

# RECYCLING ARECA HUSK TO SUSTAINABLE AND ECO-FRIENDLY ARECA MATCHSTICKS

*Project Reference No.: 45S\_MBA\_065*

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## **Keywords:**

Sustainable, Global Warming, Agriculture, Areca-Nut, Areca Husk, Matchstick and Strategic Chemical Process.

## **Introduction:**

Long-term changes in temperature and weather patterns are referred to as climate change. Although these changes are natural, human activities have been the primary cause of climate change since the 1800s, owing to the burning of fossil fuels (such as coal, oil, and gas), which creates heat-trapping gases.

One of the greatest concerns facing the world community is climate change. However, there is no obvious solution to the issue. It is only via the scientific understanding that it may be comprehended. This is why our Climate Course explains the scientific foundation of climate change, its effects on the environment and society, and potential solutions – so that everyone has access to fact-based information that can help steer the transition to a sustainable future.

The Indian economy is based on agriculture. Agriculture employs half of the country's population. Farmers are vital since it is only through farming that we may exist. We are all descendants of the farmer. Farmers, particularly in Karnataka, are having additional difficulties since they are unable to sell their products at the necessary price and are receiving little compensation for the crops they have raised, particularly arecanut.

The focus of this research is to assist both farmers and customers. We want to provide extensive assistance to areca nut farmers in particular. We have seen numerous things associated with arecanut farmers, such as hats made from leaves, plates made from areca nut tea, glasses made from areca nut tea, bangles made from areca nut tea, and so on.

**Objectives:**

1. To study and understand the effective utility of areca nut and its by-products
2. To influence areca nut farmer on exploring different avenues in earning passive income
3. To comprehend and design the process on manufacturing areca matchstick from areca husk
4. To evaluate and investigate in acknowledging different innovativeness/novelty exist in areca matchstick

**Methodology:**

The Indian economy is based on agriculture. Agriculture employs half of the country's population. Farmers are vital since it is only through farming that we may exist. We are all descendants of the farmer. Farmers, particularly in Karnataka, are having additional difficulties since they are unable to sell their products at the necessary price and are receiving little compensation for the crops they have raised, particularly areca-nut.

Natural fibers are gaining popularity as a reinforcement material for the preparation of polymer composites due to their excellent properties such as high strength and stiffness, low cost, eco-friendliness, and renewable and degradable nature. We propose a radical improvement by replacing matchstick wood with Areca husk, which has excellent benefits such as good strength and stiffness, low cost, eco-friendliness, and renewable and degradable properties. We proposed a solution for replacing wood with areca fibers for a matchstick to deal with uncertainty and arrive at a conclusive inference out of areca nut to make an areca matchstick. The proposed solution for replacing wood with areca fibers for a matchstick, we follow 3 stages and they are mentioned below

**Stage 1. Chemical Treatment**

Chemical treatments of natural fiber would remove the impurities like pectin, fat, and lignin present in the fiber. After the chemical treatment, a rougher fiber surface may result due to the introduction of some reactive groups into the fiber. Hence, chemical treatments facilitate efficient coupling with polymeric resin, improve interfacial properties, and as a result natural fiber reinforced polymer composites with better mechanical properties can be obtained. In the present Investigation with areca, fibers were treated with Alkali Treatment.

**Stage 2. Hand Layup Process**

Areca fiber after chemical treatment before shipping prepared areca sheets coated with natural areca fibers to the industrial plant (Factory) where actual match sticks are produced and which go through 3 sub-steps.

Step-1: Preparation of Epoxy Resin and Hardener,

Step-2: Preparing Areca Sheets

Step-3: Testing Chemically treated Areca Sheets,

## Materials Used for Hand Layup Process

Chemical Treated Areca Fibers, Epoxy Fiber (LY 556) and Hardener (HY 951), Spacers (3mm thick), Mild Steel Plate (500mm\*400mm\*10mm), Universal Testing Machine (UTM), Upper skin of areca leaf in the form of thin Sheets (20 no's), Wax, Roller, and Brush

### Stage 3. Fabrication Work

Pile of Areca fiber sheets placed and sent to manufacturing Industrial unit where it will be treated with a machine to chop, add chemicals at its head, pack it in nicely which made them into the form of Proper Matchstick. Stage 3 has 4 separate sub-stages before a machine-made matchstick is viable for commercial purposes and they are-

Step-1: Match Stick Preparation.

Step-2: Preparation of Matchstick Head,

Step-3: Preparation of Matchstick Striking Surface,

Step-4: Matchstick packaging

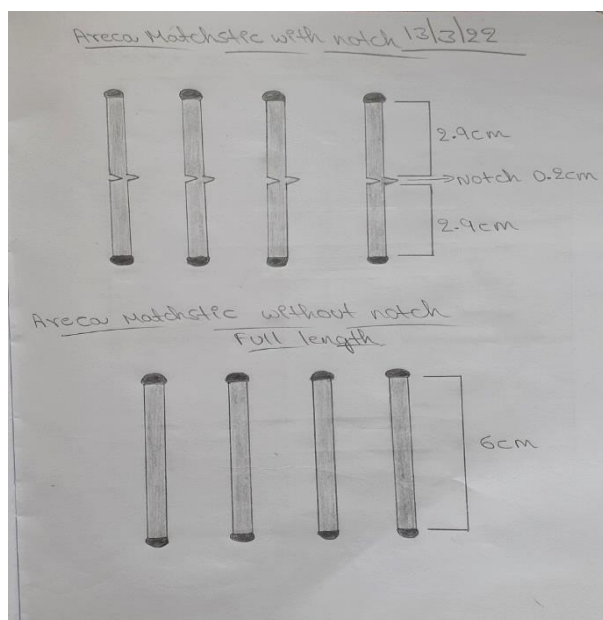


Fig-1 Conceptualizing areca matchstick with its specification

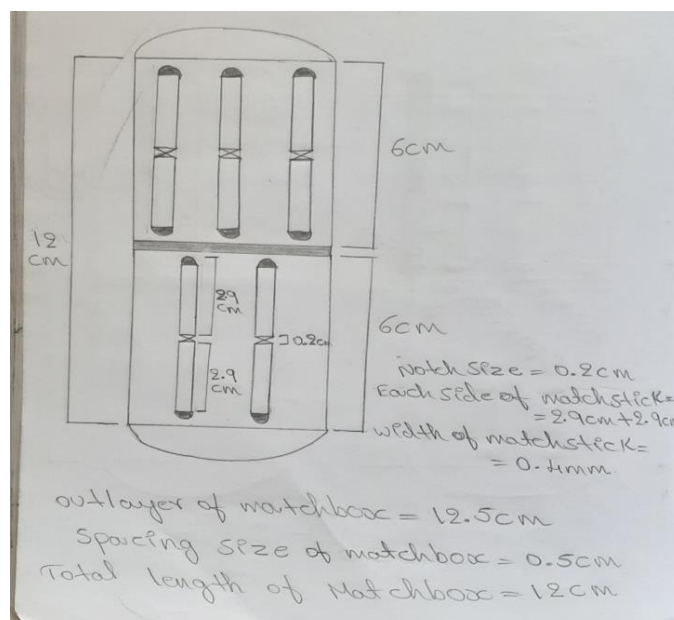


Fig-2 Areca matchstick with matchbox

## Conclusion:

Deforestation is the permanent removal of trees to make way for something other than the forest. As a result of urbanization and the growing population, mainstream nature is being destroyed. Clearing land for farming or cattle, as well as utilizing timber for fuel, building, or manufacture.

Wood is the major raw material for manufacturing matchsticks. However, the match industry has been dependent on only a few wood species for making match splints and these species are now in short supply.

Therefore, husk obtained from areca nut act as a sustainable raw material source for manufacturing matchsticks.

The main advantages of using areca nut fiber for matchstick production are (a) Reduction in the use of timber. (b) Renewable within a short rotation period, areca fiber is a sustainable raw material resource for making matchsticks. (c) Growing areca nut helps not only a commercial value but also, but a new product line can also be created thereby helping to enhance the productivity of adjoining agricultural land

Matchstick wood must be porous enough to absorb various chemicals while yet being tough enough to survive the bending forces generated when the match is struck. To be easily cut into sticks, they must have a straight grain and be easy to work with. Two typical kinds of wood utilized for this purpose are white pine and aspen.

"We intend to create an organic match stick out of areca fiber that will be more useful and distinct than what we currently have."As with all goods, quantity is desirable, and most importantly. With the introduction of areca husk matchsticks, we as responsible citizens of the world will significantly conserve our mother planet by saving a greater number of trees that have been cut down for many utilities to consider and encourage her to be herself and self-sufficient."

### **Scope for future work:**

Wood has been utilized for thousands of years for fire, construction, tool and weapon-making, furniture, and paper. Purified cellulose and its derivatives, such as cellophane and cellulose acetate, are now manufactured using it as a feedstock, contributing significantly to deforestation and contributing directly to global warming.

Many unique products have been identified from various trees/plants that may be utilized as a direct or indirect addition to existing wood (Softwood and Hardwood) that is widely used for a variety of purposes. Paper, pulp for different chemical treatments in research facilities, for adorning gardens, furniture, and producing art, for insulation, heating, for the majority of culinary utensils/musical instruments/sports equipment, and even for shipbuilding and toys

Few studies have attempted to answer the dilemma of what is left over after areca nut harvesting. Even though it is vital to fully use the areca nut and its leaf today, no one has attempted to produce a new product from Areca Husk, matchstick and we are proud to say, we invented new bread here.

The husk, on the other hand, is discarded as trash. We can convert areca nut husk into a board-like product by adding the proper chemicals and processing it with fabrication procedures. A product will be made from areca-nut husk. After peeling an areca-nut from that waste of areca husk, it will be a waste. The Areca nut has a high fiber content that can be used as a wood supplement, and many contributors will need to take advantage of its basic applications of areca nut fiber and organic properties to replace traditional utilities in the future.