic stage.(Scholar, n.d.) .

Carter created a coconut splitter in 1926. The primary purpose of the design was to split open, allowing the kernel to be readily extracted from the shell after sun drying. In

1956, Rey created a device to crack open coconuts. However, the device is very heavy.

Its reasonably diluted coconut water is a refreshing drink. Leaves and husks may be used to construct a variety of products for clothing and interior design. Smooth coconut water is a nourishing and healthful beverage. It is among the most popular drinks among city dwellers. The coconut has a green tint throughout. It must be chopped off at the top and strained in order to release the water and flesh. In order to combat the intense heat, nature has provided the most nourishing and healthful beverage for those living in the jungles: the water found in delicate coconuts, which is actually the fluid endosperm. This kind contains 90–95 percent water. This coconut has the most ideal fluid, which is typically healing. The most nourishing and healthful beverage that nature has provided for those living in the jungles to combat the intense heat is the water of the delicate coconut, which is actually the fluid endosperm. 17.4 calories are included in every 100 grams. (Kuberski et al., 1979a)

Shamsudeen et al.(1999) raised a sensitive coconut shaper in KAU. In essence, it required a hand switch, a sharp edge, a base, a stand, and a turning head. A wooden board served as the basis. The base held the stand in place. The rotating head was held at a 20-cm level and freely mounted concentric to the stand. The cutting edge measured 30 cm in length and 5 cm in width. Its bleeding edge was serrated, with serrated points that were about 4 cm apart. To enable the cutting edge to be manipulated in an upward plane, one end of the sharp edge was attached to the turning head by an even pivot, and the other end was crucially attached to a hand lever that was 70 cm long. The coconut was placed on the base of the activity with the intention of spreading its longitudinal hub to the stand. He raised the knife and placed it on the coconut. The coconut was then divided into equal halves by a downward push.

In 1997, Shamsudeen K.P. and Anitha at Kellappaji College of Agricultural Engineering and Technology in Tavanur created a delicate coconut punch and splitter. It was composed of a seat assembly and a punch assembly. A hand lever that was pivotally linked to the punch was hinged along a horizontal pin that was fixed on a stand. The punch reciprocated in a sleeve by swinging up and down with the hand lever. It was difficult to get the punch through the sleeve, even though it could pierce the soft coconut. Additionally, it was necessary to improve the mechanical advantage of the too.(Shamsudeen et al.(1997)

➤ *Problem Statement:*

The goal of this project is to design and build a extraction of coconut water Machine , with the primary objectives being increased productivity and decreased labor and time requirements, therefore increasing the advantages. The task at hand is to effectively handle and savor soft, freshly filtered coconut water. The current manual extraction method is labor-intensive, time- and energy-intensive, and frequently requires a great deal of physical exertion. Make sure the extracted coconut water has a consistent quality and taste. Optimize the extraction procedure to increase the

production of coconut water while requiring less time and work.

➤ *Materials and Cost Estimation:*

Table 1 Materials and Cost Estimation

304 Stainless Steel Plate	-Rs.250
304 Stainless Steel Cutter	-Rs.1500
304 Stainless Steel Round Pipe	-Rs.250
304 Stainless Steel Plain Sheet	-Rs.2000
1 inch MS Square Pipe	-Rs.1000
304 Stainless Steel Filter	-Rs.200
Flexible Pipe	-Rs.75
Labour Cost + Miscellaneous	-Rs.700
Total Cost	- Rs.5975



Fig 1 Side View of Coconut Water Extractor Machine

III. METHODOLOGY



Fig 2 Selection of Tender Coconut

A. Selection of Tender Coconut [Visual Selection]:

- Begin the process by selecting a fresh tender coconut.

B. Inspection of Coconut Visually:

- Look for a coconut with a green exterior. Avoid coconuts with brown spots, as this can indicate spoilage.
- Check for any visible cracks or damaged areas on the coconut. A damaged coconut may have contamination.
- Inspect the top of the coconut for any signs of sprouting. A sprouted coconut may have less water and a different taste.

C. Positioning of Coconut:

- Place the tender coconut on a stable surface, ensuring it is horizontally oriented.
- It means laying it on its side with the top and bottom pointed ends facing the opposite direction.
- Make sure the coconut is firmly in place; We might need to use one hand to hold it while the other operates the cutting machine.
- Make a Horizontal cut along the coconut's equator with the cutting machine so that we can reach the Coconut water inside.

D. Breaking of Coconut:

- As position the machine, make sure it is in flat and stable surface, and that is firmly fixed to avoid any movement while it is operating.
- To hold the coconut in place while operating the machine, use clamps or a sturdy holder.
- The equator of the coconut is its widest point, so set the machine to apply equal pressure horizontally along it.
- To move the cutting blade horizontally through the coconut, we will need to apply pressure to a coconut .
- After the machine has made the cut, carefully remove the two halves of the coconut.
- We can now access the coconut water inside the two halves.

E. Extracting of Water:

- To get the water out of the coconut, apply mechanical pressure.
- The water from the coconut will start to run out as the cut is made.
- Transfer the extracted water to a sanitized container.

F. Filtering of Water:

- Filter the coconut water once it has been extracted.
- Since the filter is fixed to the machine, the water will automatically pass through it and be clean and hygienic.

G. Collection of Water:

- Following filtration, water that has been filtered uses gravity to flow through flexible tubing.
- Place a jar or vessel underneath the coconut so that the water that has been filtered may be collected.

H. Second Filtration:

- Make sure there are no particles or contaminants by looking at the coconut water's purity and quality.
- To further improve the quality and get rid of any contaminants, filter the tender coconut water once more once it has been gathered.
- Cover a clean container or receptacle with the cheesecloth or fine mesh strainer.
- Pour the gathered coconut water slowly through the cheesecloth or into the sieve.
- This will assist in capturing any bigger particles, trash, or coconut meat that could have passed through the initial filter.
- Let the coconut water gently pass through the cheesecloth or sieve. If it's moving too slowly, you might need to use a spoon or spatula to assist it slide through.
- The coconut water should be noticeably cleaner and devoid of visible contaminants after it has gone through the cheesecloth or strainer.
- Place the filtered coconut water in a sanitized receptacle.
- To avoid cross-contamination for future usage, carefully clean the strainer, cheesecloth, and container after filtering.

I. Store or Serve:

- Depending on our intention, you can either store the coconut water in a sealed container in the refrigerator for later use or serve it immediately.

➤ *Storing Filtered Tender Coconut Water:*

- Select an uncontaminated, airtight receptacle.
- In order to preserve the freshness and quality of the coconut water, it is recommended to use a glass or food-grade plastic container with a tight-fitting cover.
- Pour the coconut water that has been filtered carefully into the designated container. To keep pollutants and air out, make sure the container's lid is securely closed.
- Refrigerate the sealed jar containing the filtered coconut water. Cold storage keeps food fresher longer and keeps it from spoiling.
- The ideal temperature range for storing coconut water is between 32°F (0°C) to 40°F (4°C). To maintain freshness, mark the container with the filtration date if necessary.

➤ *Serving Filtered Tender Coconut Water:*

- Use a clean glass or serving container to hold the filtered coconut water.
- Gently pour the filtered coconut water into the glass or container. Be careful not to disturb any settled sediment.
- Serve the coconut water immediately. We can add ice cubes for a refreshing and chilled experience if desired.
- Some people like to garnish coconut water with a small slice of lime or a mint leaf for added flavour.



Fig 3 Top View of Coconut Water Extractor Machine

IV. RESULT

The manual extraction machine significantly improved the efficiency of tender coconut water extraction. It reduced the labour and time required for the process, making it more cost-effective for producers. The machine's capacity to consistently extract coconut water horizontally increased the productivity of those involved in the industry. The manual extraction machine effectively reduced wastage of coconut water. By extracting a higher percentage of water from each tender coconut, economic losses were minimized, and the environmental impact of waste was reduced.

V. CONCLUSION

The development and implementation of a manual tender coconut water extraction machine represent a significant step forward in enhancing the efficiency, safety, and accessibility of tender coconut water production. This project aimed to address the labour-intensive and as well as safety concerns, wastage, and variations in the quality of the coconut water.

In conclusion, the development and implementation of the manual tender coconut water extraction machine have been a success. This project has not only improved the livelihoods of those involved in the coconut water

production industry but has also ensured that consumers have access to high-quality, safe, and consistent coconut water. This advancement stands as a testament to the positive impact that innovative solutions can have in traditional industries, benefiting both producers and consumers alike.

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