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Bamcot, an Onloom Blend of Bamboo and Cotton

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Abstract:
A strong and firm fabric, Bamcot from the three initial letters in bamboo and cotton was produced on the traditional kentey weaving loom, by interlacing cotton yarns and bamboo slivers. This is an initiative aimed at producing a fabric or an onloom product that can be used as a base material for the production of window blinds and bags. In this process, bambusa vulgaris was harvested, prepared and processed into slivers using local hand tools. Cotton yarns were also laid as warp yarns on the traditional loom and as binding weft yarn carried in the weaving shuttle. The traditional headdling order was adopted for this and traditional methods of preservation of bamboo was used. The two main objectives of producing window blinds and bag was achieved in integration with leatherette.

Keywords: *Bamboo, cotton, weave structure, loom, warp, weft.*

1. Introduction

Bamboo and cotton are both plant materials with high fiber content. These are two unique materials that can be described as excellent materials for countless applications ranging from handicraft and utility items to industrial products and structural components of houses. With such wide applicability, they offer tremendous livelihood potential for urban, rural communities and business. Several products have been made in each of these material that has evolved out of the need of society and these have been part of the countless achievements in the fields of Art, Science and technology. Some of the products include fabrics from both bamboo and cotton, and furniture from bamboo. The Department of Integrated Rural Art and Industry, Kwame Nkrumah University of Science and Technology teaches students to produce works of Art from these materials and in other cases from their products and to integrate with other materials technologically and aesthetically. Products made from the integration or blend of these two material has yielded the expected impact because not much research has been made in the Department of Integrated Rural Art and Industry in that area. An attempt has been made to create a fabric, Bamcot from the interlacing of cotton yarns and bamboo slivers for the production of window blinds and bags that can be used in offices and homes.

2. Materials and Methods

Bamcot and its product started with the harvesting of bamboo. Bambusa vulgaris was the type that was used in this study. The ages of the bambusa vulgaris that was harvested was within the ranges of 4 to 5 years. After delimbing of the bamboo, the culms were cross-cut, taking out the nodes and working on the internodes. Between 17 to 20 cm thick culms of the same thickness were selected for the work. Primary processing started with splitting off the lumen, and further splitting of the remaining woody part of the internodes into strips and this was done with a short machete. Gnanaharan et al (1997) explained that, for use in woven products, the culm has to be split into strips, and then the strips further processed to get splits and slivers.

Figure 1: Internodes of Bambusa Vulgaris and splits

Figure 2: Removal of the Lumen

After splitting, the strips were further processed into splits and slivers. In this a short machete was used for the opening and eventual removal of the epidermis and the lumen on each strip as suggested by Maharathi (1961). This was done to ensure that the sugar concentrated part of the bamboo being processed, the lumen is remove to reduce the risk of attack by degrading agents. This Baah (2016) in a personal communication explained that the lumen of the bamboo is the part with very high sugar concentration and when removed by plaining or splitting, reduces the chances of attack by degrading agents. He further argued that the removal of the lumen improves the durability of the bamboo in use. Gnanaharan et al (1997) also confirmed by saying that in the processing of strips into splits and slivers, any pithy inner portion is usually discarded. To ensure the thickness of the strips are uniform as possible, a draw Figure, an instrument for making the width and thickness of the slivers uniform was employed.

Figure 3: The Bamboo slivers

2.1. Preservation of the Slivers

Steiner et al (2008) opined that, an important factor, which limits the use of bamboo, is its durability. Bamboo is subject to attack by fungi and insects, and these reduces the expected life of the bamboo to less than five years. In view of this, the slivers were put in a bowl of water to leach out some soluble sugars to reduce further the sugar content of the bamboo. Sulthoni (1987) explained that, this method also reduces the starch content of the bamboo and other gummy substances present in the bamboo. The slivers were kept in the water for nine days to ensure a thorough leach out of sugars and to render the slivers unattractive to the pest.

2.2. Bleaching the Bamboo Slivers

After that, the fine slivers were removed out of the water and submerged in para zone a bleaching liquid capable of improving the colour of the slivers and serving as mordant to render the bamboo slivers affable to swede dye. In order not to weaken the fibers of the slivers, the immersion period lasted 30 minutes. In a personal communication, Baah (2016) said the bleaching of bamboo enhances its preservative properties. He further explained that bamboo is highly lignified and penetrations by liquids is sometimes impossible, bleaching however tends to destroy properties of the material as it reacts with the material on the surface making it unattractive to pest and other degrading agents.

Figure 4: Bleaching of the slivers

For art wares, splits and slivers, Gnaharan et al (1997) said should be without blemish. Colouration from internal ingredients of bamboo like gum, resins and oily substances mar the appearance of the slivers. He explained that bleaching is resorted to in these circumstances. Kallapur (1989) said in Japan bisulphite bleaching is practiced. From the bleach, the bleached bamboo slivers were put into a bigger bowl of water to rinse and wash off the parazone. This was done to stop any form of reaction on the surface of the bamboo slivers. The slivers were then spread on a table under shade to dry. Drying was completed in 24 hours. The colour of the slivers became lighter.

2.3. Dyeing of the Slivers

Several methods of dyeing bamboo and bamboo sliver has been practiced in different cultures around the world, many indigenous to the artisans, their locality and end use. In most cultures, Ranjan et al (1986) explained that dyeing of processed bamboo slivers is a traditional practice of the artisans in the localities and this is done using vegetable dyes indigenously developed from local plant extracts. Parts of the plants mostly used are the leaves and the back. In this work, swede dye was used. The previously preserved, bleached and dried slivers were submerged in clean water and was submersed in a dye bath with the following composition.

MATERIALS	QUANTITY
Swede Dye	10 grams
water	10 liters
salt	50 grams

Table 1: composition for dyeing

In this 10 grams of swede dye was dissolved in a cup with 100 milliliters of warm water. 50 grams of salt (sodium chloride) was also dissolved in 9. 9 liters of water in a 3 mm thick aluminum bowl.The dissolved dye in the cup was poured into water in the 3 mm thick aluminum bowl and was stirred to mix. The bamboo slivers were put in the dye bath and kept submerged. The dye bath was gradually heated and brought to the boil. The slivers were boiled in the dye for about an hour until the expected colour shade was attained. The dyed bamboo sliver was taken out of the dye solution, and was spread on a table expose to oxidize under shade for 30 minutes. After that the bamboo slivers were rinse of excess dye in clean water and was dried under shade.

Figure 5: Dyeing of the Bamboo slivers

2.4. Weaving on the Loom

Cotton yarns were first put on the warp mill to create the necessary crosses and number of ends required for the weaving of BAMCOT, an on loom product of the interlacing of bamboo slivers and cotton yarns on the loom. From the warp mill, the yarns

which were the warp for the weaving was spread across the width of the loom with the help of the raddle to attain the correct width. The warp was transferred onto the warp beam of the loom, a part of the loom that accommodates the warp yarns before they are released to weaving area of the loom. Crosses that were made while the cotton yarns were put on the warp mill made it possible to separate the individual ends for headdling through the eyes of the healds on the loom. The healddling order that was use for this weave structure can be coded as 121, 434 and this allowed for structure that has 3 ends of warp down and another 3 going up to open the warp for the bamboo sliver to be placed in there and after that the shuttle carrying the weft yarns is use to weave a binder to secure the sliver with a plain weave

Figure 6: Initial test weave of Bamcot

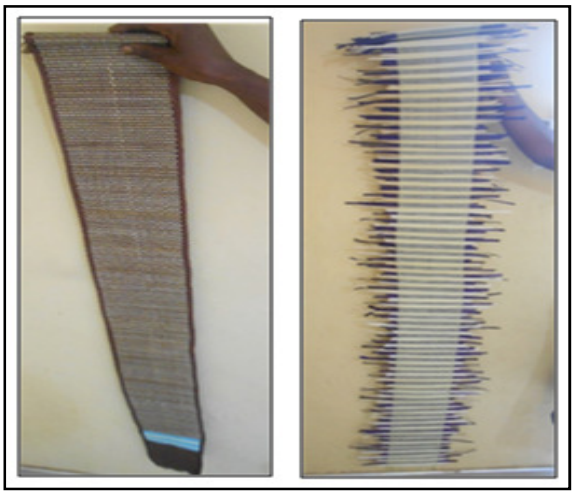

Figure 7: Bamcot made out of dyied and undyied slivers

2.5. Products Made from Bamcot

Several strips of the bamcot structure fabric were produced on the loom and were used for products that were suitable due strength of Bamcot. The selvedge of the fabric strips were trimed with a very sharp cutting shears and Satin binding byers were sown at the selvege to secure it. Figure 7. These were used for the production of window blinds.

Figure 8: window blinds

In another another situation the selvdges of the woven fabric after treaming were interlocked to join and to make wide in the partern of the indegenouse kente fabric , and this was integrated with leather for the production of a shoping bag.

Figure 9: lady's shopping bag

3. Findings of the Study

The bamcot fabric was an experimental onloom project aimed at creating a product from the blend of cotton and local bambusa vulgaris. It was also aimed at dveloping other uses for our local bamboo to promote the use of local bamboo and to increase the product and knowledge base of our local bamboo. In this study it was observed that, after the removal of the lumen the material can be hand drawn into several sheets of slivers which after submerssion in water to wash off some sugars will contribute to the production of a large quantities of bamcot strips for the production of artefacts.

It became obvious that when the slivers were drawn and processed for weaving, the flexibility of the individual sliver improved. This according to Baah Seth in a personal communication was so because the submersion period in water helped in leaching out not only sugars but other soluble mineral and debonding of materials like gum, lignin and starch which contribute in giving strength to the material. In dyeing the slivers, sodium chloride be came a nessessary fixative in the process. In the initial stages the swede dye bath was prepared without salt (sodium chloride), this resulted in a pale shade of colour and the colour remained unfixed. The unfixed colour could easily be cleaned off the slivers with a damp cloth. The addition of the sodim chloride to the dye bath darkened the shade of the colour and fixed it onto the slivers making it imposible to be wiped off by a damp cloth. On the hand, when the dyed slivers were sanded with abrasive paper, the colour was removed indicating that the colour was only at the surface of the slivers and did not penetrate the slivers. This reserchers belive is as a result of its high content of gums, reisens and lignin. These materials render the slivers impermeable to dyes and other liquids and therfore dyes are applicable only on the surface of the bamboo slivers. By implication, the expose fibers are afable to the dye, while the others are covered by the starch , lignin and other gummy substances in the bamboo. It was also found interesting to note that, slivers that were treated with smooth abrasives before dyeing came out attractive and aesthetically pleasing.

Although the loom was used to fabricate bamcot, the nature of bambcot can not be compared to other products of the loom like cotton fabric, jute fabric. Jute and cotton fabric, and other conventional fabrics. Bamcot is comparably tough, firm and rigid and is suitable for works of art that require strength and firmness like the blinds. This product can be produced on a broader scale when the broad loom is employed. Under this condition a bamboo type with a longer internode will be most appropirette to produce bamcot as described. Bambusa asper is recommended for this type of work on the broad loom.

4. Conclusion

The harvesting, processing, preservation and fabrication of bamboo into useful products has been a practice that has been with us for years. In may cultures, traditional products which constitute a segment of their culture are mostly produced of the relationship the people have with bamboo as a material. Differences in cultures have contributed to divers bamboo products found on the world's market produced under divers cultural backgrounds and traditional systems. Bamcot on the other hand is an experimental onloom product, that stands as a union or marriage of two plant fibers, bamboo and cotton technologically fabricated on the hand operated loom. This points to the fact that bamboo can be integrated with other materials technologically to creat products that can help improove economy of communities, creat jobs, and help reduce poverty in our rural communities.

5. References

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