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# Banana Mini Fiber Extracting Machine

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**ABSTRACT:** There are many types of natural fiber including hemp, flax, jute, wood fiber, rice husks, straw wheat, oats, bagasse, barley, grass reeds, banana fiber, oil palm empty fruit bunch, coir, sisal, cotton, kenaf, ramie, water pennywort, paper-mulberry, kapok, abaca, pineapple leaf fiber. The production of banana in India is 13.5 million tons per annum. Banana forming generates more quantity of biomass which goes as waste. The above ground parts like pseudo-stem and peduncle are the major source of fiber. Banana fiber used as a raw material in industry for production of papers, tea bags, currency and reinforced as a polymer composite. Natural fiber is used as an alternative resource to synthetic fibers as well as reinforcement for polymer composite materials and the manufacturing is inexpensive, renewable and environment friendly. Natural fibers have low cost, low density and low durability as compared to synthetic fibers but with the help of fiber treatments, mechanical properties of natural fibers are improved. In this paper, banana fibers are compared through their applications, use and properties and thus it is concluded that the banana fibers provide better chemical composition and properties.

**KEYWORDS:** Banana fibers, Composite material, Natural fibers, Synthetic fibers.

## I. INTRODUCTION

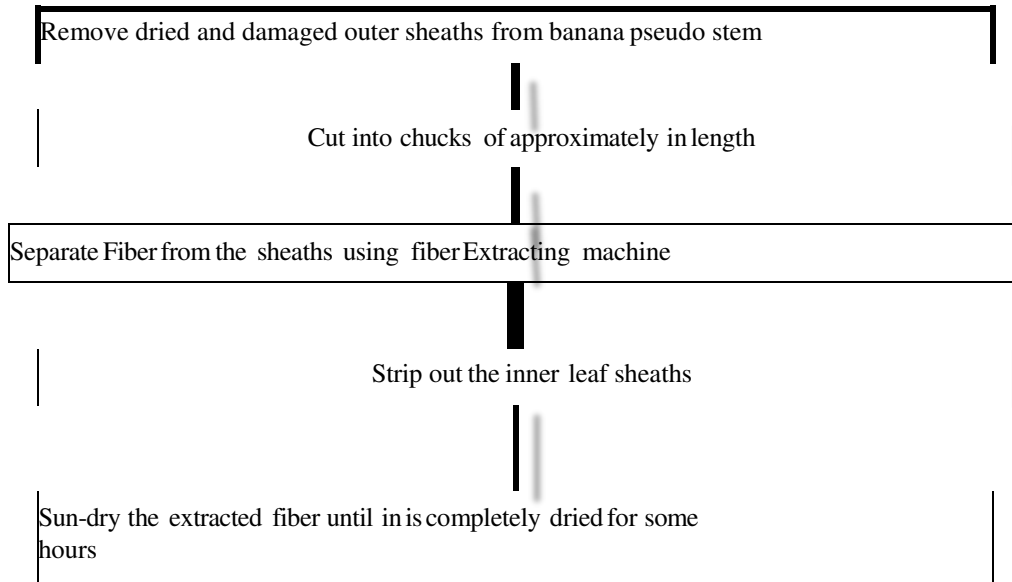
Banana fiber is environmentally friendly like jute fiber. It has large export demand from many countries like Japan, Australia, Germany and many. Fiber can be obtained from whole banana plant. After the fruit is obtained, the plant is thrown away giving rise to increase in waste. The proper disposal of this plant is another problem. By using a good fiber extractor machine, a large amount of fiber can be obtained which will give rise to additional income. Banana fiber is a best fiber with relatively good mechanical properties due to its high alpha cellulose and low lignin percentage. Natural plant fibers can easily be sourced in many tropical countries and are available in large quantity all year round. These fibers are considered as environment friendly materials due to their biodegradability and renewable characteristics. Recently, the interest has turned over on utilizing the natural plant fibers such as bagasse, coir, and oil palm fibers as effectively and economically as possible to produce good quality fiber for various applications. Production of natural fiber reinforced composite materials involves proper processing of fibers into the required dimensions and then introducing the matrix to form composites.

## II. RELATED WORK

In this section, some of the research papers studied to build our machine have been cited. In [1], a compact banana fiber extracting machine is designed and developed. The machine was tested for different samples obtained from different species of bananas. The paper also provided different informations such as properties of banana fibres, different process in extraction and dyeing of the fibers. The banana fibre is fed against the rotor, the rotor separates the pulp and water content from the banana fiber and retains the fibre. This fiber can be dried and processed further. The coir fiber extractor has blades that rotate at high speed. The blades inside a perforated drum separate the coir fiber from seeds and send it through the outlet. The cocopeat can be collected below the perforated drum. In [2], a coir fiber extracting machine was designed and developed. The machine was fabricated using locally available materials to fabricate it in low budget. The main intention for the design was to replace the traditional methods of extracting coir fiber. The device incorporates wedge-formed sharp edges that are constrained into the shell and afterward one of the cutting edges moves from the other to remove some portion of the stringy shell. This is repeated until the whole shell is

constrained from the seed. The whole task can be performed rapidly and effectively.

### III. METHODOLOGY



### IV. EXPERIMENTAL RESULTS

While designing the machine, the most important factor affecting the quality of fiber is the clearance between two rollers, speed of roller, and feeding position. Change in these factors causes change in quality of fiber.

Superior quality of fiber is one which contains no pulpy matter or pigment spots or knots. They are uniform in size and are straight. For our design, clearance of 1mm, drum speed of 700rpm and feed position of 180 degree are suitable. Instead of single crushing roller, we are providing dual crushing rollers for complete removal of Pseudostem. The average force required for extraction of fiber is 17.6kgF. By providing Guide and feeding rollers.



Fig. A- Main Extraction Roller



Fig-B Ironplate



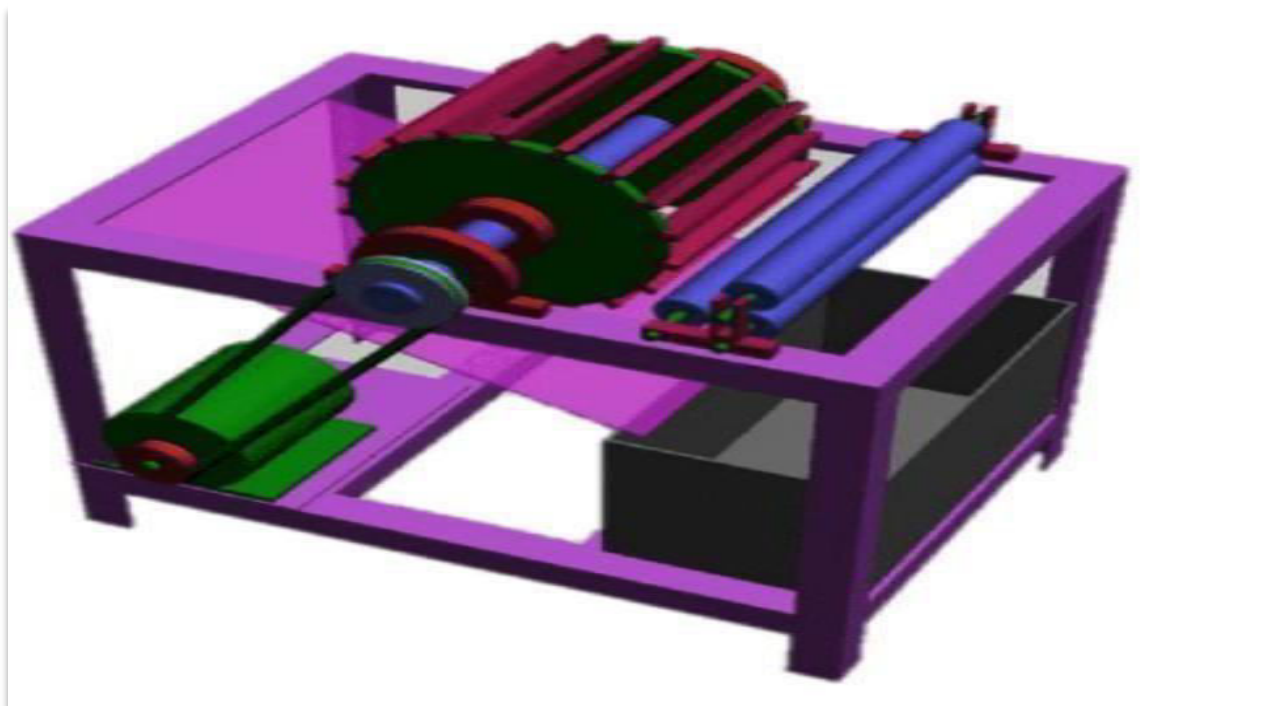


Fig C-3D diagram of Banana Mini Fiber Extracting Machine



Fig. E- MOTORS

## V. CONCLUSION

The new banana fiber extraction machine can be designed with higher efficiency. This machine will reduce manualwork and is suitable for mass production. Compact structure and easy disassembling will be another advantage. The problem of impurities and knots can be solved with this kind of design. The factors affecting quality of fiber are roller speed feed angle and clearance also affect the production quantity of fiber. By choosing these factors, correctly quality and production of fiber can be increased. By the application automatic feeder and conveyor time and effort can be saved.

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