WONDERFUL NATURAL COLORANT IN TEXTILES

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Abstract

The natural dyes in textile is folk knowledge which was transfer from one generation to the next generation and coupled with a traditional weaving methods for long times ago. The natural dye color is complicated method. Due to the dyed fabric of each color were used different of natural materials and dyeing methods. In this study was finding the way out of the indigo)*Indigoferatinctoria* L.(dyeing process from Black Tai people in Tambon Ban Don, U-thong district Suphanburi Province.

The aim of this study was investigate the natural textile dyes method derived from indigo)*Indigoferatinctoria* L.(. The utilization of natural mordant from drill mud water, nypa palm bark water and water of waste coconut ash were investigated. The indigo colorant extracted from the mordant experimental were comparisonand used as pile up dyes following theBlack Tai pattern.

Keyword: Natural dyes textile.Black Tai people, indigo

Introduction

At present, natural dyes become popular and are in great demand both domestically and abroad. Because the fabric is unique and the colors are beautiful. However, the natural dye textile could not produce fast and enough for market demand. Because of its take a long time to produce one piece of natural dyed fabrics that was due to cumbersome and complicated dyes process.

An essential dyes process is start from preparation of natural dyes solution, which was the heart of the dyed fabric and depending on the techniques and skill of the dyer. The next step of dyed process also important to produce a different color shades on the textiles. If dyed only one time the color will be lighter than dye several times will produced a darker color.Thus, the most natural dyer look at on the method of fixing color in fabric and color stability. Some local dyer using mordant from alum, aluminum compound, chromium, copper, iron and tin compounds to helped adhesion between the dye and fabrics. However, some local using natural mordant such as mud and lateritic soil soaked cotton before dye, which was produce a different color shades and more colorant stability (Thiensak, 1996).

Sources of natural dyes

Natural dyes in fabric and textiles work are small group when compared to synthetic dyes and can be classified into three groups as following:

1) Mineral dyes are aninorganic pigments. This could be a mixture of metal oxides or a complex compound of color-imparting fillers between the fiber molecules. Because these compounds are very stable and the colorant are resistant to light. The most metals used include iron, copper, cobalt, lead, manganese and nickel (Fig 1).

Figure 1 Varioustype of mineral dyes

(2) Animal dyes; An important natural animal dyes are divide into three types; namely Cochineals, Kermes and Lac. The pigments from dried insects or excreted from the color of lac insects are given a red color. While, the color drive from the Lacciferlacca insect are used to dye silk and wool (Fig 2). The stability of lacca colorant is believed to depend on the quality or types of host trees.

Figure 2 colorant from lacca give a red dyed

3) Vegetable dyes are organic compounds from different parts of the plant such as roots, bark, stems, heartwood, leaves, flowers, seeds, etc., Its can be classified according to the dyes methods such as direct dyes, mordant dyes and wax dyes (Dalikar et al, 2003).

The grouping of various natural dyes according to color tones are as following:

Red colortonewasderived fromlacca, *Morindacoreia* Buch.-Ham root, *Baccaurearamiflora*stem, Annatto grain, Sappan tree (CaesalpiniaSappan L.), *Terminalia chebula* Retz.husk,

Yellowcolor tone: The natural yellow color tone are drive from a turmeric root, zedoary, gardenia core, night blooming jasmin, Sappan root, tamarind leaves, bark jackfruit, quince puree,bark mangosteenfruit, lantana flowers, Ma phut)Garcinia dulcis)Roxb.(Kurz(husk, AdhatodavasicaNeesleaves, jackfruit core, Agasta core, Psidiumguajava core, Bengal root, yellow silk cotton, cork tree core, river spiderwort, Siamese cassia leaves,Satue treesand Etiinkiegleaves and bark of horse mango *(Mangifera Foetida)*

Brown colortone: The natural brown color tone was extracted from mangrove bark, pale Catechu bark,white meranti bark, pomegranate fruit skin, sheoak bark, *Avicennia officinalis* bark,yellow flamboyant bark, Lumnitzerabark, Lakoocha bark, cotylelobiummelanoxylon bark, *Pruniflorum* Gogelbark andgolden shower bark.

Blue color tone: Thai natural blue color tones are drive from a part of several tree such as luffa cylindrical leave, tropical almond leave, broken bones leave,myrobalan bark, terminaliabellirica bark, the calabur leave and indigo leave.

Black color tone are extract from ebony fruit, vibhitakafruit, white-head leave, kenari fruit, bark ofterminaliaalataheyne ex, frogbit fruit, tomato peel.

Figure 3 Several of natural dye plant species

The popular natural dyes method are divide into 2 types; the first type is hot dyes and the second is cold dyes.The hot dyeing process was extracted by boiling the natural color plant. While in the cold dyeing process, the natural color was extracted by fermentation of natural color plant by using sunlight as a catalyst in the dye staining. For example, dyed with indigo, ebony etc. and hom)Vitsanu, 2010(.

Indigo

Indigo)*Indigoferatinctoria* L.(is Fabaceae with in the subfamily of nuts)*Faboideae(papilionoideae or papilionaceae)*.Indigo is a small shrub species with many branches and round stems with green color. Indigo tree found in the forest in Northeast and the Northern of Thailand which was popular planted for making of indigo dye fabric)Fig 4(.

Figure 4 Appearance of Indigo branch and leave

Method of indigo dyes fabric

In general, the procedure of indigo dyes fabric are as follow: The first step of local indigo dyeing fabric in Thailand are start from cut the indigo tree branch and then roll up to bundles and tide with thin bamboo stick. Secondly step is soaking of the indigo bundles in water tank for 2-3 day until the indigo leaves tender.After that the indigo bundles was untie to let the leaves off from the stems and discarded the stems. Thirdly, an appropriate ratio of lime (calcium hydroxide) was added into the indigo leave water. Fourthly, the ashes from burned banana stalks was mixed into the indigo solution for about 2-3 nights with occasion stirring until the water solution is clear. After that discard the clear upper water and blue sedimentation was collected by thin cotton filtrate for utilization in fabric dyes. The fabric dyeing step was done by squash or crumple a cotton yarn in the indigo solution yarn until the blue color flesh thoroughly, which was avoid a tangled of the cotton yarn. Finally, after the cotton yard had desired color intensity, the cotton yarn was taken up from the pot and twist to remove water and drying on the clothesline.

Objective

To investigate the knowledge of the natural dye from Black Tai community in Tambon Ban Don, U-thong district, Suphanburi Province Thailand.

Method

1. Extraction of indigo colorant. The fresh indigo stem was weigh accurately 6.5 kg and bundles put in the clay pot and water were added to flood over above the heavy object to prevent bundle indigo floating and soaking for 10 hours with gradually invert the indigo bundle. The indigo bundle was continue soaking at room temperature for 8 hour until the water had blue-green color. Afterward, the blue-green color solution were analyzed of pH with pH meter
2. Extraction of natural mordant dyes; The natural mordant dyes were extracted from mud, nypa palm fruit, and coconut ashes as following extraction method:

2.1 Extraction of drilling mud: The best mud for using as mordant should collect from pond with water all year. Drilling mud was extracted by added of 1 part water to 1 part of mud to get a brown and darker tone.

2.2 Extraction ofbark of nypa palm fruit solution by boiling water in a ratio of 1:1 which wasproducing a darker tone.

2.3 Extraction of waste coconut ash solution by pour into water and stir thoroughly and leave it sedimentation for 4-5 hours. Afterward, the upper solution was filtrate and collect for use mordant dyes.

3. Indigo dyed cotton fabrics. The cotton fabrics were soaking in the solution of indigo from previous preparation at 35-40°C for 60 minutes. During soaking was regularly stirring and turning to color distribution

and penetration into the cotton fabric and prevent stains in the dye. After optimum time, the cotton fabric was picking up with air staining and twists out the water and beat for 5 to 10 minutes. Then put the cotton fabric back into its original water and repeated until a total time of 5 hours. Afterwards, the dye cotton fabric was semi drying by aerated and keeping in a plastic bag and leave it to fermentation for 1 night with compost bag and tightly twist. Then the indigo dyed cotton was dried in the shade area. Finally, the indigo dyed cotton was washing and rinse until the water comes out is clear, then rub a indigo dyed cotton fabric for 3 times and then dried in the shade area again.

4. Indigo dyed cotton fabrics with Mordant: The 3 previously preparation mordant (drilling mud, bark of nypa palm fruit solution and waste coconut ash solution) were used in this experiment (Fig 5). The previous indigo dyed cotton fabrics were soaking in the each of mordant at 35-40 °C for 60 minutes. Then the indigo dyed cotton fabrics was picking up with air staining and twist out the water and beat for 5 to 10 minutes. Then put the indigo cotton fabric back into its original mordant and repeated until a total time of 5 hours. Afterwards, the dye cotton fabric was semi drying by aerated and keeping in a plastic bag and leave it to fermentation for 1 night with compost bag and twist them lightly. Then the mordant indigo dyed cotton was dried in the shade area. Finally, the mordant indigo dyed cotton was washing and rinse until get clear water, then the mordantindigo dyed cotton fabric was rubbed for 3 times and then dried in the shade area again.

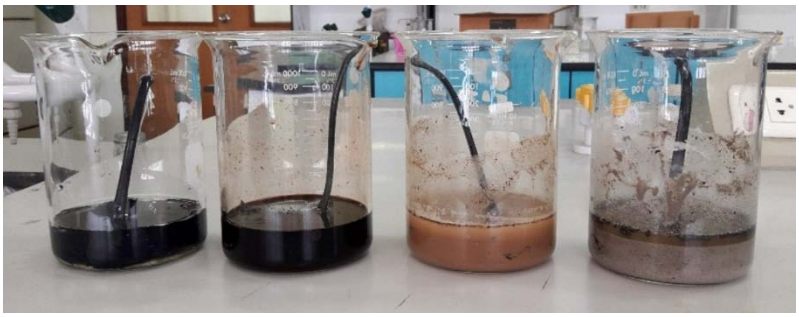

Figure 5 The Indigo dyed cotton fabrics with 3 mordant and non-morda

Results

After cotton fabric was natural dyeing with indigo cotton fabric and then continue to soaked indifferent natural mordant the results showed various color shade that depending on the kind of mordant (Fig. 6). Result found that the indigo dye cotton fabric with bark of nypa palm mordant had a dark blue to back color when compare to the natural indigo dye cotton fabric (Fig 6 D). While, the use of water instead of mordant found that the indigo dye cotton fabric was little pale of blue color (Fig 6 C). In the case of Indigo dyes cotton fabric with mordant from drilling mud and waste coconut ash solution found different on blue color tone as show in Fig 6 E and F. After that all of the natural and mordant indigo dye cotton fabrics were continues dyes with bark and core of Burma padauk tree (*PterocarpusmacrocarpusKurz*) solution with following a pattern of the Black Tai community in Thailand.

Figure 6 shows a color and characteristic of indigo dyed fabrics with different treatments (A: natural cotton fabrics, B: natural indigo dyed fabrics, C: water mordant indigo dyed fabrics, D: bark ofnypa palm fruit solution mordant indigo dyed fabrics, E: drilling mud mordant indigo dyed fabrics and waste coconut ash solution mordant indigo dyed fabrics.

Conclusion and discussion

The use of natural dyes from indigo tree and natural mordant from drilling mud,water of nypa palm fruit bark and waste coconut ash water are given a different blue tone on cotton fabrics. We can be clearly seen that the mixed of natural material with different method and dyeing step causes the magic of a different color on the woven fabric. An appearance of color shades demonstrate of beauty and unity of the nature.Thesebecause of human are beings as a part of nature and leader of utilization of around things in natural for colorant fabric since ancient time and transfer to the present generation. For example, the indigo dyed fabrics from the black Tai community in Thailand, which they were developed manyindigo dyes fabric which was to be ownidentity.

In addition, the natural dyes are help to reduce the use of chemicals during dyes fabric. Recently, we are well known that respiratory diseases, cancer, skin diseases caused by the accumulation of chemicals. People who work with chemical dyes always felling of bad smell, burning nose that cause of dizziness and poisoning disease which was inability to continue to there dyes work. Thus, many hand dyes fabrics are turn back flow to natural dyes. These due to the natural color is purity, no toxic, safety life and without disease. In advance, the natural dye fabric has a specific distinctive features and had shadow after woven.However, in the natural dyes are requires skill, patience, expertise and experience in each dyed fabric to get the same color.

Advantages of natural color

1. The natural color does not harm the health of producers and consumers.
2. The waste water from the dye process does not harm the environment.
3. The raw materials used are readily available in the community without imported of chemical dyes from abroad.
4. The natural dyeing method produce a self-learning and increasingly knowledge base on an experience and so on its can be transfer to the future generations which was become a local wisdom.
5. The natural dyes are diversity in color that depending on the kind, age and a part of the plants used, as well as, mordant types and dyeing process.
6. Natural dyes fabric produced an appreciate value and benefits on utilization of natural resources.
7. Natural dyes fabric promote a relationship between the human and plants which was inevitably cause of love, cherish and learn to conserve and plantation for production sustainable.

Limitations of natural colors

1. The amount of color in dyed material is minimal, led to light color after dye or need more quantities of material required.
2. Inability to produce natural dye in large quantities and produce a color according to market demand.
3. Light color and unstable to fading light
4. The quality natural dyes depends on several factors, which was difficult to control the same color staining
5. In natural dyes, if have not good method and awareness on sustainable resource use will inevitably become a destructive environment.

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