Korean J.Plant.Res. 5(3) 206~209(2002)

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

Ⅳ. The Natural Dyeing on Ramie Fabric Using *Mentha arvensis* Herba.

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ABSTRACT

This study was performed to investigate the effect of *Mentha arvensis* Herba extract on the treatment of chromaticity and colorfastness. *Mentha arvensis* Herba has been used as a Korean medicine. It is effective in headache and stress. It is also good as a aphtha 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 *Mentha arvensis* 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, *Mentha arvensis* Herba has an efficiency in removing aphtha and in treating cold. So it is considered that *Mentha arvensis* Herba can be applied effectively to headache and stress.

Key Words : *Mentha arvensis* 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.

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

Whole plants of *Mentha arvensis.* 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	light green
	alum	40～50℃	20～30	green
	acetate-iron	40～50℃	20～30	deep green
	dichloride copper	40～50℃	20～30	deep blue

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	chart11
	alum	chart 6 (Y40%)
	acetate-iron	chart 6 (Y60%)
	dichloride copper	chart 7 (Y70%)
Doosung Paper	non-mordant	L59
(Designers color 139)	alum	D59
	acetate-iron	N 2
	dichloride copper	D61

the flowering time and dried. The whole plant tastes to be pungent. *Mentha arvensis*. is effective in headache and stress. It is also good as a removing aphtha and in treating cold. (Euk, 1981).

It' s main compounds are menthol, acetate-menthol, limonene, pinene, camphene. (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 *Mentha arvensis*. extract, we have found that the change of color and dyeing color fastness were occurred.

MATERIALS AND METHODS

Mentha arvensis. 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 Mentha arvensis. 1.2kg., soaking Mentha arvensis. in water 12 *l* . Boiled the soaked Mentha arvensis. 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
Mentha arvensis.	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.
Mentha arvensis.	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
Mentha arvensis.	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 *Mentha arvensis.* 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 light green color, alum showed green, acetate-iron showed deep green, dichloride copper showed deep blue. Ramie-fabric showed differences in color by mordants.

In Japan Inc-chemical company' s color sample, non-mordant showed chart11, alum showed chart6, acetate-iron showed chart6, dichloride copper showed chart7. In Doosung Paper' s color sample, non-mordant showed L59, alum showed D59, acetate-iron showed N2, dichloride copper showed D61.

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. no-mordant, dichloride copper and alum' s grade is 3 and acetate-iron' s grade is 2-3. Discoloration was alum ,non-mordant and dichloride copper was higher grade than 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 and alum was higher than acetate Iron and dichloride copper.

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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(Received Nov. 5, 2002)
(Accepted Nov. 20, 2002)