

# Manipulating Indigenous Vegetable-Tanned Leather for Use in Crocheting Art

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**Abstract:** The study explores techniques and methods used in converting indigenous vegetable-tanned leather into yarns that can serve as an alternative material and convert the locally made yarns into crocheted ladies containers and footwear using different stitches. It embraces a qualitative research of which the approach implements two various approach's (Descriptive and Studio-based research). The novelty of the study came from sampling, which consisted of Crochet Artisans, Leatherworks Teachers, and Leather Technologists within the above areas. The Crocheting Artisans were selected through the snowball sampling technique, whereas the Leatherwork Teachers and Leather Technologists were selected using the purposive sampling technique. The results from data gathered via the project experiments involved studio activities in converting the local vegetable-tanned leather into yarns and crocheting the yarns into ladies containers and footwear using different stitches were analysed and discussed. The study concludes that indigenous vegetable-tanned leather is suitable for use in making crocheting yarns and crocheting artefacts due to its strength, flexibility, and hook construction. Moreover, spiral cutting techniques came out to be the most appropriate technique for cutting leather into yarns for use in crocheting art. The study recommends that the use of leather in making crocheting yarns should follow these steps - the cutting of leather, softening of leather (wet pounding) and dyeing of leather (vat dye and the mixture of suede and insoluble dye). In addition, the study suggests that to create diversity in crocheting yarns, crocheting artefacts and expand leather usage, the potential leather should be tapped by both Crocheting and Leather Artisans.

**Keywords:** Manipulation, Indigenous, Vegetable-Tanned Leather, Crocheting, Yarn

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## 1. Introduction

Throughout the ages, from prehistoric times through to the period of the industrial revolution, wild animals were hunted for food and their skins used for clothing and shelter. In ancient times, clothes, footwear, bags, shelter (makeshift tents), and other objects were made from the skins of wild animals and other big domestic animals. Leather was used for making garments, footwear, saddles and chaps, holsters and harnesses, sword sheaths, ropes, rugs, water skins, bottles, bags, and containers [1]. The ancient Egyptians, used leather for making tents, quivers, saddles, footwear, harnesses, body armour, and weapon carriers [2]. Leathers made from

goatskin was used in making maps, while leathers obtained from pigskin was used in making water skins [3]. Leather were also used to render a number of items like boots, automotive and aircraft upholstery, fabrics, handbags, book covers, accessories for fashion and furnishings [4]. In transportation and mobilization leather has been used for seating due to its longevity and comfort [5]. The sailing ships also used leather jackets and patches to protect the rope rigging from mechanical wear [6]. Correspondingly, in these modern times, due to the excellent overall properties such as breathability, comfort, wear resistance, and puncture resistance, leather is widely used in civilian and military footwear, automobile interiors, and office furniture. However, as people's living standards rise, so do their expectations of

the functionality and performance of leather-based materials, albeit, the process of treatment and preservation has changed drastically [7]. Generally, within Africa and most third world countries, when an animal is killed for the extraction of its skin, the skin is removed from the flesh, dried in the sun. It is then hardened by pounding in animal fats and brains and preserved by salting and smoking. Skins obtained from leather go through various processors to make it suitable for production. Leather's hydrothermal stability, mechanical properties, and resistance to chemical and biological degradation allow it to be used in a wide range of applications [8]. Again due to its highly flexible and durability nature it makes it easy to be manipulated to produce various items [9]. Leather is an alternative to other materials used in art techniques such as macramé, marquetry, painting and weaving, among other art techniques. Vegetable-tanned leather developed in Ghana's northern and southern parts have unique characteristics that make it the best for use in a variety of leather products [10]. The common occurrence of animal skin products over time, whether tanned leather, parchment, vellum, oil or fat cured skin or rawhide, attests to the enduring usefulness and desirability of animal skin as a material. Whereas the properties attribute to the enduring presence of leather as a robust and flexible sheet material and its ready availability in cultures where meat got is from a slaughtered animal [11]. Series of research studies have examined the use of manipulated vegetable-tanned leather in various art techniques, and findings stimulates that the characteristics of the materials used in macramé knotting had some similarities with Ghanaian indigenous vegetable-tanned leather [10]. Also, macramé artefacts produced with leather are attractive, durable, and easy to use. The use of vegetable-tanned leather in marquetry was examined and showed that leather has some properties such as durability, pliability, and affinity to dyes that make it suitable for use in marquetry [12]. However, it emerged that marquetry artisans do not use leather for their works because of its awful impactful smell. A study on the use of vegetable-tanned leather in the production of ladies' fashion accessories revealed that consumers embraced items made of leather albeit they preferred imported ones which come with excellent finishing [9]. Thus, it appears that the use of leather in crocheting art has rarely been explored in art literature. Crocheting is one of the earliest needlework arts which involves the use of thread and hook to produce a fabric. Thus, its origin comes from the French word "crochet", meaning "hook". Crocheting appeals to many people because of its unique uses to make an extensive range of artefacts such as decorative items, scarves, caps, vests, sweaters, purses, belts, lace, doilies, tablecloths, pillow covers, and bedspreads. Crocheting art has gained much prominence in the Ghanaian art industry over a couple of decades. However, it does appear that crochet artisans have not explored the use of leather yarns in making artefacts. They tend to rely on threads or yarns made of cotton, wool, or nylon for the artefacts, notwithstanding the unique characteristics of leather as a suitable material for making crochets. Over time,

artisans have manipulated leather in various ways to produce different artefacts. For instance, leather has been worked out and used in weaving, macramé, carving, and pyrography, among others. Moreover, several studies have examined the use of vegetable-tanned leather in art techniques such as macramé, weaving, and painting, among others [10, 9, 12]. For instance, goat leather is very durable and flexible when used in making strips for macramé knots [10]. This is due to the fact that goat leather has better water vapor permeability, greater porosity, wear-comfort property, hygienic property, and cooling mechanism. Furthermore, goat leather has slightly more acceptable stretchiness and elongation properties than cow leather. Because goat skin is primarily composed of collagen, the appearance, thickness, and length of these fiber bundles differ in various organs of the body [13]. However, the use of locally made vegetable-tanned leather yarn in crocheting art has rarely been explored in the art literature. Most writers have evidently made it clear in their literature that the use of leather in making a variety of artefacts is for human consumption. The use of leather in crocheting art has rarely been explored. For example, the Ghanaian indigenous vegetable-tanned leather which is readily available on the market has unique features such as flexibility, durability, high-temperature resistance, elasticity, high-pressure resistance, smooth dyeing, and colouring. However, locally made leather yarn has been not used in the production of crochet products. To date, there appears to be a less empirical study on the topic despite the evidence that leather is more durable than other foreign materials used.

### **1.1. Leather Manipulation**

Since this study is aiming at finding techniques and methods to manipulate indigenous vegetable-tanned leather into yarns for use in crochet art was found as a purposeful approach to extend the practical importance of locally produced leather to reach contemporary requirements and aesthetic appeal. Manipulation is defined as (a) to be used or modified (numbers, facts, etc.) in a skillful manner or for a specific purpose; (b) to be handled or performed with or as if by hand or by mechanical means, by skillful means; (c) to be altered by artful means to serve one purpose according to [14]. In addition, manipulation has been described as the realistic method of turning the leather into a condition that will make it possible for the expected work to be carried out [10]. These concepts are in direct line with what the study seeks to accomplish. The manipulation in this study is, therefore, the physical method of converting the condition of indigenous vegetable-tanned leather into a new shape to make it appropriate for use in crocheting craft.

### **1.2. Concept and Properties of the Leather Yarns**

The only property appropriate for the manufacture of yarns which are lacking in rawhide is a long, thin length; thus, the rawhide undergoes a complicated cutting procedure, which gives this function after being processed to the regular tannage of fine clothing leather [15]. It also shows that the

design of the sector, the features of fine clothing/outfit leather, the relatively limited size and the reasonably high precision at which leather yarns must be cut, and the need to extract tanning deposits and natural oils and fibrous particles from cut yarns prior to knitting, are some of the problems faced in the manufacture of commercially acceptable leather. Leather has vast properties which made it impossible for earlier writers to define [16]. Some properties of leather includes strength, durability, elastic (and sometimes flexibility and stiffness) [17]. He again reviewed that the characteristics that leather comes with, originates from the natural structure of the skin they are tanned from and partly due to the choice of the manufacturing process hence the property of leather vary considerably on the grounds of type and quality of both the raw material and the tanning process employed [16]. Thus, there is inconclusiveness about the general properties of leather, and hence the properties may vary with the type of leather in question. The literature on the leather works, and their suitability for specific artefacts appears to be scant and almost non-existent. However, the few that exist follow that the kind of leather suitable differs in their uses. For example, patent points out that macramé leather lace slows down crocheting considerably, attributing it to its heaviness and thickness, which makes bending difficult when involved in needlework and knitting machinery [15]. The functionality of the intended product to be made from leather is a prerequisite to the specific applicable properties of the leather [16, 18]. The five criteria of finished leather yarn needed for needlework, such as crocheting and machine knitting for fine garments to be coupled with softness, firmness of depth, and the strong narrowness of breadth, sufficient strength properties and consistency [15]. Softness, which tends to be the most distinguishing factor between leather yarn and leather lace, gives drapability to the knitted fabric made of leather yarn and the "soft side" that attracts the fashion industry. This leather yarn attribute often enables it to be shaped into various shapes throughout the knitting process.

Some of the animals whose skin possesses the consistency of softness for knit fashion clothing and foldability required for knitting machines include cattle, sheep, pigs, buffalo, deer, antelopes, horses and goats. With clear depth thinness, this property is based on the efficiency of the splitting machines, as the leather in its natural state is not standardized [15]. Similarly, the quality and narrowness of the width are decided by the machine and the device that enables the leather to be cut precisely. This allows the system used in the process to be precisely designed and optimized to preserve the flexibility needed for this material. To achieve precision, since the leather is soft, it is reviewed that a temporary stiffening compound should be added to give make the leather rigid to allow for accurate cutting. To withstand the pressure and stresses exerted by machine knitting and needlework, the yarn for leather works must be of sufficient tensile strength. This property saves the situation of wear and tear on the knitted fabric. Although leather for clothing garments does not require the tensile strength of lace leather,

adequate tensile strength is required. The leather kind that satisfies this requirement has a dense grain structure, and this can be traced to young animals such as calves. However the younger animals have small and thin skins which results in smooth and fine grain structure, and comparatively, the female skin usually has a finer grain structure than the male skin and consequently, a softer and more elastic leather [16, 18]. The continuity factor for both the length of the yarn required for the economical operation of the knitting machine and the consistent representation of the other four properties [15]. This study, therefore, seeks to explore different techniques and methods of manipulating the indigenous vegetable-tanned leather to produce yarns which can serve as an alternative material and be used for crocheting artefacts.

## 2. Methods and Materials

As the study was to project the novelty as proposed, studio-based research and descriptive research were adopted. The studio-based research was used to explore the various means to find techniques and methods to manipulate the locally tanned leather into yarns for use in crocheting art, while the descriptive research was employed to provide a comprehensive description of the manipulation processes of the locally tanned leather into yarns.

### 2.1. Secondary Preparation Technique

#### 2.1.1. Preparation

The secondary preparation technique was done on leather [11]. The goatskin treatment was aimed to prevent the leather surface from mould infestation and to reduce the offensive odour which is associated with local leather. The secondary treatment involved. Sanding: this process was achieved with the help of 60-grade sandpaper had a rough texture. The flesh side of the leather was scrapped with sandpaper to get rid of the excess flesh left after tanning. Liming: the flesh was scraped with a mixture of lime and wood ash. The aim was to remove the smell, blood, and other impurities from the leather. Soaking: the leather was immersed in clean water to wash away the mixture which was applied above and to make it soft. Stretching: the leather was stretched on a clean board, and the edges were pinned. The leather gained the full size of the skin.

Before the final work (crocheting artefact) was executed, the locally made leather yarns had to go through a series of processes to find out if the properties of leather suit the crocheting materials used in the production of crocheting artefacts since the crocheting yarns are noted for, flexibility, durability, construction, texture, and colour.

#### 2.1.2. Considering the Suitability of the Ghanaian Indigenous Vegetable Tanned Leather for Use in Crocheting Art

The study was based on the features of the yarns used for crocheting. Two types of strips (flat strip and rounded strip) were concentrated on all from goatskin. To find out which one was more appropriate for the crocheting yarn, the

following qualities with existing crocheting yarns were looked out for, flexibility, strength, composition, construction, texture, and colour. The following practical measures were applied to manipulate the selected leather for use in the study:

#### 1) Cutting method

##### a) Straight Cutting Technique

The leather was marked out with a pencil. With the aid of the ruler, the marked point was joined with a straight line. The straight lines were cut out with a sharp scissor as shown in Figure 1 below.

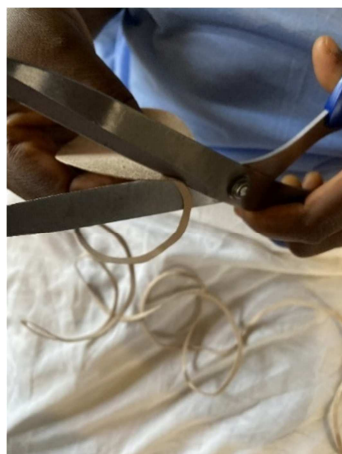


Source: Studio Activity

**Figure 1.** Cutting the leather sheet in straight lines.

##### b) Spiral Cutting Technique

A pencil in a compass was used to draw several circles of the same line spaces on the leather surface. The circles connected with a diagonal line were cut with a pair of scissors along the marked lines to the last circle to secure a long strip. Figure 2, demonstrate cutting of leather in spiral form.



Source: Studio Activity

**Figure 2.** Cutting the leather sheet in spiral form.

#### 2) Soften Techniques

##### a) Dry Pounding

The marked and cut outstrip pounded with a pestle and mortar to open up the fibres to attain flexibility without any liquid substances added to it as shown in Figure 3 below.



Source: Studio Activity

**Figure 3.** Pounding the cut out leather strips.

##### b) Wet Pounding

In this type of pounding process, the leather strip was soaked in water overnight, pounded, soaked in water and pounded repeatedly to get the water to penetrate the leather fibres to cause softness as demonstrated in Figure 4 below.



Source: Studio Activity

**Figure 4.** Leather strips soaked in water.

### 2.1.3. Examining the Suitability of Goat's Strips (Flat and Rounded) for Crocheting Yarn

#### Activity 1: Testing for Flexibility of the Leather Strips

The strips obtained from project one (wet pounding and dry pounding) were pulled, bend and crumpled with the hands continuously to know the malleability of each strip. Figure 5 is an example of crumpled leather.



Source: Studio Activity

**Figure 5.** Leather strips crumpled.



### Activity 2: Testing for Strength of the Leather Strips

Physically testing with the hands, the two strips were forcefully pulled in different angles to know how strong each strip was. Figure 6 below shows the strips pulled.



Source: Studio Activity

**Figure 6.** Pulling of leather strips.

### Activity 3: Testing for the Texture (Roughness or Smoothness) of the Leather

The eyes, fingers and the skin were tools used to examine the texture. The strips were pressed with fingers then after passing on the skin to feel the texture better as shown in figure 7 below.



Source: Studio Activity

**Figure 7.** Feeling the leather strips with the fingers.

### Activity 4: Testing for Easy Construction with Hook

Each of the leather strips tested was to know how well it picked by the hook and how it able to correspond to the stitches made with it as illustrated in Figure 8 below.



Source: Studio Activity

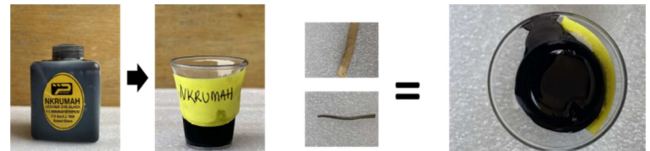
**Figure 8.** Leather strips being picked by the crocheting hook.

### The Application of Dyes on Leather Strips

The aim of testing the strips in various dyes was to know how each strip respond to the dye. The study identified some of the dyes available on the market and tested them on the leather. Liquid dyes were poured into a small clean contain whiles the powdered ones were also

mixed and poured into the same clean contain. The containers were labelled according to the dye poured into them. Pieces of strips A (dry pounding) and B (wet pounding) were cut out and immersed in the dyes for 5 minutes. The strips were removed from the dye and placed on a clean surface under the shade for 3 minutes. The strips were soaked in clean water to remove the excess dyes and placed on a clean surface under the shade to dry gradually. Figures 9 to 16 demonstrate the various dye.

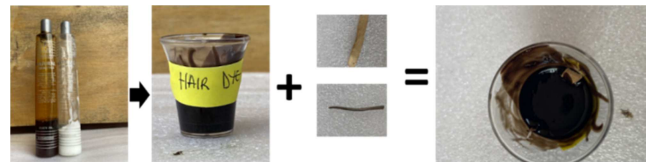
#### Nkrumah Dye



Source: Studio Activity

**Figure 9.** Testing leather strip A and B with Nkrumah dye.

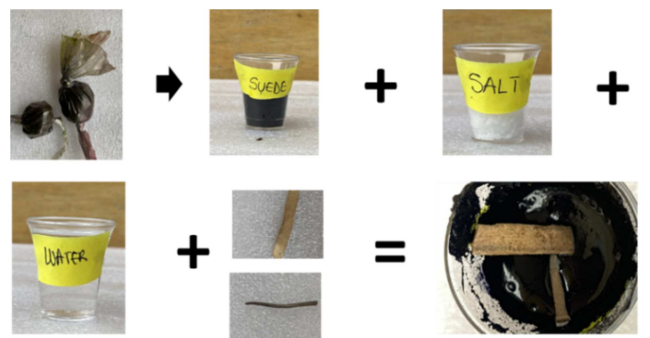
#### Hair Dye



Source: Studio Activity

**Figure 10.** Testing leather strip A and B with a hair dye.

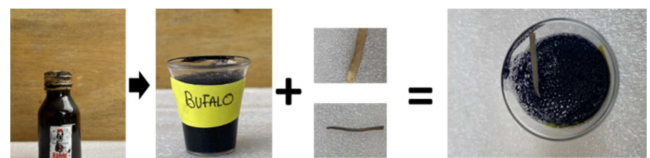
#### Suede Dye



Source: Studio Activity

**Figure 11.** Testing leather strip A and B with suede dye.

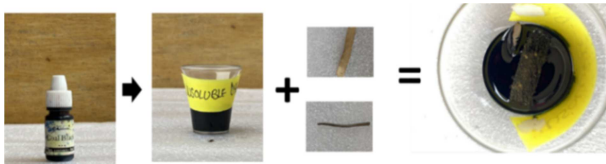
#### Buffalo Dye



Source: Studio Activity

**Figure 12.** Testing leather strip A and B with buffalo dye.

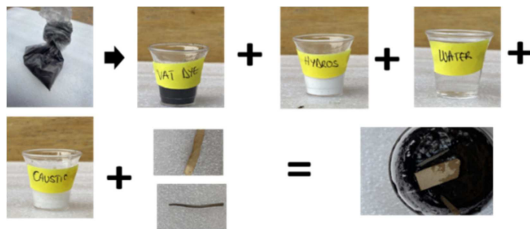
#### Insoluble Dye



Source: Studio Activity

**Figure 13.** Testing leather strip A and B with insoluble dye.

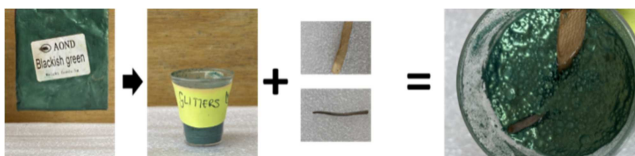
#### Vat Dye



Source: Studio Activity

**Figure 14.** Testing leather strip A and B with vat dye.

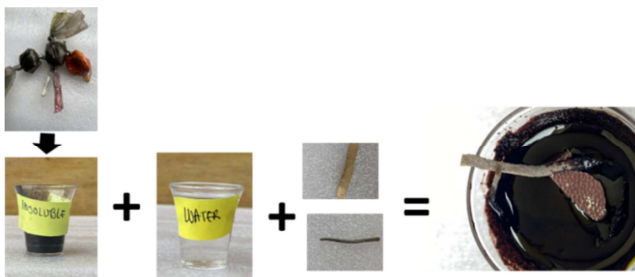
#### Glitters Dye



Source: Studio Activity

**Figure 15.** Testing leather strip A and B with glitters dye.

#### Insoluble Powder Dye



Source: Studio Activity

**Figure 16.** Testing leather strip A and B with insoluble dye.

## 2.2. The Production of Leather Strips for the Leather Yarn

After a series of experiments with the locally tanned strips for crocheting yarns, the following manipulated strips were found suitable for this study.

- 1) Pounded leather strips soaked in water
- 2) Strips dyed with a mixture of suede and insoluble dye
- 3) Strips dyed with vat dye

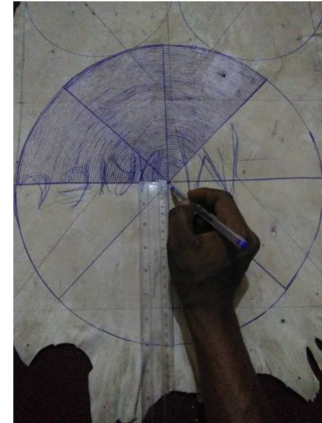
The production of the leather yarns was divided into five projects. These projects are presented below:

### 2.2.1. Project 1: Production of Bluish Green Leather Yarn

The working process involved in the production of bluish-

green leather yarn is as follows:

Step 1- Circles drawn on sheets of leathers with the use of a compass and a pen were 450mm in diameter. Spaces between circles were 0.25mm from the centre to the edge of the leather with a ruler and pen as indicated in Figure 17.



Source: Studio Activity

**Figure 17.** Drawing of circles of the same distance on the leather sheet.

Step 2 - The measured strips were cut out with a pair of scissors using a spiral cutting technique by connecting each circle with a diagonal line. The strips were soaked in water overnight and pounded for 10 minutes, soaked again for 20 minutes and pounded again. This process was done five times respectively in a mortar with a wooden pestle to loosen up the fibres, making them softer and obtaining a strand-like effect.

Step 3 - Three tablespoonsful (15 grams) of green suede dye, two tablespoonsful (10 grams) of insoluble dye and twelve tablespoonful (60 grams) of salts mixed with warm water in a bucket. The strips were soaked in the mixture for 10 minutes for the dyes to penetrate well into the fibres. The strips were taken out and left in the shade for 10 minutes and then rinsed in clean water to clear off the excess dyes. The dyed strips were stretched on a metal mesh and left in the shade for it to dry slowly as seen in Figure 18 below.



Source: Studio Activity

**Figure 18.** Leather strips soaked in dye and placed under a shade to dry gradually.

Step 4 - After drying, the strips were trimmed with a scissors at the knotting point of each meeting strip and rolled onto a plastic rod. Figure 19 is an example of leather being trimmed and rolled.





Source: Studio Activity

**Figure 19.** Leather being trimmed and rolled.

### 2.2.2. Project 2: Production of Orange Leather Strips

The working process involved in the production of orange leather yarn is as follows:

Step 1 - A khaki leather was marked on the flesh side with circles of diameter (450mm) using a compass and pen as seen in Figure 20.



Source: Studio Activity

**Figure 20.** Circles drawn on the leather sheet.

Steps 2 - Equal spacing of 0.25mm were measured from the centre of the circles on the sheets to the edges with a metal ruler and pen.

Step 3 - The drawn circles were cut out with a scissors using the spiral technique by creating a slanted line between each spaces. The strips were soaked overnight after it was pounded and repeatedly soaked five times, respectively.

Step 4 - Six tablespoonful (30 grams) of orange vat dye, six tablespoonful (30 grams) of hydro, 750ml of clean water, and half a teaspoon of caustic were mixed in a bucket following the above arrangement respectively. The strips were soaked in the mixture for 10 minutes. The strips were removed and left in the shade for 10 minutes and rinsed with water to clear the excess dye solution. The strips were stretched on a metal mesh and allowed to dry as illustrated in Figure 21 below.



Source: Studio Activity

**Figure 21.** Strip allowed to dry and stretched on a metal mesh.

Steps 5 - The dry strips were trimmed at the knotting areas, where two strips met with scissors and rolled onto a plastic rod. Figure 22 is an example of leather yarn rolled.



sSource: Studio Activity

**Figure 22.** Rolled orange leather yarn.

### 2.2.3. Project 3: The Production of Tie and Dye Leather Yarn

The working process involved in the production of tie and dye and golden yellow yarn is as follows:

Step 1 - Circles of different diameters were drawn to cover the whole sheets of leathers with the aid of a compass and a pen. Equally spaced lines of 3mm were marked from the centre on the circles on the sheets of leathers to the edge. After marking, the sheets of leathers were cut in a spiral form to achieve a long strip with a pair of scissors.

Step 2 - The cut-out strips were soaked in clean water overnight after which they went through a series of pounding and soaking in a mortar with a wooden pestle to loosen up the fibres, to make them soft and have a strand-like look.

Step 3 - Half of the pounded strips were tied with a leather strip to give it a tie-dye effect. The remaining strips of leather were dyed without tying. Three tablespoonsful (15 grams) of orange vat dye, three tablespoonsful (15 grams) of hydrous, and 750ml of water and a half teaspoon (1 gram) of caustic were mixed in a container. The twisted leather strips were immersed in the dye solution for three minutes to enable it to penetrate the fibres. Three tablespoonful (15 grams) of violet vat dye, three tablespoonful (15 grams) of hydrous, 750ml of water and a half teaspoon (1 gram) of caustic were mixed, and the leather strips were immersed in it for another three minutes. Another vat dye mixture was made (orange, brown and blue-black), and the leather strips were soaked in each for three minutes. Finally, all the vat dye solutions were mixed in one container, and the leather was soaked in it for 10 minutes before left under the shade to dry for five minutes. The strips were then rinsed in clean water to remove excess dye and stretched on a metal mesh. Figure 23 below illustrate leather strips tied and soaked in a dye solution.



Source: Studio Activity

**Figure 23.** Leather strips tied with shorter strips and soaked in dye.

Step 4 - After leather strips were dried. It was trimmed at the knot sections with scissors and rolled onto a plastic rod. Figure 24 below is an example of a tie and dye leather and a golden yellow yarn.



Source: Studio Activity

**Figure 24.** Rolled tie and dye leather yarn and golden yellow.

#### 2.2.4. Project 4: The Production of Blue-Black Leather Yarn

The working process involved in the production of blue-black leather yarn is as follows:

Step 1 - Circles with a diameter of 450mm were drawn on sheets of leathers with the use of a compass and a pen. Each space between the circles was 0.25mm from the centre to the edge of the cut-out circular leather with the help of a metal ruler and pen.

Step 2 - The measured strips were cut out with scissors using a spiral cutting technique by connecting each circle with a slanted line. The strips were soaked in water for a day after which it was pounded for 10 minutes and soaked again overnight and a series of soaking and pounding. This process was done five times respectively in a mortar with a wooden pestle to loosen up the fibres, make it softer and have a tinnier strand look. Figure 25 below is an example of leather cut into a strip.

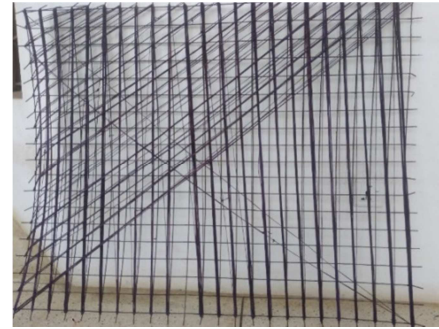


Source: Studio Activity

**Figure 25.** Leather cut into a strip.

Step 3 - Six tablespoonful (30 grams) of blue-black vat dye, six tablespoonful (30grams) of hydro, 750ml of clean water

and half teaspoon (1 gram) of caustic was mixed in a bucket following the arrangement respectively. The strips were soaked in the mixture for 10 minutes. The strips were removed and left in the shade for 10 minutes and rinsed with water to clear the excess dye solution. The strips were stretched onto a metal mesh and allowed to dry as shown in Figure 26 below.



Source: Studio Activity

**Figure 26.** Leather yarn stretched onto a metal sheet.

Steps 4 - The dried strips were trimmed at the knotting areas, where two strips met with scissors and rolled onto a plastic rod. Figure 27 below is an example of a blue-black yarn rolled.



Source: Studio Activity

**Figure 27.** Rolled blue - black leather yarn.

#### 2.2.5. Project 5: The Production of Violet Leather Yarn

The working process involved in the production of violet leather yarn is as follows:

Step 1: The remaining circular leather was cut using 5mm spacing with scissors. They were soaked in water overnight and pounded in a mortar and pestle for 20 minutes to loosen the fibres, make it small and give it a bit of roundness as shown in Figure 28 below.



Source: Studio Activity

**Figure 28.** Marked leather being cut and soaked in clean water.



Step 2 - Three tablespoonful (15 grams) of violet vat dye, three tablespoonful (15 grams) of hydrous, 750ml of water and a half teaspoon (1 gram) of caustic. The leather strips were immersed in the dye solution, stirred and left for twenty minutes to enable it to penetrate the fibres. The strips were then rinsed in clean water to wash off excess dyes and stretched on metal mesh for it to dry gradually under the shade as illustrated in Figure 29 below.



Source: Studio Activity

**Figure 29.** Preparation of vat dye and leather yarn stretched on metal sheet.

Step 3 - The knotted sections were trimmed with a scissor and rolled onto a plastic rod. Figure 30 below is an example of leather yarn rolled.



Source: Studio Activity

**Figure 30.** Violet leather yarn rolled.

### 2.3. Crocheting Product Outcome with the Manipulated Leather Yarns

The artefacts were crocheted with combinations of crocheting stitches to create varieties in the products.

#### Flower and Close Crochet Stitches



**Figure 31.** Lady's handbag and a pair of heels made with the violet leather yarn.

#### Double and Treble Crochet Stitches



**Figure 32.** Mini traveling bag and a pair of wedge made with the blue black leather yarn.

#### Double and Half Double Crochet Stitches



**Figure 33.** Mini school bag and a pair of sandals made with the tie dye and golden leather yarn.

#### Single Crochet Stitch and Bubble Crochet Stitches



**Figure 34.** Clutch bag and a pair of sandals heel made with the orange leather yarn.

#### Double and Single Crochet Stitches



**Figure 35.** Clutch bag and a pair of slipper made with the bluish- green leather yarn.

## 3. Findings and Discussion

The main objective of this study was to explore techniques

of manipulating the indigenous vegetable tanned leather into yarns and convert the locally made yarns into ladies containers and foot wears using combination of crocheting stitches. Two cutting techniques were adopted for this study thus the spiral and the straight cutting. When the sheets of leathers were marked in straight lines and cut out, the strips obtained were short and couldn't be used for crocheting. The spiral technique gave a lengthy strip and the strip gotten was determined by the size of the leather sheet. After the pounding techniques Strip A (drying pounding technique) became flat, elongated and flexible while strip B (wet pounding technique) made the leather strip rounded and very flexible due to the series of soaking and pounding. When pressure was exerted on the two strips by crumpling and pulling them at different angles, strip A had few wrinkles on the grain side but had no evidence of tearing, on the other hand, strip B had no wrinkle and had no evidence of tearing. An extreme force of pulling was exerted on strip A, the small size broke, but the bigger ones had no evidence of tearing, strip B had no evidence of tearing no matter the size. After feeling both strips with the fingers, strip A felt a bit rough due to its grain texture while strip B felt smoother to be compared with strip A. Since crocheting is a needle work, both strips were tested with the needle by constructing a piece to know the easiness and outlook. After construction of strip A, the sample showed both sides; thus the grain and flesh side, the strip mostly slipped off the hook, making it a bit difficult to work with it. On the other hand, strip B was a more comfortable to be constructed.

At the end of testing the leather strips with different dyes, it showed that strip A was not able to dye well, especially at the grain side to be compared with strip B. The vat dye glitters, and suede couldn't dye both sides of strip A well to be compared with that of strip B. The insoluble pigment still made the leather moist, but when it was added to the suede plus salt solution, it dyed perfectly with no moisture content in it. At the end of the testing with vat dye, the mixture of suede and insoluble were the best suitable dye solution for the project due to its availability, cost and effect. Burnishing and dyeing of leather strips (cords) makes the end products attractive and appealing to the eye [2]. However, the local vegetable tanned leather yarn been able to be dyed in different colours made the artefacts very beautiful, the tie-dye effect also gave a plus to the colouring effect since it rare in the existing yarns on the market. The flexibility of the goat strips allowed the yarns to be crocheted into different stitches which gave a detailed structure, and this made the artefact very attractive and appealing to the eye. The continuous pounding of the leather strips gave a different texture to the final work. Since the leather strip was tested and proved to be stronger enough which had no evidence of wear or tear, made the artefact produce stronger. The leather yarns crocheted to ladies products were very comfortable to be used. The lady's office bag, school bag, purses, wedges, slippers, sandals and heels came in different styles, sizes and shapes. The bags and purses served as containers, to hold different items. The footwear made were to protect the feet against any sharp

object on the ground and also to compliment the bags made. The various designs and nature of the work made it possible for the artefacts to the fits-its purpose.

## 4. Conclusion

The purpose of this study was to examine the viability of vegetable-tanned leather as an alternative material and convert the locally made yarns into ladies containers and foot wears using combination of crocheting stitches to reduce the overdependence on foreign and other local materials yarns which are limited on the market. In order for the objective to be achieved, places of individuals where crocheting artisans make their products with yarns and buy yarns were visited to have knowledge of their crocheting yarns and products they normally produce using the yarns. The characteristics or physical properties of their yarns were all examined. The study reviewed available related literature similar to the topic. The indigenous vegetable-tanned leather was manipulated to produce suitable yarns which can serve as an alternative material and converted the yarns into artefact by firstly passing the leathers through a secondary process. Practical measures served as criteria in selecting strips (flat and rounded) for the study by physically examining them of the view of getting the best which can serve as an alternative yarn for crocheting art. Physical examination included testing for durability, flexibility and the yarn's ability to be picked by the hook. Finally, the strips were tested with different dyes on the market to know which one was appropriate for dyeing the leather yarns into different colours. In the study, it was observed that the manipulation of the indigenous vegetable tanned leather in the production of yarns for crocheting art was successfully carried out through the framework of cutting the goat leather into yarns using the spiral cutting method, series of soaking and pounding method, using vat dyes and suede mixed with insoluble dyes for changing the colour of the leather. The study revealed that indigenous vegetable tanned leather can be manipulated in the production of yarns for use in crocheting art using spiral and wet pounding techniques. Strips from wet pounding were seen to be the best to be used as crocheting yarn due to their strength, ability to twist and fold easily, ability to be constructed easily with the hook and ability to show details of stitch structures. Through the various dyes application, leather can be dyed to achieve varieties of colours. Again, it was observed from the fields that most crocheting artisans limit their works to a few yarns on the market and leather artisans and students do not use crocheting techniques for their works and ones the potential of leather is tapped by both Crocheting and Leather it will help to create diversity in crocheting yarns, crocheting artefacts and expand leather usage.

## 5. Recommendation

An in-depth study of the current state of knowledge regarding the manipulation of indigenous vegetable tanned

leather for use in crocheting art has been conducted. However, it appears that there are some research gaps in the field, resulting in limited leather yarn production for crocheting. In light of this, additional research is still needed in the following areas:

- i. Assessing and improving the color fastness of various dyes (acid dyes, direct dyes, basic dyes, sulfur dyes) and their effect on leather yarns.
- ii. Investigating the workability of leather yarns in various techniques such as plastic canvas stitch and knitting.
- iii. Innovative traditional/foreign finishing techniques to enhance the texture, color, appearance, versatility, and quality of leather yarns.
- iv. Combining locally produced leather yarns with other materials (wood, fabrics, cords, bamboo, metals, and ceramics) to create a diverse range of artifacts.
- v. Manipulation of other types of skin (rabbit, pig, snake, etc.) and hide leather (deer, buffalo, etc.) leathers in the production of yarns for use in crocheting art.

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