

## **Application of Natural Dye Substances on Crust Suede Sheep Skin by Dyeing Methods Using Jumputan Techniques**

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**ABSTRACT:** The research aims to apply natural dyes on crust suede sheep leather by dyeing methods with jumputan techniques to produce jumputan motif on tanned leather. Secang (*Caesalpinia sappan* L) wood Materials are used on tanned crust suede sheep leather. The procedure consists three steps: 1. Secang wood extraction methods; 2. The application of the secang dye on the Crust sheep suede leather by dyeing method with Secang material (dry/ fermentation) concentration variation (5%; 10%;15%); dyeing time (1 hour;2 hours;3 hours); jumputan techniques (bonding technique; suture technique); 3. Testing of color resistency of jumputan motif. The tested result produces 4 score, it means good on secang fermentation, 2 hours dyeing duration time; 10% dye concentration, ikat jumputan motif, croupon part crust suede sheep leather, and the tested result produces 4 score on secang dry, 3 hours dyeing duration time, 15% dye concentration, ikat jumputan motif, croupon part crust suede sheep leather. It can be concluded that the secang wood can be applied on crust suede sheep leather by jumputan techniques to produce unique and exclusive motif as raw material for handicraft leather products.

**Keywords:** Secang wood dye, Crust suede Sheep skin, dyeing methods, jumputan techniques

### **INTRODUCTION**

Jumputan motif can be developed rapidly in Indonesia and even began to be known abroad, jumputan pattern making process has certain characteristics because of its beauty and uniqueness. Jumputan not only be used as goods that has magic value but jumputan also has a a motives variety. It is not only loved by the people of Indonesia but also foreign tourist. Therefore jumputan should be developed with a variety of motives, to add value to the richness of Indonesian culture.

Jumputan is counteraction technique of color in certain places is not penetrated by the dye solution caused the bond / traction sutures, usually Jumputan media is cloth or other media marked motif, pinch (drawn or pulled) and then tied with a rope and then dyed. Basically jumputan formed through binding of specific parts of the surface of the fabric and then dyed with natural dyes or synthetic.(Larsen, 2004:123-150). In the coloring process jumputan, ancient dyes used natural dyeing. Natural dyeing process is more complicated than the synthetic dyeing, this is the challenge to explore the potential of color-producing plants to produce natural dyes that are practical to use and environmentally friendly (Lemmen, 2008: 3-8).

On the other hand, the leather industries has produce tanned leather which has been used as a skin product/leather. Crust suede leather is ready colored tanned leather to provide a base color in order to use for leather clothing (Abrahart, 2005: 123-145). Sheep skin types based on its quality as follows: 1. Part Croupon, is part of the skin that is located on the back and having the most compact network structure, the extent of 40% of the total area of the skin; 2.The neck skin is rather thick, very compact but there are a few wrinkles; 3. Part shoulders skin is thinner, the quality is good, just sometimes there are wrinkles that may reduce quality; 4. The abdomen and thigh tissue structure less compact, thin and stretchy skin. (Covington, 2009: 269-278; Ding Zhiwen, 2008:45-63).

In rare color dyeing process using jumputan motif on crust leather suede sheep has a great chance to increase the wealth by using the motif media of jumputan tanned leather to be used as a

new business opportunity. (Glory, 2012: 3-8).

In Indonesia the Government advocated the use of dyes that are environmentally friendly (green chemistry), which are safe for health and the environment. Prompting to do research, the research goal to obtain dye eco-label on the product jumputan media tanned leather with suede crust sheep, produce colors that ethnic motifs that can be socialized on business opportunities / SME. Natural dye that can be produced as an alternative substitute synthetic dyes that can reduce the environmental impact caused, low toxic properties and is safe for humans and the environment. (Pitojo, 2009: 10-16).

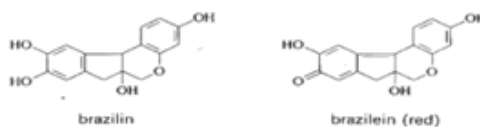
Based on the description above, this research aims to investigate the following: 1. Assessing the physical properties and chemical dyes cup (*Caesalpinia sappan L*) so that it can be applied on crust leather suede sheep; 2. Assessing the factors that affect the application of the dye cup on crust suede sheep skin using dipping method with jumputan ikat techniques; 3. Assessing absorption color fastness of jumputan motif. The advantages is expected as a basic consideration in the selection and use of environmentally friendly dyes on media tanned leather, as an alternative to synthetic dyes substitution which can reduce environmental pollution and have lower toxic effects for humans (Sastrawijaya, 2009: 3-18).

## MATERIALS AND METHODS

The experiments are conducted in the laboratory, the material used is bark cup (*Caesalpinia sappan L*) with the dry ingredients and fermentation treatment, Crust tanned suede sheep skin. The procedure is as follows: 1. dye Extraction from the bark of the plant Secang (*Caesalpinia sappan L*); 2. Dye secang application on tanned leather sheep suede dyeing method (dyeing) with fastening techniques with a variety of dyes jumputan cup (dry; fermentation); immersion time (1 hour, 2 hours; 3 hours); ikat technique (bonding technique; suture technique); 3. Knowing absorption color fastness by means chrockmater and observed with greyscale (fastness test SNI No. 0039.73).

## RESULTS AND DISCUSSION

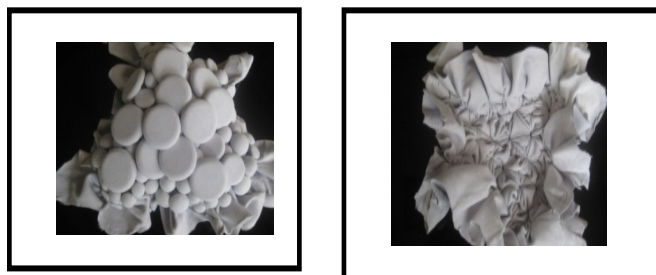
Identification of the secang dye and dry secang fermentation of physical and chemical properties of dry secang: color (red -violet); pH 4-5; density (1-3) OBE, brazilin content, yield of 8.5%; and from fermentation secang material: color (violet-red), density (3-5) OBe, brazilein content, yield 12.8%, and the yield of the color difference caused by the length of time of fermentation for 6 days, giving a high level of solubility and changes the dye brazillin be brazilein (red), secang acidic dyes that can be as dye tanned leather, figure 1.



**Figure 1.** Chemical structure Brazilin and Brazilein in the bark Secang (*Caesalpinia sappan L*)  
Application of substance dyes results secang on tanned crust suede sheep skin immersion using  
jumputan ikat technique.

Using samples of crust sheep suede leather with a size of less is more (4-5) ft / lb consists of the back (Croupon), neck, shoulders, abdomen and thighs. Further weighing is done to the basic formula of making the dyeing process, and before the dyeing process is done, wetting and neutralizing is a process of managing the skin by soaking and play them in a solution of alkaline salts with a view to adjusting the properties of the skin for a basic coloring process. Jumputan ikat technique (mechanical bonding; stitching techniques)

There are three basic bonds of mechanical fastening jumputan recognized: 1. Mechanical single bond a bonding technique that is done by members of bonds on tanned leather with one bond alone, in order to get a binding motif; 2. Double bond techniques, the bonding techniques given a bond of more than one bond in order to get more than one binding motif or double; 3. Mechanical cross-linking, bonds performed cross each other, so we get motif shape crossed the line. The strap used can be vary yarns / polyester, raffia rope or elastic cord, in this study using elastic strap. Fig.2



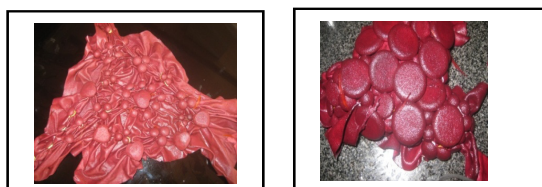
**Figure 2.** The method of bonding techniques (a) and suture technique (b) jumputan the tanned leather Crust Sheep Suede.

In Jumputan application of bonding techniques in media tanned leather, there is a high degree of difficulty compared to the fabric, because it is influenced by the thickness of the skin of the back (Croupon), neck, is thicker than the shoulder, abdomen and thighs, tail so that greatly affect the bond. Skills to create works motif requires high creativity and skills to obtain beautiful creation. The degree of difficulties (%) influenced by the thickness of tanned leather and its network structure, the order is as follows highest degree of difficulty is the cross-linking (70%); the double bond being the degree of difficulty (50%) and the easiest is a single bond (10%), to form jumputan motif.

Sewing baste technique is to sew tanned leather material by using sewing baste method in order to create pattern on the color line using yarn and thread. Pull the thread tightly to wrinkle the leather. At the dyeing process the meeting yarn will block the color entry to the skin, the thread used should be thick and strong thread such as plastic threads / synthesis, jeans threads, or bounded nylon threads. Results of jumputan Sewing baste will form connecting dots that create the motif. The difficulty level is high (80%). The thickness of leather material and needle used in sewing baste technique will affect the pattern/motif result.

### Formula and Dyeing Process

In the dyeing process yan amount of dye used with various concentrations of dye cup (5%; 10%; 15%) of the weight of crust tanned leather, and 150% of warm water (60°C), the percentage is calculated from the weight of crust leather. Dyes secang already weighed dissolved in cold water to become a paste, then diluted with hot water (60°C), included in the bucket of the skin and the water, and in doing dyeing with variation of time (1 hour; 2 hours; 3 hours). Testing the dyeing process is considered sufficient if the liquid in the bucket / container has been clear and the skin surface of both parts of the meat or parts of the tatto when held color does not fade, figure 3.



**Figure 3.** Results of immersion in the dye cup tanned leather Suede Sheep Crust the method of fastening techniques jumputan.

Dyeing obtained by variation of time produced three different colors. Red-violet produced by dry secang in three hours immersion. Secang fermentation gives older color or violet-red caused by concentration of dyes material. The greater presentation of color concentration, the stronger color on the skin produced. Using a large amount of dye is not always a good thing because it can cause uneven color. Length of immersion will affect the penetration of the dye into the skin.

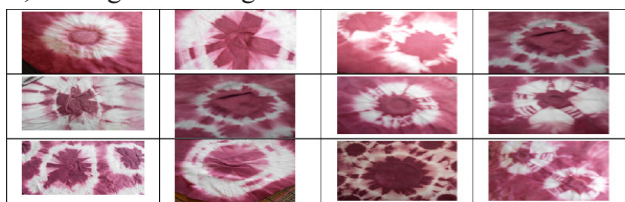
**Secang color absorption by concentration variations (%) and time immersion (hours)**

**Table 1.** Absorption secang color of the skin of sheep Suede Crust variations in the concentration (%) and immersion time (hours)

Secang	Consetration (%)	Lenght (1 hour)	Lenght (2 hour)	Lenght (3 hour)
Dry	5,0	Light – red	Dark - Red	red-violet
	10,0	Light – red	Dark - Red	red-violet
	15,0	Light – red	Dark - Red	red-violet
Fermentation	5,0	red	Red - violet	Violet -red
	10,0	red	Red - violet	Violet -red
	15,0	red	Red - violet	Violet -red

Differences in the color absorption are affected by the type of tanning, concentration and immersion of time. Secang dye acidic group containing anions which bind anionic with cationic amino acid groups of proteins of the skin. skin chromium salts tanned will bind the carboxylic acid groups of the protein of the skin, so the skin is tanned chrome tends to increase the amount of cationic charge. Furthermore, the salt will be hydrolyzed by removing acids also increase the acidity of the tanned skin, bonding happens very quickly when using acid dyes.

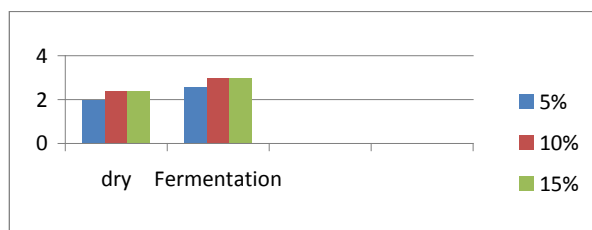
Jumputan motif towards secang absorption on tanned Crust Suede sheep skin by ikat method with bonding techniques (Single, Double, Cross). Bonding techniques are part of the tie, toned it when dyed colors are not affected, so that after the bond is released the image will be formed, the tied median will cause motif / pattern, the tie should be tight, so that when dyed colors are not affected, so that after the bond is released will form an image in the form of motifs. Ikat technique is done by holding the fabric surface / other media with a fingertip, then the surface of the tanned leather belt with a clearly better with a single bond, a double and a cross. How to tie is diverse, flat, sideway, folding combination, folding and rolling.



**Figure 4.** Results jumputan dye motif cup on Suede leather Crust Sheep bonding technique (single, cross).

Counteraction technique of color on the skin is not pierced by the media dye solution which caused bond, tanned leather that has been marked as a motive, pinch (drawn or pulled) and then tied with a rope and then dyed. Basically, jumputan formed through binding of specific parts of the surface of the cloth is then dyed with dye. At the time of that meeting dyed yarn would block

entry to skin color, motif jumputan against absorption of color, value = 3.0 means a pattern of lines / curved translucent good; value = 2.0 means that a pattern of lines / curved translucent medium and value = 1.0 means that a pattern of lines / curved translucent less, figure 4.

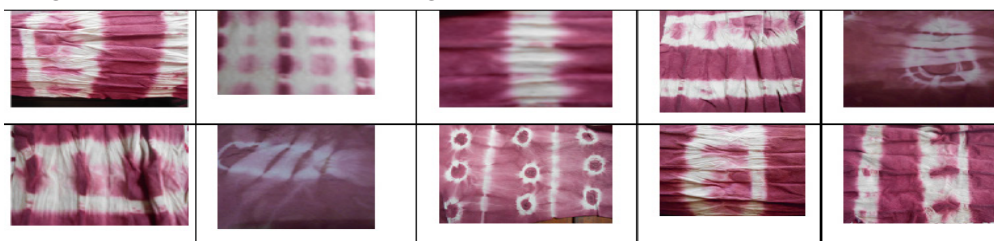


**Figure 5.** Motif jumputan and power translucent dye bonding technique Dyes secang (dried and fermented), 3 hours.

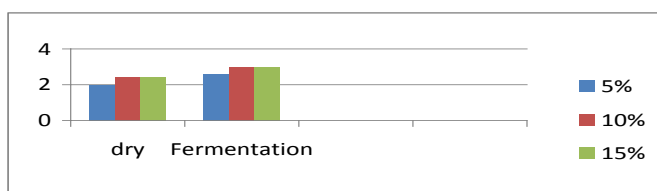
The best color results of jumputan motif obtained on the technique of secang dye colors (fermentation), three hours translucency. The value = 3, it showed that either translucent curved line pattern at a concentration (15%; 10%) is good. Results of translucent color motif for optimal power on ikat dye techniques cup (dry), three hours translucency value = 2.4 means motif curved lines being at a concentration (15%) on a single ikat technique. The degree of difficulty (%) of jumputan motif for creating a single ikat technique is 10%; double ikat technique is 50% and cross-belt techniques is 70% in the medium crust leather suede sheep skin.

**Jumputan Motif on crust suede sheep skin by dipping method with bonding stitches technique**

Motif stitch sewing technique using a needle and a plastic strap, generate the appropriate motif image creation with baste motif images result.



**Figure 6.** Results jumputan motif on on crust suede sheep skin by dipping method with bonding stitches technique



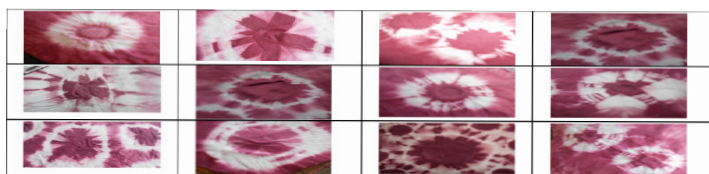
**Figure 7.** Graph motive power jumputan and stitch bonding technique translucent dye Dyes secang (dried and fermented), time 3 hours

The jumputan motif optimal results for secang dye fermentation towards color penetrating is obtained by bonding techniques using in three hours length. The value is 2.6, it means transparent curved line pattern is at 10%; 15% concentration. The best results on color penetration produced by secang dry dye stitch bonding technique in three hours length. The value is 2.4, it means motif



curved lines is at 15 % concentration. The degree of difficulty to create jumputan motif for bonding stich techniques is 80%, the media used is crust suede sheep skin, image 6.

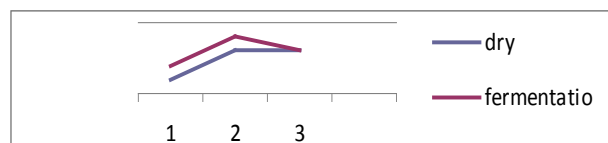
**Jumputan motifs and Secang colors**



**Figure 8.** Results of secang dry color motif / fermentation on tanned Crust Suede Sheep skin

Differences in color motif penetration is influenced by the structure of the sheep skin, the skin of the back (Croupon), located at the back and has the most compact structure; the extent is 40% of the total area of the skin. It produced the most penetrating color than the neck skin. The neck part is rather thick, very compact but there are some wrinkles. The shoulder skin is thinner, the quality is good, but there are wrinkles that may reduce quality; as well as the belly part and thighs structure is less compact, thin and stretchy skin.

**Power testing fastness of color on the absorption of crust suede sheep skin**



**Figure 9.** Graph of the results of applying the dye fade resistance on the secang Crust Suede sheep skin with immersion method.

From the color fastness test obtained four (4) value, it means good, there is a little color change to the original color in secang dye fermentation in two hours lenght; Concentration of dye is 10.0% using bonding technique on crust suede sheep skin croupon parts, and color endurance test results obtained four (4) value, it means good, the coloring agent concentration is 15.0% on dry secang using bonding technique on crust suede sheep skin croupon parts in three hours time immersion. Figure 9.

**CONCLUSIONS**

**The extraction of dye secang**

The study indicated that there is a different result obtained between dry secang dye and fermentation secang dye. Dry secang dye produced red –violet color with pH 4-5; density (1-3) °Be, brazilein content, yield 8.5%, while, secang dye fermentation produced violet-red color with density (3-5) °Be, brazilein content, yield 12.8%. This difference is caused by the high level of solubility fermentation time so that it changes brazilein becomes brazilin. Secang dyes has acidic nature that can be a dye for tanned leather.

**Applying the results of secang dye on suede crust sheep skin using dyeing method with jumputan fastening techniques**

There is an optimal difference found on fermentation secang dye with bonding technique in three hours immersion. The value is three (3), it means the curved line pattern is good in

concentration of 15% or 10%. The degree of difficulty to create motif or pattern applied on crust suede sheep skin by using single bonding technique is 20%, double bonding is 50%, cross bonding is 70%, and bonding stiches technique is 75%. Different motifs and colors influenced by the structure of the skin of sheep, the skin of the back (Croupon), produces the most penetrating power and color than both the cross-section of the neck, shoulders, belly and thighs.

#### **Absorption Test results Secang to power fastness**

The test results secang color fastness (fermentation) obtained a value of 4, it means good, a little color changes to its original color, dyeing time is two (2) hours; The concentration is 10% using bonding technique on crust suede sheep skin on croupon part, and the results color endurance of dry secang dye obtained a value of 4, it means good with concentration of 15.0% using bonding technique on crust suede sheep skin on croupon part in three (3) hours time immersion.

#### **SUGGESTIONS**

There should be a futher study conducted on natural color consistency with improved dyeing process, emphasized on the influence of temperature and concentration of natural dyes to color durability by adding a suitable mordant and developed jumputan techniques motif creation on tanned leather.

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