

BATIK DISCHARGE PRINTING ON SILK, POLYESTER AND POLYESTER/COTTON BLENDS

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Abstract: Malaysian batik has traditionally used wax as a physical resist to create designs on fabrics from cotton, silk and rayon. Discharge printing style is chosen because it is able to produce printed effects that would otherwise be virtually impossible to obtain by conventional printing style on polyester and polyester/cotton blend fabrics as “new” batik fabrics as well as traditional batik fabrics. Polyester and polyester/cotton blend fabrics should be considered as alternative fabrics for batik application because of their competitiveness in price, durability and colour fastness in comparison with traditional batik fabrics of cotton, silk and rayon. The printing techniques carried out were screen printing, block printing (cap), canting and brush. The fixation methods applied on the printed fabrics were dry heat at 150°C for three minutes and dried under the sun for one hour at a temperature of around 35°C. The result of different printing techniques and different methods of fixation were compared.

Keywords: Discharge printing, batik, disperse dye, reactive dye

INTRODUCTION

Batik is a technique used to decorate woven cloth with designs using wax to resist the dye from penetrating into the waxed area of the cloth during the dyeing process. The common methods in batik making are *Batik Cap* (Block print batik), *Batik Tulis* (Hand drawn batik) and hand-screen print batik [2].

Discharge printing is a printing method in which by applying a chemical substance onto specific areas of a dyed fabric, the dye is discharged (removed) leaving a white or different colored pattern. Discharge printing is performed on piece-dyed fabrics. The patterns are created through removal, rather than addition, of color; hence, most discharge printing is done on dark backgrounds. The dyed fabric is printed using discharge pastes, which remove background color from the substrate when exposed to steam [1]. White discharge prints are those in which the design motif is white. Color discharge prints are those in which the design motif has many colors. Colors (discharge resistance dyes) may be added to the discharge paste to create different colored discharge (illuminant) areas [1]. The discharge printing is introduced to overcome the problems of limited materials for batik printing. The discharge printing style changes the concept of traditional batik printing by using the reducing agent chemical to discharge the ground color. Using this technique it is possible to create batik design on polyester and polyester/cotton blend fabrics and several other types of material.

MATERIALS AND METHODS

White Fabrics

- cotton
- silk
- lightweight polyester
- 65/35 polyester/cotton blend fabrics.

Dyestuffs

- Reactive dyes
- Disperse dyes

Dyeing Cotton, Silk and Rayon with Reactive Dyes: The dyeing process is carried out at low temperature (room temperature) dyeing for 60 minutes and liquor ratio of 1:20. The percent of dyeing is 4%.

Dyeing Polyester and Polyester/cotton Blend with Disperse Dyes: The dyeing process for polyester is carried out at high temperature dyeing and pad dyeing process.

Printing Methods

Figure 1 shows the schematic discharge printing flowchart. This flowchart is applicable to all types of printing i.e. screen-printing, canting, block and brush.

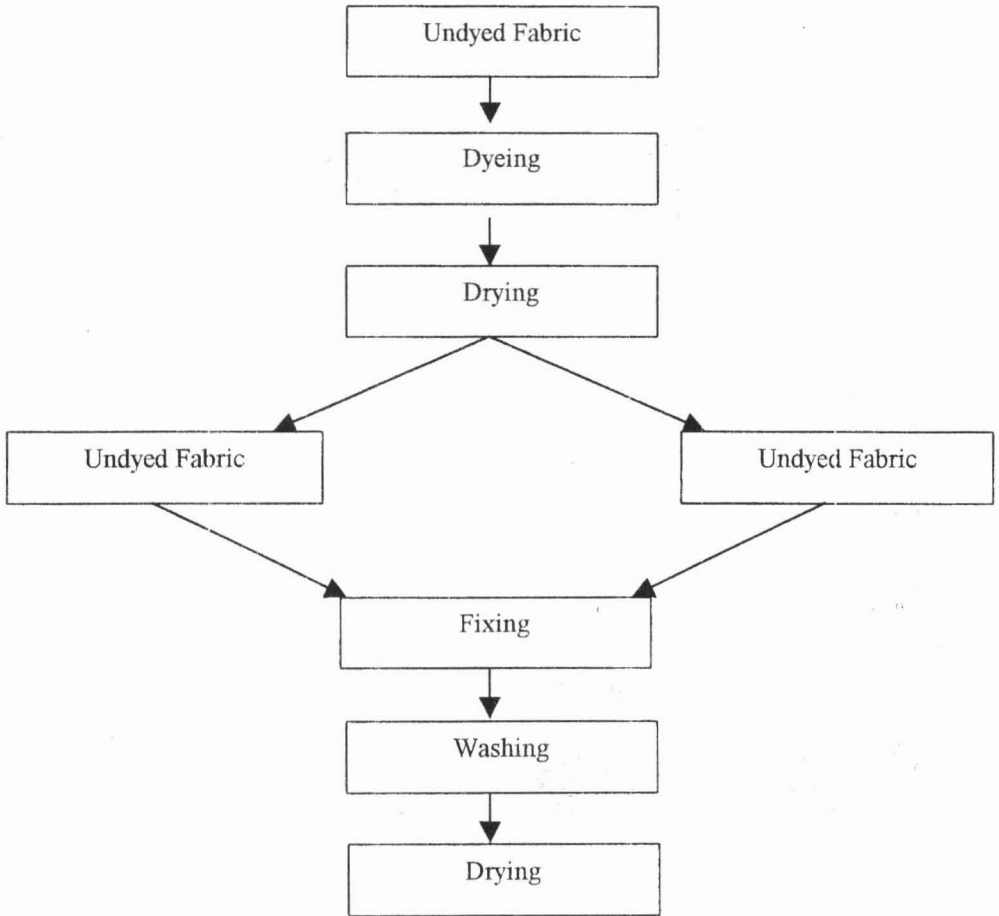


Figure 1: Discharge Printing Flowchart

Recipe of White Discharge Printing

Table 1: Recipe of White Discharge Printing

Stock thickener	770 gm
Sodium formaldehyde sulphonylates	230 gm
Total	1000 gm

Recipe of Colored Discharge Printing

Table 2: Recipe of Colored (Illuminant) Discharge Printing

Stock thickener	857 gm
Sodium formaldehyde sulphonylates	80 gm
Undischargeable dyes	43 gm
Urea	20 gm
Total	1000 gm

Fixation of Print Paste

There were two methods used to fix the print paste, dry heat at 150°C for 3 minutes and dry for an hour under the sun (around 35°C or at 12.00 to 3.00 pm). After fixation the washing process was carried out to remove unfixed dye, thickener and chemical residue and great care must be taken in removing these impurities to prevent back staining. The printed fabric was then washed and dried.

RESULTS AND DISCUSSION*White Discharge Printing*

Table 3: White Discharge Printing Result

Key:

1. Poor 2. Good 3. Excellent

Fabrics	Printing Techniques				Fixation Methods	
	Screen Printing	Canting	Block Printing	Brush	Dry Heat (150°C for 3 minutes)	Under the Sun (+ 35°C for 1 hour)
Cotton	✓				3	3
		✓			2	2
			✓		2	2
				✓	2	3
Silk	✓				3	3
		✓			2	2
			✓		2	2
				✓	2	3
Rayon	✓				3	3
		✓			2	2
			✓		2	2
				✓	2	3
Polyester	✓				3	1
		✓			3	1
			✓		3	1
				✓	3	1
65/35 Polyester/cotton	✓				3	1
		✓			3	1
			✓		3	1
				✓	3	1

Colored Discharge Printing

Table 4: Colored Discharge Printing Result

Key:

1. Poor

2. Good

3. Excellent

Fabrics	Printing Techniques				Fixation Methods	
	Screen Printing	Canting	Block Printing	Brush	Dry Heat (150°C for 3 minutes)	Under the Sun ($\pm 40^\circ\text{C}$ for 1 hour)
Cotton	✓				1	1
		✓			2	2
			✓		2	2
				✓	2	2
Silk	✓				1	1
		✓			2	2
			✓		2	2
				✓	2	2
Rayon	✓				1	1
		✓			2	2
			✓		2	2
				✓	2	2
Polyester	✓				3	1
		✓			3	1
			✓		3	1
				✓	3	1
65/35 Polyester/cotton	✓				3	1
		✓			3	1
			✓		3	1
				✓	3	1

Tables 3 and 4 show the result of white and illuminant discharge printing respectively. The techniques of applying designs were carried out using screen, canting, block and brush. The best overall result was achieved by using screen printing in combination with 150°C dry heat fixation. The success of the discharge printing depends on the dyeing method, fixation method, selection of dyes and amount of illuminant for colored discharge. These factors together with the amount of discharging agent used play a very important part in making batik discharge printing on 'unconventional' substrates such as polyester and polyester/cotton a reality.

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