The Experiment of improving penetration property at dye Wood(Ash)

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1. INTRODUCTION

The wood dyeing, different from fiber dyeing, has characteristically the weakness of draining off inside and outside when dyeing with acid dyestuff, due to permeability problem that causes color difference between surface and inner part. To solve such problem, methyl alcohol was used in this study to improve permeability when dyeing with acid dyestuffs. And in this study we attempted to find out how to improve penetration property by methyl alcohol applied.

2. EXPERIMENTALS

2. 1. Sample and Reagent

Three kinds of acid dyes were applied to refined ash. As for agent, disperse retardant, penetrate, acetic acid and methyl alcohol were used.

2. 2. Dyeing and Fixing

The mixing ratio of methyl alcohol and water was properly adjusted to 50:50, 30:70, 10:90 and 0:100(Methyl alcohol : Water). Three kinds of acid dyes, i.e. Aye-L-2, Are-M-7 and Abl-L-9, were used in dyebath with dyestuff(3% o.w.f.). Dispersant 1g/L, penetrate agent 1g/L and acetic acid 2% o.w.f. were added to them, which were dyed for 65℃ for 5 hours and then washing and fixation at 70℃ for 10 min using fixing agent 1g/L.

2. 3. Assessment of Dyeing Property

2. 3. 1. Confirmation of Build-up Property per Ratio of Methyl Alcohol

For the wood(Ash) dyed with methyl alcohol application ratio 50:50, 30:70, 10:90 and 0:100, colorimetric data were calculated using spectroPhotometer(GretagMacbeth™ Color-EYE 3100) , and the color difference and concentration were compared.

2. 3. 2. Exhaustion

Exhaustion of wood were measured using a Dye-O-meter (Dye Max-L, Korea) as real-time dyeing machine. The ratio of methyl alcohol to water was properly adjusted at 50:50 and 0:100.

2. 3. 3. Assessment of Permeability

To measure permeability, surface was scratched 4～5 times with sharp tool. And with microscope (Sometech CT14FE) image measuring instrument, the scratched surface and its permeability were checked.

3. RESULTS AND DISCUSSION

3. 1. Confirmation of Build-up Property per Ratio of Methyl Alcohol

The result showed a tendency that the less methyl alcohol is applied, the higher the surface concentration becomes, the more Reddish the *a value of color becomes, and the more Yellowish the *b value of dyestuff(except Blue) becomes.

Table 1. Change of color of Ash wood with methyl alcohol ratio

		Ash			
		K/S	*L	*a	*b
Aye-L-2	50:50	2.3911	78.61	10.54	46.27
	30:70	2.7658	76.34	14.53	48.25
	10:90	6.1375	70.81	25.11	61.43
	0:100	7.5041	67.66	18.93	69.68
Are-M-7	50:50	6.7484	44.32	44.98	5.52
	30:70	10.1831	38.62	44.18	7.28
	10:90	10.9258	39.35	47.13	9.84
	0:100	9.7529	40.54	47.13	8.39
Abl-L-9	50:50	2.1637	56.27	-11.26	-15.91
	30:70	2.8066	52.42	-9.28	-19.28
	10:90	4.9874	43.91	-7.54	-21.69
	0:100	5.4168	42.49	-6.94	-21.60

3. 2. Exhaustion

The exhaustion behavior of ash wood was shown in Figure 1. In this study, the ratio of exhaustion were decreased with the relative amount of methyl alcohol increased.

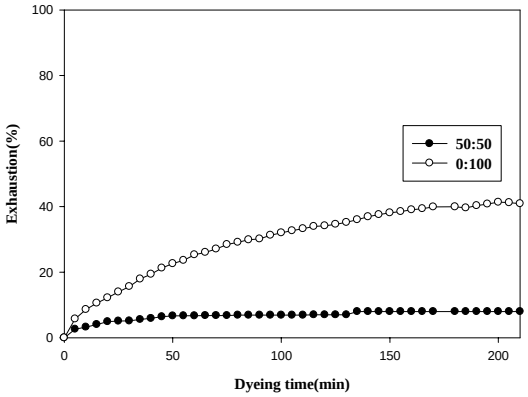

Fig.1 Exhaustion Curve of methyl alcohol ratio

3. 3. Assessment of Permeability

The surface of dyed Ash was cut off and checked with microscope image measuring instrument. As a result, it was found that applying large quantity of methyl alcohol brings enhanced inner permeability and that the permeability falls as the ratio of water rises.

ratio

M:W		Penetration
Aye-L-2	50:50	○
	30:70	○
	10:90	○
	0:100	○
Are-M-7	50:50	○
	30:70	○
	10:90	Δ
	0:100	x
Abl-L-9	50:50	○
	30:70	○
	10:90	Δ
	0:100	x

Table 2. Penetration of Ash wood with methyl alcohol

4. CONCLUSIONS

It was discovered that when the applying quantity of methyl alcohol is increasing, the permeability into inner part is enhanced but the surface concentration becomes low. As a result, it is concluded that the ratio of methyl alcohol to water may be proper at between 30:70 and 10:90 considering surface concentration and permeability.