SSRG International Journal of Material Science and Engineering
ISSN: 2394–8884 / https://doi.org/10.14445/23948884/IJMSE-V10I1P101

Volume 10 Issue 1, 1-5, Jan-Apr 2024

Short Communication

Manufacture and Use Obom: Review

Elong Elong Elie Firmin Kuate[1], Nkemaja Dydimus Efeze[1,2], Fabien Ebanda Betene[1], Jessica Dacleu Ndengue[1], Pierre Marcel Anicet Noah[1], Nsangou Abdouramane[1*]

[1]*Department of Mechanical Engineering, ENSET, University of Douala, Cameroon.*
[2]*HTTTC Bambili-University of Bamenda, Cameroon.*

Corresponding Author : abdouramanensangou791@gmail.com

Received: 21 November 2023 Revised: 26 December 2023 Accepted: 11 January 2024 Published: 30 January 2024

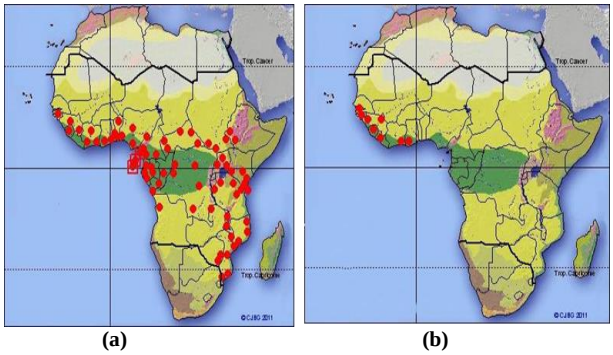
Abstract *- This work aims to evaluate the literature on the improvement of Obom fabric, the traditional dress of the Fan-béti in central, southern, and eastern Cameroon, over time. The aim is to search the literature for improvements in the properties of this fabric over time in order to identify what remains to be done since the advent of sustainable development calls for valorizing biodegradable textiles, in short, textiles of natural origin. Consultation of databases (Google Scholar and Researchgate) reveals that the use of tapered bark in clothing is an ancient culture known not only in Cameroon but in many other countries around the world. The trees constantly used in the manufacture of this fabric are Iroko, and it has been found that there are two types of tree, Millicia excelsa and Millicia regia, which nevertheless have certain morphological and physiological distinctions. It should also be noted that slick extraction can be carried out on a tree trunk that has already been cut down and on a tree that is still alive. In the latter case, care must be taken with the quantity of bark to be removed from the tree to avoid destroying it. In the end, the fabric that emerges from this traditional untreated extraction is still quite stiff and does not have good textile properties; we, therefore, need to experiment in future studies with appropriate treatments to obtain properties that can be compared with those of modern textiles.*

Keywords *- Obom, Manufacture, Use, Traditional textile.*

1. Introduction

Central Africa has the second largest continuous expanse of dense tropical forest after the Amazon basin for its wealth of natural resources and biodiversity [1,2]. Cameroon is a country where biological diversity is particularly high, with a number of woody species accounting for around 42% of its surface area [3]. This Central African country has one of the largest components of this forest block, with around 20 million hectares (ha) of tropical rainforest [4]. Timber is the country's second most important export (30%), after oil (60%) [5]. Despite the fact that they are regressing at a rate of 0.16% per year [6], these forests are among the most varied tropical ecosystems [7] but also the least well-known in terms of biodiversity characterization [8].

While slash-and-burn agriculture and domestic energy needs are some of Africa's main sources of deforestation today [10-11], forestry can also make an important contribution to the textile industry. The bark is an abundant by-product of the forestry industry. This external wood tissue represents between 9% and 15% of the total volume of a log. It is largely made up of fibers yet is most often destined for the pulp and paper industry (300 kg generated per ton of pulp produced) [9].



(a) **(b)**

Fig. 1 Distribution areas of Milicia excelsa (a) and Milicia regia (b) are the only two species in the genus Milicia—mapping based on the location of herbarium specimens from various botanical gardens [9].

Textile materials derived from wood can be divided into two categories: those derived from the bark of trees, shrubs, or bushes (Tilia sp., Populus tremula, L.,...) and those derived from stemmed plants (Linum usitatissimum L., Urtica dioica L., ...). Due to their diversity, the focus will be on the fibrous web from the liber (inner layer of the bark formed by the cambium) of Iroko (milicia excelsa and milicia regia). In Africa, several resources are located in different places [9-12]. Each region, each ethnic group, each person has their own traditions and has developed their own customs, sometimes ancestral, which define and

characterize them singularly. People have taken advantage of the various constraints imposed by the habitat in which they live and developed fabrics that meet their needs, but not only that. Indeed, fabrics have one main function: clothing, but over time, certain textiles have quickly become ways of standing out and showing one's role in society [9-12]. Throughout time, textiles have quickly come to be seen as a temporal or hierarchical marker in society. In Central Africa (Cameroon and Nigeria), for example, among the Bamilekes, Ndop or Wukari from Nigeria is a royal fabric. It is worn as a ceremonial garment and reserved almost exclusively for funerals or secret ceremonies. Like Ndop in West Cameroon, other regions of the country, such as the South, Centre, and East, have also developed their own textile called Obom, made from the beaten bark of the iroko tree, with a manufacturing process that has remained a real secret for its makers. The aim here is to review the current use of this fiber fleece, the method of obtaining it, its origin, and the iroko tree used to make this fabric.

2. History of Obom

The first textiles in Africa were made from beaten bark, widely used throughout the continent for a time, and then concentrated in Central Africa. "Obom" is the common name for the fabric made from tree bark and is commonly known as tapa in Asia and throughout the Pacific Islands. "Murumba, Pongo or Lengbé" among DRC pygmies [13]. Obom" among the pygmies of eastern Cameroon, "Pêle-mêle" among the Bamoums in Cameroon; this type of textile is made and used in South America, Central Africa, Southeast Asia, the Philippines, and Indonesia, but it is in the South Pacific islands that it achieves its greatest refinement and richest diversity, making it one of the most characteristic products of the cultures of these regions. The figure below shows an image of Obom fabric without finishing.

3. Description

Beated bark is also used in Oceania, South America, Central Africa, and Indonesia and is made from various trees [14]. To date, in Cameroon, 5 tree species have been identified and recognized by the "Baka" Pygmies for manufacturing plant fabrics from their bark. These include Chlorophora Excelsa, a member of the Moraceae family, known as Bangii in Pygmy and Abang in Ewondo [13]. Ficus Mucuso also belongs to the Moraceae family, known by the common name of Fig Tree [13] in Baka Ewawa and Tol in Ewondo.

Petersianthus Macrocarpus, a member of the Lecithidaceae family, was once used to make blankets for newborns, as its bast gives finer, thicker fabrics—paper mulberry (broussonetia papyrifera) [13]. Iroko (Millicia regia, Millicia excelsa), family Moraceae, highly prized for the quality of its wood, is revered by local populations, and the cloth made from its bast is revered by traditional chiefs in Cameroon because of its quality. This is the species that will interest us in our study.

3.1. Harvesting Obom Cloth

After selecting a tree with smooth, straight branches or trunk, at least ten years old, to obtain long strips of bark, the work begins with one or more incisions marking the breaking points of the bark [9]. Barkers are used for this; they are made of bone, bamboo, or wood, depending on the region. This type of utensil is undoubtedly widespread among Neolithic bone and antler artifacts (chisels, bevels, etc.) but remains difficult to identify due to its lack of morphological specificity. It is also possible that the adze, better suited than the axe to precision work, was used to debark large-diameter trunks [9]. This is done by sliding the barker between the xylem and the epidermis, lifting, then pulling to loosen the bark. As long as the sap is not flowing through the branches, the fiber adheres tightly to the wood; as it rises, a moist zone appears between the xylem and the epidermis, facilitating removal. To obtain the best, it is usually necessary to retort the material.

Fig. 2 Obom texture in Cameroon and beaten bark with protective Mbuti pygmy swastikas [21].

Fig. 3 Representative images of the Iroko tree and leaves.

3.2. Methods used to Harvest Obom Tablecloths

Generally, harvesting is carried out either on a barter tree that has already been cut for the use of its wood. However, literature and experimentation do not contradict the possibility of debarking standing trees [15]. Debarking begins with one or more incisions marking the breaking points in the bark. Tools used for this purpose are difficult to identify due to their lack of morphological specificity. They are numerous among the Neolithic bone and antler objects. Some artifacts are reminiscent of contemporary debarkers [15], and analyses confirm their use in bark processing [16]. After carefully incising, using a debarker, then detaching the start of the strip of bark, traction is exerted from bottom to top in the case of standing trees to tear off a strip. In the case of trunks that have already been cut, the detachment can be done in a circular fashion. As long as the sap does not circulate, the fiber adheres strongly to the wood; when it goes up, a wet zone appears between the xylem and the cortex, facilitating the bark removal. The choice of tree is decisive: to obtain long and regular strips of bark, selecting a smooth trunk with no lower branches is preferable. Young trees and stump shoots are quality supports.

Fig. 4 Bark extraction methods [17].

After debarking, in the case of trees from which strips have been extracted, studies have shown that trees generally develop new tissue, such as callus (hardening and thickening of the epidermis), to ensure their survival [18]. The outer callus originates from the cambium and/or the differentiation of mature xylem cells. Removing bark results in a sharp reduction or slowing down of the stem's growth in thickness to the benefit of the renewal of the bark surface removed. This renewal enables the tree to rapidly re-establish its protective and sap circulation functions [18].

3.2.1. Tanning

According to the testimony of local garment makers, tanning is carried out with the mesh engraved with motifs beforehand; its purpose is to separate the fabric from the tree trunk and allow the quantity of water and sap to be removed mechanically using an ancestral technique.

Fig. 5 Tanning and tanning tools.

To remove the bast from the tree trunk, use a well-filed machete to cut the tanned layer from the trunk, peel off the partially tanned layer, and then carry out a second tanning operation. This operation is carried out using traditional techniques, as illustrated in Figure 6.

(a) (b) (c)

Fig. 6 (a): Unwinding the web (b) Peeling (c) Tanning.

3.2.2 Retting

This type of retting is based on the principle of micro-organism development: after hours of beating, the bark is immersed in water for 5 to 7 days. During this time, the fabric is naturally subjected to the action of anaerobic bacteria. As soon as the fabric is judged to be free of undesirable constituents and porosities that can be seen on the fabric, it is removed from the water, rinsed, and dried.

Fig. 7 Rewinding of the Obom nappe.

4. Use of Obom

For the time being, Obom is still used in a very specific way. Only people vested with traditional authority can have the privilege of putting it on their bodies, such as traditional chiefs or notables in the Béti tradition [13]. Figure 8 shows a few Cameroonian personalities in Obom garb.

Fig. 8 Presentation of some traditional Obom garments.

4.1. Fashion Industry

Some fashion designers have invested in the manufacture of decorative objects based on Obom fibers, but the authenticity of this fiber is still not recognized in the textile manufacturing industry; it remains, nevertheless, an object of clothing ennoblement, as illustrated in Figure 9.

Fig. 9 Mannequins dressed in Obom fabric and shirts

5. Geographical Distribution and Main Tree Characteristics

Iroko is widely distributed on the African continent, from Guinea-Bissau to Ethiopia and as far south as Angola and Zimbabwe. The M. regia species, on the other hand, is less widely distributed, confining itself to Senegal and Ghana [19]. Iroko reaches a maximum height of 45 to 50 m, with a diameter of around 2.5 m [19-20]. The bark is grey to dark brown, with yellowish lenticels. The trunk is cylindrical and generally straight, with no branches over a height of 15 to 30 m. It is sometimes slightly serrated at the base and exudes abundant yellowish-white latex when notched. Mature trees often have shallow, prominent roots. The crown is spreading, with obliquely ascending branches. Leaves are simple and alternate, elliptical to oblong, 6 to 20 cm long and 4 to 10 cm wide. While the main morphological features are identical between the two taxa, to the extent that they were and still are commonly confused [20], certain vegetative and reproductive characteristics show a significant difference between M. excelsa and M. regia [21-22].

6. Limits of Obom bark cloth

With scientific progress and the emergence of new technologies, the use of fabrics has moved beyond the traditional domain to conquer the technical field. The variety of weaves and the diversity of raw materials used give fabrics a specific mechanical behavior that has become the focus of much research. As a result, today, the design of a product intended for human contact is no longer possible without considering its sensorial rendering. These sensory characteristics are added to the mechanical properties required for the product to function properly; textile surfaces are obviously involved. As far as the current Obom is concerned, it is a fleece that has so far only one field of use, that of clothing. It's also important to note that, over and above its traditional character, and according to our consumer surveys, this textile has poorer sensory properties and little-known textile potential. In light of this, we asked ourselves the following question: wouldn't it make sense to explore the textile potential web through mechanical, physicochemical, and thermal treatments and characterizations to recommend its various areas of use [23]. In this work, we will first experiment with a better method for extracting and then treating the Obom web before carrying out characterizations. Finally, based on its various properties, we can eventually recommend its various fields of use.

7. Conclusion

At the end of this analysis, let's recall that this work aimed to evaluate the literature on the improvement of Obom fabric, the traditional dress of the Fan-béti in central, southern, and eastern Cameroon, over time. The aim is to search the literature for improvements in the properties of this fabric over time in order to identify what remains to be done. The advent of sustainable development calls for valorizing biodegradable textiles, in short, textiles of natural origin. Consultation of databases (Google Scholar and Researchgate) reveals that the use of tapered bark in clothing is an ancient culture known not only in Cameroon but in many other countries around the world. The trees constantly used in the manufacture of this fabric are Iroko, and it has been found that there are two types of tree, Millicia excelsa and Millicia regia, which nevertheless have certain morphological and physiological distinctions. It should also be noted that slick extraction can be carried out on a tree trunk that has already been cut down and on a tree that is still alive. In the latter case, care must be taken with the quantity of bark to be removed from the tree to avoid destroying it. In the end, the fabric that emerges from this traditional untreated extraction is still quite stiff and does not have good textile properties; we, therefore, need to experiment in future studies with appropriate treatments to obtain properties that can be compared with those of modern textiles.

References

[1] Mayaux Philippe et al., *Central African Forest Cover and Cover Change Mapping, The Forests of the Congo Basin-State of the Forest 2006*, Comifac & Lanoo, 2007. [Google Scholar] [Publisher Link]

[2] Marie Caroline Momo Solefack, and Ghislain Kenguem Kinjouo, "Anatomical Modifications after Debarking of Three Species in Southwest Cameroon," *Journal of Applied Biosciences*, vol. 115, pp. 11490-11501, 2017. [CrossRef] [Google Scholar] [Publisher Link]

[3] Njankouo Moumbagna Mouhamet, and Guizol Philippe, "*Status Report on Forest Plantations of Local Species in Dense Forest Areas in Cameroon*," Master's Thesis, University of Dschang, 2018. [Google Scholar] [Publisher Link]

[4] Benoit Mertens et al., Interactive Forestry Atlas of Cameroon, Atlas Forestier Interactif Du Cameroun Version 2.0, World Resources Institute, 2007. [Online]. Available: www.wri.org/research/interactive-forestry-atlas-cameroon-atlas-forestier-interactif-du-cameroun-version-20.

[5] Abdon Awono, Diomede Mani Raki Za, and Verina I. Ngram, "*Basic study of Prunus Africana in the North West and South West provinces of Cameroon*," Center for International Forestry Research, FAO-CIFOR-SNV-World Agroforestry Center-COMIFAC, 2008. [Google Scholar] [Publisher Link]

[6] Duveiller Gregory et al., "Deforestation in Central Africa: Estimates at Regional, National and Landscape Levels By Advanced Processing of Systematically Distributed Landsat Extracts," *Remote Sensing of Environment*, vol. 112, no. 5, pp. 1969-1981, 2008. [CrossRef] [Google Scholar] [Publisher Link]

[7] State of the World's Forests, Food and Agriculture Organization of the United Nations, Rome, 2011. [Online]. Available: https://www.fao.org/3/i2000e/i2000e00.htm

[8] Doucet Jean-Louis, "*The Delicate Alliance of Forest Management and Biodiversity in the Forests of Central Gabon*," Doctoral Thesis: University Faculty of Agricultural Sciences of Gembloux Belgium, 2003. [Google Scholar] [Publisher Link]

[9] Kasso Daïnou et al., "Identity and Ecology of Commercial Forest Species from Central Africa: The Case of Milicia Spp. (bibliographic synthesis)," *Biotechnology, Agronomy, Society and Environment*, vol. 16, no. 2, pp.229-241, 2012. [Google Scholar] [Publisher Link]

[10] Oliver Damette, and Philippe Delacote, "Unsustainable Timber Harvesting, Deforestation and the Role of Certification," *Ecological Economics*, vol. 70, no. 6, pp. 1211-1219, 2011. [CrossRef] [Google Scholar] [Publisher Link]

[11] John M. Harkin, and John Westel Rowe, *Bark and Its Possible Uses*, Forest Products Laboratory, U.S. Forest Service, 1971. [Google Scholar] [Publisher Link]

[12] Meriem Boras, "*Comparative Study and Optimization of Pretreatments of Wood Bark for the Extraction of Phenolic Compounds*," Thesse University of Technology of Compiègne, 2015. [Google Scholar] [Publisher Link]

[13] Kabien Sassa, *Traditional Baka Pharmacopey and Bantu Healing Foods: Health and Well-Being Thanks to African Medicinal Plants*, Kindle Edition, 2017. [Publisher Link]

[14] Dwayne L. Dunaway, Brad L. Thiel, and Christopher Viney, "Tensile Mechanical Property Evaluation of Natural Andepoxide-Treated Silk Fibers," *Journal of Applied Polymer Science*, vol. 58, no. 3, pp. 675-683, 1995. [CrossRef] [Google Scholar] [Publisher Link]

[15] Fabienne Médard, "Textiles d'écorce. The Contribution of Trees to Prehistoric Textile Production," *Annals of the Fyssen Foundation*, no. 19, pp. 20-29, 2004. [Google Scholar] [Publisher Link]

[16] Yolaine Maigrot, "Traceology of Cutting Bone Tools from the 5th and 4th Millennium Bc. Bc in the Paris Basin: Methodological Test and Application," *Bulletin of the French Prehistoric Society*, vol. 94, no. 2, pp. 198-216, 1997. [CrossRef] [Google Scholar] [Publisher Link]

[17] Hilary Stewart, *Cedar: Tree of Life to the Northwest Coast Indians*, Douglas and McIntyre (2013) Limited, 2009. [Google Scholar] [Publisher Link]

[18] A. Chevalier, "Novelties of the African Flora – Urticaceae," *Bulletin of the Botanical Society of France*, vol. 58, pp. 207-211, 1912. [Google Scholar]

[19] Patrick Van Damme, "Plant Resources of Tropical Africa (7)1 – Timbers 1," AVRUG-Bulletin, vol. 22, no. 2, pp. 105–106, 2009. [CrossRef] [Google Scholar] [Publisher Link]

[20] Hawthorne William, and Carel Jongkind, *Woody Plants of Western African Forests*, Royal Botanic Gardens Kew, 2006. [Google Scholar] [Publisher Link]

[21] J. Perez-Rigueiro et al., "Silkworm Silk as an Engineering Material," *Journal of Applied Polymer Science*, vol. 70, no. 12, pp. 2439-2447, 1998. [CrossRef] [Google Scholar] [Publisher Link]

[22] R. Boughriet, "Plant fibers: Promising New Applications Emerge," *Actu-Environnement*, 2009. [Google Scholar] [Publisher Link]

[23] Azonkponon Norbert, "In Situ Conservation of Iroko (Milicia exelsa (Welw.) CC Berg) in the Vodun Cultural Area in Benin," *Faculty of Agronomic Sciences/National University of Benin*, 2001. [Google Scholar] [Publisher Link]