

Interior Accessory Design from Sugarcane Bagasse with a Coastal Theme Using an Experimental Approach

Shania Regina Ferdinandus^{1,*}, Mochamad Junaidi Hidayat²

^{1,2} Program Studi Desain Produk, Institut Teknologi Adhi Tama Surabaya

Email: Shaniarf07@gmail.com*

*Corresponding author

ABSTRACT

The large amount of bagasse that is not utilized and left to accumulate over a period of time will risk environmental pollution. Therefore, of reducing the amount of bagasse that accumulates, researchers will utilize the remaining bagasse into products that have selling value as well as can create new business opportunities. For this reason, an experimental method will be used, with this method researchers can find out more about bagasse so that it can be used as a product. The experimental stages carried out begin with sorting, softening, separating, drying, coloring, pattern formation, and ending with finishing. In this experiment, it was found that the most effective shaping process using the bagasse powder pressing technique with wood glue produced a sturdy and rough-textured character. By considering the experimental results, the type of product to be made is an interior accessory consisting of three products, namely a mirror, wall clock, and tissue holder.

Keywords: Accessories, Dregs, Interior, Sugarcane, Utilization

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INTRODUCTION

From environmental status data, Indonesia has as much as 70% of the amount of organic waste that has been generated [1]. One of the largest contributors to organic waste comes from sugarcane, which is known that Indonesia is one of the countries with the largest sugarcane harvest area in the world [2]. From 475,000 hectares of sugarcane land, it can produce more than 33 million tons of sugarcane per year, and produce 10 million tons of bagasse per year or 2.35% of the total bagasse worldwide which reaches 424 million tons per year [3]. About 60% of bagasse will be utilized by sugar factories for fuel, papermaking materials, and also the mushroom industry [4]. However, there is always residual bagasse that is not utilized because the bagasse stock exceeds the burning needs [5].

Meanwhile, according to the results of an initial survey of sugar cane ice traders on Jalan Arief Rahman Hakim, Keputih, Sukolilo sub-district, Surabaya, it is known that one quintal of sugar cane that has been milled can produce two to three sacks of 15 kg bagasse residue every day. The remaining bagasse can later be reprocessed as animal feed [6], but most of the

remaining bagasse will be directly disposed of in temporary waste storage (TPS). Based on the results of the initial survey, it can be seen that one sugar cane ice trader is able to produce three 15 kg bags of bagasse which will be directly disposed of, while the number of sugar cane ice traders is not small so it can be clearly seen that a lot of the remaining bagasse is not utilized and accumulates resulting in hoarding [7]. The accumulation of bagasse in a certain period is at risk of fire because sugar cane is a flammable material [8]. It also risks environmental pollution, and takes up a large area of land for storage [9].

Based on these problems to reduce the amount of bagasse, especially the remaining unused bagasse from sugar cane ice sellers, researchers will utilize bagasse into a craft product that has selling value [10]. As for some handicraft products from bagasse that have been made are tables, souvenirs, partitions, and stationery storage [11]. However, the fact that crafts from bagasse are still rarely found even though the opportunities in the field of crafts are very large as seen from the statement of the Director General of Small, Medium and Miscellaneous Industries (IKMA) regarding the advancement of the Indonesian handicraft industry which has held a market share of world handicraft products to reach two percent, so that researchers feel that the utilization of the remaining bagasse into crafts has great potential especially since crafts from this material are still not widely produced even though the products produced are as good as products from other materials such as rattan and so on [12].

The craft products to be made are interior accessory products. This is due to the high consumer interest in interior accessory products from nature due to the trend of natural residential nuances so that later the products made can be potentially demanded by consumers [13]. In this study, the product was made using the experimental method and the experimental results of sugarcane bagasse were found to be less smooth even though it had been processed into powder and when compacted it would have a rough texture so it was less suitable to be used as a product that came into direct contact with human skin because of the risk of injuring the user, instead the results of compaction of powder with wood glue had the right character for interior products that were hard and strong [14], therefore the utilization of sugarcane bagasse into interior accessory products was deemed more appropriate because it was safer to use and its character was suitable to be used as an interior product [15].

Based on the data exposure above regarding the opportunity for bagasse as an interior accessory craft product and the results of the experiment, it can be concluded that bagasse has the potential to be utilized as an interior accessory. The products to be made are wall clocks, tissue holders and mirrors. These are the three product categories most chosen by respondents based on the results of the product selection questionnaire.

METHOD

To explore the potential utilization of the remaining bagasse, the method used is experimental or experimental, which is a method that aims to find the effect of exclusive treatment on others under controlled conditions. This method aims to obtain the characteristic results of bagasse in the form of meat fiber and sugar cane skin as an analysis material for product determination and design process. The stages of the experimental method to be carried out start from the sorting stage to the finishing stage which can be seen in the following flow chart.

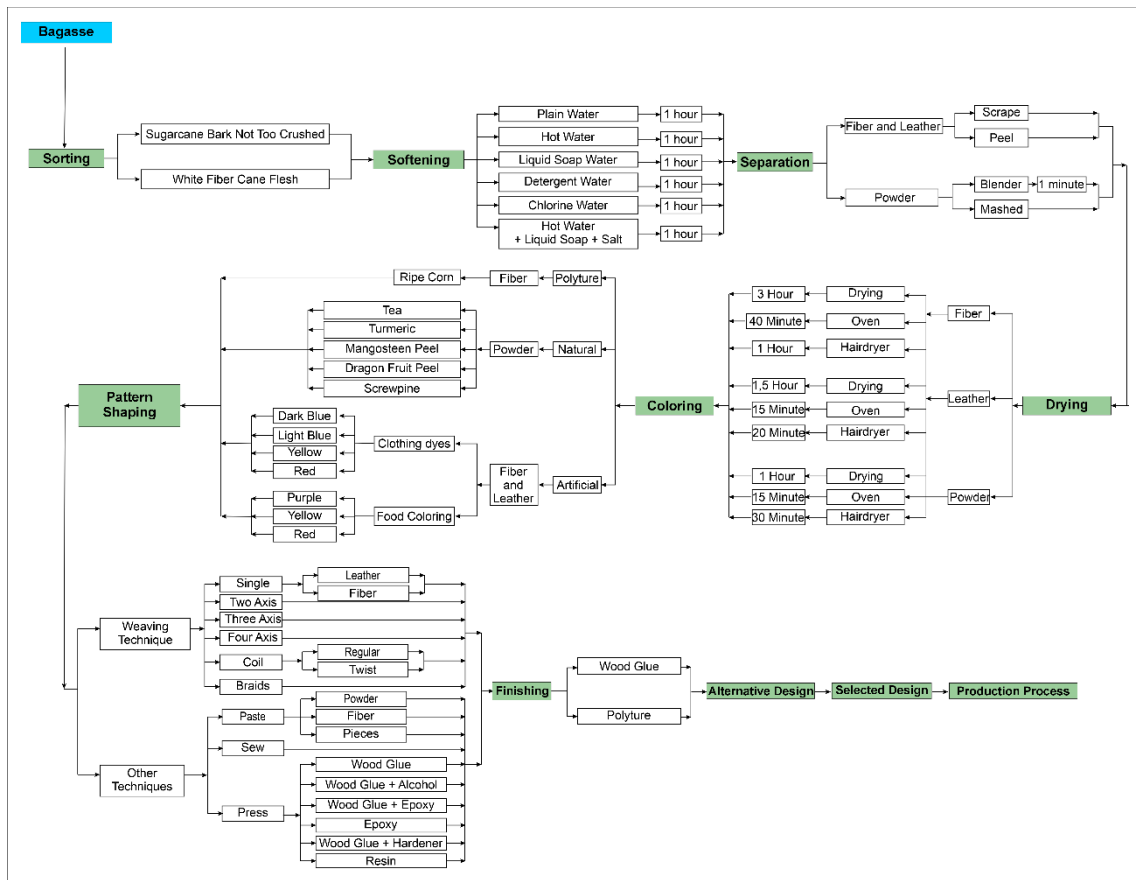


Figure 1. Experiment Flowchart
Source: Researcher Documentation 2023

RESULTS AND DISCUSSION

1. Sorting

The process of sorting out the remaining bagasse that is still suitable for use in experiments is done manually and the results are only sugarcane skin that is not too crushed and white bagasse that can be used in this experiment.



Figure 2. Showing The Result Of Bagasse Sorting
Source: Researcher Documentation 2023

2. Softening

The process of softening the sugarcane meat fibers that are still attached to the sugarcane skin to facilitate the separation process. This process uses several different liquids such as plain water, hot water, liquid soap water, detergent water, chlorine water, and finally hot water given liquid soap and salt, each experiment is carried out for 1 hour. Of these six experiments, the softening process using hot water mixed with 1 tbsp of liquid soap and 3 tsp of salt is the most effective because the sugarcane fibers are cleaner and softer faster.



Figure 3. Shows The Appearance Before And After The Softening Process Using Hot Water With Salt And Liquid Soap

Source: Researcher Documentation 2023

3. Separation

The process of separating bagasse into two parts, namely fiber and skin, also produces small pieces, as well as powder. The separation process is carried out in several ways, namely by scraping, peeling, blending, and pounding. Based on the results of experiments conducted by researchers, to separate the skin and fiber the most effective way is by scraping using a cutter, because the results are neater and faster. As for producing sugarcane powder, the most appropriate way is with a blender, because it is faster and the results are smoother than being pounded.



Figure 4. Show The Results Of Fiber, Skin, And Powder Separation

Source: Researcher Documentation 2023

4. Drying

The drying process is done to remove any remaining water. This process is important because if the bagasse is dry, it will reduce the risk of mold.

The process of drying sugarcane fiber uses the same method as the process of drying sugarcane skin, only the duration is different. The duration when drying the fiber is longer than the skin, because the fiber absorbs a lot of water while the skin does not.



Figure 5. Shows The Appearance Of Sugarcane Fibers Before And After Drying

Source: Researcher Documentation 2023

To dry sugarcane fiber, the most effective way is in the oven, because sugarcane fiber dries faster evenly and can dry large amounts of fiber at the same time without being affected by the weather.



Figure 6. Showing The Appearance Of Sugarcane Skin Before And After Drying
Source: Researcher Documentation 2023

Then the results of the experiments that researchers conducted were most effective for drying sugar cane skin in a hairdryer, because it was not influenced by the weather and the results were not scorched. In addition, it produces sugar cane skin that is not too dry, thus reducing the risk of breaking more easily (brittle).



Figure 7. Showing The Appearance Of Sugarcane Powder Before And After Drying
Source: Researcher Documentation 2023

The most effective powder drying process from several experiments that researchers have done is in the oven, because it dries evenly faster and is not affected by the weather.

5. Coloring

The bagasse coloring process is divided into three types: natural, artificial, and polytune. The natural coloring process uses materials taken from nature, the natural coloring experiment on bagasse uses the powder part, the mixing process uses a blender for 1 minute. Some of the materials used in this experiment are tea powder, turmeric, mangosteen peel, dragon fruit peel, and finally pandanus, which produces an attractive appearance but fades quickly.



Figure 8. Showing The Result Of Natural Coloring
Source: Researcher Documentation 2023

Artificial dyes use materials not derived from nature directly but are made by humans. In this experiment, the dyes used are clothing dyes and food coloring. The best color is clothing dye because it is easily absorbed by bagasse, while for sugar cane skin, a sandpaper process is needed first so that the color can easily enter the sugar cane skin.



Figure 9. Showing The Results Of Coloring With Food Coloring And Clothing Coloring
Source: Researcher Documentation 2023

Coloring using polytute, which is a liquid applied to the surface of the sugar cane fiber to produce a shiny appearance that can also protect from scratches, the color used is the color of ripe corn.



Figure 10. Shows The Appearance Before And After Polytute
Source: Researcher Documentation 2023

6. Pattern Shaping

The pattern formation process is useful for combining or uniting materials into a form in making products. There are several experiments that have been carried out by researchers such as plaiting techniques consisting of single plaiting, two axes, three axes, four axes, twisting, and braiding. For single plaiting up to four axes of sugar cane skin, it produces a less neat appearance due to the wavy shape of the sugar cane skin, besides that the sugar cane skin that has dried will be easily brittle so it is less appropriate to be applied into a product. For the formation of patterns in the twisting and braiding techniques using sugarcane fibers that have been moistened to reduce the risk of fibers being too brittle to be processed, the results in the twisting technique have a less neat appearance because many fibers are cut off when twisted while in the plaiting technique the results are quite neat and strong to be made into products. The other techniques are paste, sewing, makrame, roller, and press. Of the five most effective techniques is the press technique, there are six materials that will be mixed with sugar cane powder when pressed including wood glue, wood glue and alcohol, wood glue and epoxy, epoxy, wood glue and hardener, and finally resin. Of the six experiments that can be used to be made as a product is a press from a mixture of sugar cane powder and wood glue which results in a sturdy but slightly flexible with a smooth textured press surface. So it can be concluded from several experiments on pattern formation techniques that have been carried out, the woven technique from sugar cane fiber and the pressed technique using a mixture of sugar cane powder and wood glue are the most effective techniques to be developed into interior accessory products.



Figure 11. Showing The Result Of Forming A Powder Pattern Pressed With Wood Glue And Fibers Woven Into A Braid

Source: Researcher Documentation 2023

7. Finishing

The finishing process is useful to maximize the results of the product, it can also function so that the product can be durable. The experiments carried out using two methods, namely smearing the surface with wood glue so that it produces a waxy appearance and also by smearing polyurethane which the end result has a shiny and hard appearance.



Figure 12. Showing the result of finishing with wood glue and polyurethane

Source: Researcher Documentation 2023

8. Alternative Design

The process of making alternative designs is carried out after determining the product design concept. In this research, the design concept that will be used in making products utilizing the remaining bagasse into interior accessories is coastal. Coastal is inspired by the natural elements of the seaside beach, sand, and sky. Both the color and texture of the beach will be applied to the interior of a room to create a serene and relaxing atmosphere. The application of coastal in the interior products that researchers will make can be seen from the use of coastal colors in the form of blue which means the sea, then ivory which is similar to beach sand, and finally orange as the color of the beach sky at sunset. While in terms of material, the product uses natural materials in the form of sugar cane fiber, there is also a woven braid type of sugar cane fiber. The appearance of the product is inspired by sea objects such as coral reefs, sea waves, and shells.



Figure 13. Alternative Design of Bagasse Mirror

Source: Researcher Documentation 2023

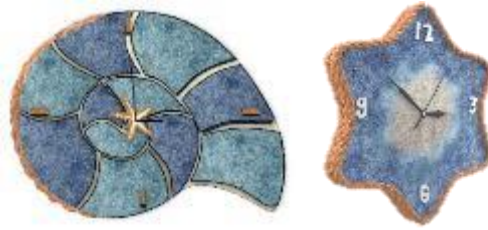


Figure 14. Alternative Design of Bagasse Wall Clock
Source: Researcher Documentation 2023



Figure 15. Alternative Design Of Bagasse Tissue Holder
Source: Researcher Documentation 2023

9. Selected Design

The process of determining the selected design was carried out by distributing questionnaires online and getting a total of 30 respondents. From the results of the questionnaire that has been carried out, alternative design 3 is obtained as the selected alternative design in all product categories, as for the product appearance and detailed images can be seen as follows.

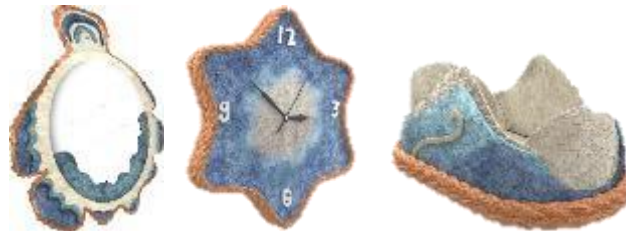


Figure 16. Final Design Of Bagasse Mirror, Wall Clock, And Tissue Holder
Source: Researcher Documentation 2023

10. Production Process

The production process was carried out for 1 month, starting from the process of making wall clocks then tissue holders and mirrors. The wall clock production process begins with making a framework with wire which will then be coated with braided sugarcane fiber, after which the framework is shaped according to the design. After that, the inside of the framework is pressed using sugar cane powder dough that has been mixed with wood glue. After drying the wall clock will be installed with the engine and clockwork, then the woven braid will be polished using the color ripe corn.



Figure 17. The Final Look Of The Bagasse-Based Wall Clock
 Source: Researcher Documentation 2024

The process of making a tissue holder begins with making a framework which is then coated with braid from sugar cane fiber. After that, the right and left sides of the tissue holder are made by pressing then after drying it will be cut according to the design form. After that, the sides of the tissue holder will be placed on the inside of the framework then the base of the tissue holder will be pressed using powder that has been mixed with wood glue. After drying the braid from the fiber will be lacquered using ripe corn color.



Figure 18. The Final Look Of The Bagasse-Based Tissue Holder
 Source: Researcher Documentation 2024

The process of making a mirror is done by making a skeleton first and then it will be wrapped around a braid of sugarcane fiber. After that, the framework is formed according to the design and the mirror is placed in the center which is then pressed using powder dough that has been mixed with wood glue. After drying, the edges will be pressed again using light blue, dark blue dough according to the design. After that, the plaited part of the braid will be polished using ripe corn color.



Figure 19. Final Look Of Bagasse-Based Mirror
 Source: Researcher Documentation 2024

The costs incurred while making the three interior accessory products can be seen as follows.

No	Material	Harga	Jumlah Barang	Total
1	Bagasse	Rp4000	4 kg	Rp16.000
2	Wood glue (700gr)	Rp15.000	10 piece	Rp150.000
3	Sewing thread (putih)	Rp2.000	1 piece	Rp2.000
4	Wire (diameter 0,9mm)	Rp8.000	1 curl	Rp8.000
5	Wire (diameter 2,1 mm)	Rp20.000	1 kg	Rp20.000
6	Polytute	Rp90.000	1 liter	Rp90.000

7	Garment dye	Rp3.500	2 piece	Rp7.000
8	Clockwork + battery	Rp25.000	1 piece	Rp25.000
9	Mirror glass (Diameter 24,5 cm)	Rp30.000	1 piece	Rp30.000
Grand Total				Rp348.000

Figure 20. Budget plan for wall clock, tissue holder, and mirror
Source: Researcher Documentation 2024

CONCLUSION

From this research it is known that nowadays natural handicraft products are in great demand, especially in the field of interior accessories with materials that are still rarely found such as bagasse. To determine the product design of interior accessories made from bagasse, experiments are needed first so that they can find out the characteristics of bagasse to be processed. An effective experiment to do is a softening technique using hot water with a mixture of salt and liquid soap because bagasse decomposes faster and does not mold easily, after that the coloring process, natural coloring has a better color but is easy to fade quickly, while clothing dyes are more easily absorbed by bagasse and also the color is more durable. The coloring of the sugar cane skin is done by rubbing it first using sandpaper and then soaking it with clothing dye. Then the pattern formation technique is pressed and printed as well as braided. The results of the experiment explain that bagasse that has passed several stages of experimentation has a hard texture so it is suitable for use as an interior product. To make the product requires 4 kg of the remaining bagasse with the duration of manufacture is 1 week. From this research it is also known that the percentage obtained to reduce the remaining bagasse from the sale of sugar cane ice is 3.8% of the total of one bagasse seller.

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