Preparation of Paper from Banana fiber

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ABSTRACT

Banana is an important crop in Indiaand is grown on a large scale. Though fruits and leaves are being used for various purposes, many parts of the tree such as the pseudo stem go to waste. The pseudo stem is the part of banana tree which looks like a trunk. It is formed by tightly packed overlapping leaf sheath. The fibers of pseudo stem which generally goes waste, can be used in different industries for large number of applications.

Key words:Banana, Pseudostem, Fiber, Wax

Introduction

A banana becomes waste after the product is extracted. Due to this the fiber in its stem is also wasted. In order to make productive use of it this topic has beenselected. The paper which is made, solves multiple purposes. It can be used as a regular paper as well as it can be used as a wrapping material. It is also made water proof. This product is intended to substitute the harmful plastic products which are in use today.

General procedure

Initially the waste pseudo stem of banana tree is taken. Then outer leaf sheaths are removed to obtain the inner fiber.

Pseudo stem of Banana tree

Following is the detailed process for preparation of a paper from the fiber.

Process of making the basic paper

Step 1

The first step is obtain the fibre from the stem by peeling of outer layer. The inner fibre is then cut into thin slices as shown in figure 1. These thin cut slices are used as the raw material.

Figure 1

Step 2

These slices are sun dried to remove all the moisture and are cut into small pieces as shown in figure 2. This makes the processing easy.

Figure 2

Step 3

Fairly concentrated solution of NaOH is then added to the pieces and mixed well as shown in figure 3. Quantity of the fibre pieces is taken as per the requirement and NaOH solution is added accordingly. This mixture is then boiled till the pieces starts to break down. The boiling can be continued by topping the mixture with water.

Figure 3

Step 4

The boiled mixture is washed with water to remove NaOH. The mixture is then taken in a mixer and a thick paste is made out of it as shown in figure 4. The paste should be uniform and there should not be fibre threads in it. The left over threads, if any, may reduce the paper quality in terms of smoothness.

Figure 4

Step 5

The paste is taken in a cloth and pressed sufficiently to remove all the moisture. The pressed paste can then be kept to dry in the sun as shown in figure 5. We get the final product, ***"paper"*** after the drying is complete as shown in figure 6.

Figure 5

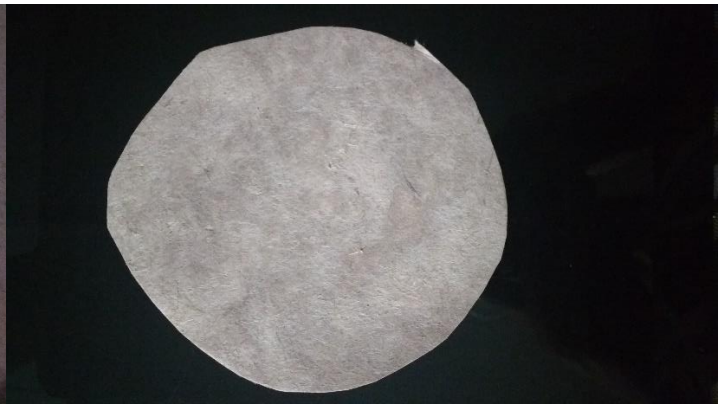

Figure 6

Properties of the paper

1) The paper has a rough texture.
2) It is completely eco-friendly as it has been made from plant waste.
3) It is also not hazardous as the NaOH has been removed by washing, pressing and drying.
4) The paper is durable.
5) The more paper is dried more whiter it becomes.

Making the Paper waterproof

The paper can be made waterproof using Alum, Gum, Natural Glue and Castile Soap. A solution of these two ingredients is made in warm water. The mixture is made uniform by stirring it thoroughly. The paper is then dipped into the solution and kept hanging to become dry. This process makes the paper waterproof and protects sheet from dust. It increases its durability.

The paper can also be coated with papaya latex to make it water proof, however this method may make the paper unfit for writing purpose.

Advantages and Benefits

The pseudo stem of banana has large number of applications. It has unique properties and it can be practically used as a fibre for many fibre related applications. This process is an efficient way of converting waste into a useful product. It is an extremely easy process and requires raw materials such as a mixture, a heating device, cloth and castile soapwhich are available in any household. It requires very less time and very less money as an entire stem is available at just Rs100. The process is also not very time consuming.

Uses and applications

1) Being a paper it can be used for the main purpose of writing.

2) Plastic is often used as wrapping material but is environmentally harmful. This paper can effectively replace plastic as it is also waterproof. It can be used to wrap fruits while transportation.

3) A lot of foodstuffs in India are served in newspaper. However the carbon content of the newspaper is harmful for the food. Instead, this paper can be used to store food. It can be used to serve food stuffs.

4) **In India many times thermocol plates are used in functions. If this paper is made more hard and designed properly it can play a huge role as temporary use and throw dishes or plates.**

5) **The paper can also be used to make a carrybag as plastic carrybags cause a lot of pollution.This bag can be made available cheaply and hence can be used extensively.**

6) The paper can be used for different handicrafts and arts such Origami etc.

Conclusion

This study helps to show that the banana fibre can be used to make an extremely useful product which can be applied in many ways as stated above. The product can effectively replace several other products which are environmentally harmful and are difficult to dispose. The study is intended to find the perfect application of plant waste which is environmentally not harmful.

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