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A Study on the Dyeing of Ramie Fabric Treated with Medicinal Plant

Ⅲ. The Natural Dyeing on Ramie Fabric Using *Perilla frutescens* Herba

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ABSTRACT

This study was performed to investigate the effect of *Perilla frutescens* Herba extract on the treatment of chromaticity and colorfastness. *Perilla frutescens* Herba has been used as a Korean medicine. It is effective in removing dangerous for an unborn child and suppressing pain. It is also good as a detoxification and in treating cold. In the long history of Korea, dyeing has been applied for a means representing the grace of natural and inner esthetic consciousness of man. Vegetable dyes give us such great benefits, diversified color, but no pollution. And ramie fabric has distinctive features such as beautiful brilliance, elegance, and strong durability. So, it is regarded as a special product of Korea traditionally. These studies were carried out to treat with acetate iron, dichloride copper and alum with a mordant to ramie fabric. The ramie fabric was died with *Perilla frutescens* Herba extract. The results of experiment showed as follows:

First, the chromophoric degree was the highest in acetate iron but not distinction in another mordants. Second, the light colorfastness was the highest in non treated and dichloride copper, but alum was the lowest. Third, the discoloration was alum and dichloride copper showed first grade in washing colorfastness. Abrasion colorfastness was not significant in this test. According the previous results, *Perilla frutescens* Herba has an efficiency in removing skin disorders and suppressing pain. So it considered that *Perilla frutescens* Herba can be applied effectively to theraphy of detoxification and in treating cold

Key Words : *Perilla frutescens* Herba, ramie fabric, chromophoric, colorfastness, discoloration, climacteric disturbance.

INTRODUCTION

In the long history of man, dyeing has been applied for a means of representing the grace of God and inner esthetic consciousness of man.

Perilla frutescens.(*Labiatae* family) is perennial plant which grow widely in the tropical and temperate areas of the world (Lee, 1982).

Whole plants of *Perilla frutescens.* were gathered at

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Table 1. Color differences by mordants

Fabric	Mordants	Temperature(℃)	Testing time (min)	chromophoric effect
Ramie-fabric	non-mordant	40~50℃	20~30	ivory
	alum	40~50℃	20~30	green yellow
	acetate-iron	40~50℃	20~30	light green
	dichloride copper	40~50℃	20~30	light brown

Table 2. Variation of color chart by after mordanting with alum, acetate iron, and dichloride copper.

Color sample	Mordants	COLOR CHART
Japan Inc-chemical company	non-mordant	chart1
	alum	chart 5 (Y10%)
	acetate-iron	chart 4 (Y20%)
	dichloride copper	chart 6 (Y20%)
Doosung Paper	non-mordant	O61
(Designers color 139)	alum	L59
	acetate-iron	Y 4
	dichloride copper	G61

the flowering time and dried. The whole plant tastes to be pungent. *Perilla frutescens.* is effective in detoxification and in treating cold. It is also good as a removing dangerous for an unborn child and suppressing pain. (Euk, 1981).

It' s main compounds are perillaldehyde, *l*-limonene, α-pinene, arginine, cumic acid. (Euk, 1981). Vegetable dyes give us such great benefits, diversified color but no pollution. And the ramie fabric has distinctive features such as beautiful brillance, elegance, and strong durability. Also It is regarded as a special product of Korea traditionally.

In these days, the life of convenient color is being needed more and more as technology is developed day after day. But the synthetic dyestuff has some serious problems. Synthetic dyestuff' s causes the side effects such as dermatitis, nasal inflammation, and allergy. And synthetic dyeing makes us be polluted. The high technology goes with non-pollution and the moderns take pleasure in natural color and desire the life of non-pollution (Lee et al, 1993).

But some kind of natural dyestuffs had anti-bacillus. When the ramie-fabric were dyed and treated with *Perilla frutescens.* extract, we have found that the change of color and dyeing color fastness were occurred.

MATERIALS AND METHODS

Perilla frutescens. was used for testing dyeing plant. Testing material was ramie fabric. And acetate iron, dichloride copper, alum were used for mordant.

Testing progress was as follows: washing the dried *Perilla frutescens.* 1.2kg., soaking *Perilla frutescens.* in water 12 *l* . Boiled the soaked *Perilla frutescens.* making first dyeing solution. Pour out the first solution, and then boiled with 8 *l* water to make second solution. and then I made the third solution Third solution need 4 *l* water. Mixing whole solutions and preparing strained solution for the test.

The ramie-fabric was tamper with 10~20 minutes treat in 40~60℃ for soaked in dyeing solution. The ramie-fabric as soaked with dyeing solution at whole testing time. Because It was prevent ramie-fabric from

Table 3. Colorfastness to light of fabric

Mordants	Discoloration(grade)			
	non-mordant	Alum	Acetate-Iron	Dichloride copper
Perilla frutescens.	3	3	2-3	3

Table 4. Colorfastness to washing of fabric

Mordants	non-mordant		Alum		Acetate-Iron		Dichloride copper	
	DIS	POL.	DIS	POL.	DIS	POL.	DIS	POL.
Perilla frutescens.	2-3 grade	5 grade	2-3 grade	5 grade	2 grade	5 grade	2 grade	5 grade

x) DIS : Discoloration Pol. : Pollution

Table 5. Colorfastness to abrasion of fabrics

Mordants	Pollution			
	non-mordant	Alum	Acetate-Iron	Dichloride copper
Perilla frutescens.	3grade	3grade	2-3grade	2-3grade

stain. This kind of treats were 2 or 3 times repeated. The ramie-fabric was washed 5 to 6times after dyed.

The ramie-fabric was mordant with acetate iron, dichloride copper and alum and treated for 20~30 min. After treating mordant ramie-fabric was washed many times. Each mordants weights were 2~3% per ramie-fabric weight.

RESULTS AND DISCUSSION

1. Test of Colorimetry

The investigation was made for the purpose of finding out ramie-fabric mordant with *Perilla frutescens*. Color chart of Japan Inc-chemical company was used in this test. The colorimetry was shown in Table 1 and Table 2.

Testing temperature was 40~50℃ and testing time was 20~30 minutes spent. This test was carried out under the same condition. Non-mordant showed ivory color, alum showed green yellow, acetate-iron showed light green, dichloride copper showed light brown. Ramie-fabric showed differences in color by mordants.

In Japan Inc-chemical company' s color sample, non-mordant showed chart1, alum showed chart5, acetate-iron showed chart4, dichloride copper showed chart6. In Doosung Paper' s color sample, non-mordant showed O61, alum showed L59, acetate-iron showed Y4, dichloride copper showed G61.

Colorimetry was significant by each mordants.

2. Measure the colorfastness

Colorfastness of ramie-fabric dyed with mordants was shown in Table 3. Table 4. and Table 5.

Investigation of light colorfastness was carried out used 4 kind of ramie-fabric It was basked in the light 20hours. Discoloration has 8 grade. non-mordant, dichloride copper and alum' s grade is 5 and acetate-iron' s grade is 4. Discoloration was non-mordant and alum was higher grade than dichloride copper and acetate-iron.

Investigation of washing colorfastness was carried out and used 4 kind of ramie-fabric. It was tested by KS K0430 A-1. Discoloration was non-mordant, alum was higher than acetate Iron and dichloride. Pollution was not significant in this test.

Investigation of abrasion colourfastness was carried

out and used 4 kind of ramie-fabric. The ramie-fabric was rubbed ten times by 900g weight per 10seconds. Abrasion colourfastness has 5 grades. Pollution was non-mordant and alum higher than acetate-Iron and dichloride copper in this test.

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