

ABSTRACT

SJKT SUNGAI SALAK

Narmatan Tamil Arasan, Angelina Rita Aruldass, Prishah Satiyan, Durkasini Kumar, Thavaruban Jagaveeran

Advisors: Ms.M.RAJASVERY, Ms.S.SABRINA, Ms.M.SHALINI, Ms.P.VIKNESWARI

ECOFRIENDLY BSB

Exploration of banana Fibre as low cost eco friendly jute bag

ABSTRACT

The Malaysian government aims to ban the use of plastic bags across all business sectors nationwide by 2025. This innovation and invention is about the fabrication and testing of banana fiber eco-friendly carry bags. Banana fiber is a natural fiber with high strength, which can be blended easily to produce composite material. Pseudo-stem and leaves are major portions of banana waste and yield good quality fiber. Banana Fibers are best in cost saving, low in density, cheap, renewable and environment friendly. Implementation of our invention can reduce the usage of plastics and will help to keep the environment healthy and pollution free.

1.0 INTRODUCTION

Nowadays humans are beginning to develop an alternative solution to the issue of the plastic waste problem. To help minimize the use of plastic bags, eco bags made out of eco-friendly materials are being used as alternatives to plastic bag usage.

Using the stem fiber from a banana tree, it is now possible to replace plastic bags. 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 been selected. 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.

Eco bags are a type of shopping bag which can be reused many times. It is an alternative to single-use paper or plastic bags. Plastic or paper shopping bags are not as good as reusable shopping bags. They are used to deflate the waste in the environment. The materials used for the production of these bags have no negative impact on the environment. Eco bags not only recycle material that would be going to waste, they also eliminate the need for single-use plastic bags that have proven to harm the environment.

2.0 PROBLEM STATEMENT

Plastics can pollute the environment. Plastics are non-biodegradable materials so we need to find biodegradable materials to substitute the plastics. Usage of biodegradable materials leads to a better environment for our future generation. Banana stem fiber offers a potential solution to the environmental problems caused by traditional plastic and paper bags. However, there are challenges hindering its widespread adoption for paper bag production. Despite the potential of banana fiber as a sustainable and strong alternative for bag production, challenges exist in developing a cost-effective, high-quality production process that minimizes environmental impact while remaining competitive with existing bag options. Current methods might not produce banana fiber paper bags as strong and durable as traditional paper bags, limiting their reusability and

weight capacity. Untreated banana fiber paper bags might be susceptible to moisture and tearing when wet, reducing their functionality. By addressing these issues, we had found and create high-quality, affordable, and eco-friendly banana stem fiber paper bags, promoting their widespread adoption as a sustainable alternative. We conducted various experiments to ensure the produced bags have desirable qualities like strength, durability, and water resistance to compete with traditional bags.

3.0 AIM AND OBJECTIVES



The main aim of a banana stem fiber bag is to provide an eco-friendly alternative to traditional plastic bags. These bags are made from the fibers of the banana plant's stem, which is a byproduct of banana cultivation that would otherwise be discarded as waste.

The objective of our innovation to is to provide a sustainable alternative to plastic bags. Plastic bags are a major contributor to pollution and landfill waste. Banana stem fiber bags are biodegradable and made from a renewable resource, lessening dependence on plastic. Other than that, banana stems are a byproduct of banana cultivation and typically discarded. Creating bags from these fibers utilizes waste material, diverting it from landfills and promoting resource efficiency. Another objective is to develop a bag that is strong and long-lasting, able to be reused for shopping or other purposes. Banana stem fibers have the potential to be quite durable, meeting this goal. Another objective is to create a bag that is lightweight and easy to carry around. Moreover, banana stem fiber is naturally lightweight, making the bags comfortable for everyday use. Overall, the objective of creating a banana stem fiber bag is to address environmental concerns about plastic waste and create a practical, sustainable alternative for consumers.

4.0 METHODOLOGY

INGREDIENTS NEEDED TO MAKE THE BSB

Materials and Instruments

		
Banana Stem	Banana Fiber	Sodium Hydroxide
		
Okra	Potato starch	Frame strainer
		
Weighing Scale	Measuring Cylinder	Coconut husk
		
Glycerin	sieve	Blender

In this innovation the materials we used were banana stem, coconut husk, okra, glycerine and potato starch. Beside that we also used sodium hydroxide NaOH (liquid 1 mol). For the instruments, stove, pot, sieve, wrong scale, measuring cylinder and frame strainer.

4.1 PROCEDURE TO MAKE THE BSB

1. First, the outer layer of the banana fiber is peeled off
2. The inner fiber is then cut into thin cubes.
3. Small pieces of okra are then diced.
4. After that, The outer layer of the coconut is peeled off, and the husk is removed.
5. Next, 500g of banana fibers are weighed and prepared for cooking. Then, the banana fibers and 50g of coconut husk are boiled together for an hour. Simultaneously, the okra is boiled in a different pot for 15 minutes.
6. Then 40 ml of concentrated sodium hydroxide (NaOH) is added to the boiled banana fiber and coconut husk mixture, and it is mixed well.
7. After an hour, the mixture is strained using a sieve to remove the sodium hydroxide (NaOH). Then, the mixture is washed thoroughly with water and strained again.
8. The fibers are then blended together with the boiled okra to achieve a pulpy consistency. The pulp is poured through a fine mesh and prepared for rinsing.
9. Next ,100g of the pulp is weighed and put into the water container. Then, the pulp is rinsed thoroughly with a frame strainer.
10. Then, the rinsed pulp is dried under sunlight or left overnight.
11. The dried paper is peeled out from the frame strainer.
12. Then mixture of potato starch and glycerine is applied on the dried paper.
13. Finally, this dried paper is sewed into an eco-friendly jute bag.

✚ This are the methods and steps to prepare eco-friendly BS Bag.



5.0 OUTPUT

TRIALS	AMOUNT OF BANANA STEM (grams)	VOLUME OF WATER (ml)	TIME OF BOILING (minutes)	RESULTS
1	500	1000	60	1 BSB bag
2	1000	1000	60	2 BSB bag

After some trials and errors, the results showed that the banana stem can be used as an alternative kind of paper for creating bags. The results that we gathered proved that banana stems can be used as an alternative for making papers. We believe that it isn't easy to be a researcher and also it takes time to make a final product of an investigatory project. The project make us improve our thinking capacity in making a product successful and it let us open our minds in savings and preserving what mother earth has given us.

6.0 BENEFITS

6.1 BENEFITS OF THE INGREDIANTS THAT WE USED

Banana stem has several benefits as a material for eco bags. Banana stem is a sustainable fiber because it is strong and durable. It is also soft and lightweight and long-lasting materials. The use of banana stems in eco bags helps in developing competitive advantage in an industrial economy by effectively utilizing waste materials.

Our second ingredient is coconut husk. Coconut husk has several benefits for making eco bags. Firstly, coconut husk is a natural fiber that is environmentally friendly and readily available in tropical countries.

Okra fibers have several benefits in making a paper bag. Firstly, okra fibers are renewable, biodegradable, and cost-efficient, making them a sustainable choice for

packaging materials. Secondly, okra fibers have excellent mechanical strength and stiffness.

Sodium hydroxide treatment improves the mechanical properties of banana stem fiber composites, making them more effective for use in eco bags. Sodium hydroxide treatment improves the tensile strength and flexural strength of banana fiber reinforced polyester resin composites. Sodium hydroxide is also used to modify the properties of these materials, such as increasing their strength and flexibility, to make them more suitable for use in eco bags.

Potato starch has some inherent water repellent properties. When used in the bag making process, it can create a slight barrier to moisture, making the bags more resistant to light rain or spills.

6.2 BENEFITS OF THE BSB

There are many benefits of using our BSB eco-friendly banana stem jute bags. Our BSB bag is durable and strong. Jute is a natural fiber known for its strength and durability, making the bag capable of handling moderate weight. Besides that, our BSB jute bag is relatively affordable. It is readily available and cost-effective material compared to some other natural fibers. Similar to banana stem fiber, jute is biodegradable and breaks down over time without harming the environment.

Combining banana stem fiber with jute and also potato starch with glycerin can create a stronger bag and sturdier bag than using banana fiber alone. Our BSB bag has sustainable and eco-friendly qualities. Jute provides additional reinforcement for carrying groceries or other items. Both materials are biodegradable, so the bag remains environmentally friendly. Banana stem jute bags offer a strong, reusable option that reduces plastic waste and promotes sustainable practices. Moreover, it is cost-effective whereby jute's affordability can contribute to a competitive price point for the bag. Furthermore, our BSB bag has versatility properties. The ratio of banana stem fiber to jute can be adjusted to create bags with different characteristics. A higher jute content might make the bag ideal for heavier loads, while more banana fiber could result in a lighter everyday use bag. Our bag is also having lightweight properties. Banana stem fiber

is naturally lightweight, making the bag comfortable to carry, even with its increased strength from the jute.

Banana stem fiber bags are a great eco-friendly alternative to traditional plastic and paper bags. They are sustainable, biodegradable, durable, and versatile. Overall, banana stem jute bags offer a strong, reusable alternative to plastic bags. They are eco-friendly throughout their lifecycle, from resource acquisition to disposal, while remaining practical and potentially cost-effective for consumers.

7.0 Commercial viability

Consumers are increasingly eco-conscious and looking for sustainable alternatives. Banana stem bags can reduce plastic waste, utilizing a renewable resource, and being biodegradable. This can be a major selling point of our eco friendly Banana Stem Bag. Banana fibers are surprisingly strong, and with potato starch reinforcement the bags can be quite durable. They can be designed to be water-resistant and reusable, offering a practical alternative to plastic bags. Our bag also has potential for lower production costs. The banana stem is readily available and considered a waste product in banana cultivation. Overall, the commercial viability of eco-friendly banana stem bags offering a price point that is affordable to consumers while still being profitable for inventors.

8.0 CONCLUSION

Creating the banana paper bag as a replacement for plastic bags is a crucial move in decreasing plastic waste and supporting sustainable practices in the retail sector. Utilizing banana fibers as the primary material for producing paper bags provides a feasible answer to the issue of plastic pollution and presents numerous benefits compared to conventional plastic bags. Eco-friendly banana stem bags offer a compelling solution to the plastic bag problem.

They are made from a renewable resource, reducing waste in the banana industry. The bags themselves are biodegradable, and with potato starch reinforcement, they can be durable, water-resistant, and reusable. This makes them a sustainable and practical alternative to traditional plastic bags.

In conclusion, eco-friendly banana stem bags have the potential to become a mainstream choice for eco-conscious consumers, paving the way for a more sustainable future. Furthermore, this study can help the environment. The effects of using plastic keep getting worse, including the extreme heat that can lead animals to leave their habitats and become dehydrated. So, just by producing our eco-bags, not only can we reduce greenhouse gas emissions that badly affect the environment, but it can also serve as a stepping stone towards the development of what we want to achieve in our research. Thus, the production of banana stem fiber bags is intended to reduce the need for single-use plastic bags, which have been proven to be harmful to the environment, as well as to recycle solid waste.

9.0 REFERENCES

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Research on banana fiber as a sustainable material: Several studies explore the potential of banana fibers for various applications, including bags. Searching for terms like "banana pseudo-stem fiber" or "banana fiber applications" can lead you to relevant research papers (<https://www.intechopen.com/chapters/64570>)

Articles on bio-based composites: Since potato starch is often used as a binder in banana stem bags, exploring research on bio-based composites incorporating starch and natural fibers can be informative (<https://www.scribd.com/document/526883217/Banana-Fiber-as-an-Eco-Handmade-Paper>).

News articles on eco-friendly banana stem bag initiatives: Searching for news articles about companies or organizations developing banana stem bags can provide insights into the current landscape and potential applications (<https://www.scribd.com/document/634694268/Untitled>).