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R Saranya

Assistant Professor,
Department of Home Science,
Gandhigram Rural Institute,
Deemed University,
Gandhigram, Dindigul, Tamil
Nadu, India

C Viji Sheema

Student B.Sc Textiles and
Fashion Design, Department of
Home Science, Gandhigram
Rural Institute, Deemed
University, Gandhigram,
Tamil Nadu, India

TR Asha

Student B.Sc Textiles and
Fashion Design, Department of
Home Science, Gandhigram
Rural Institute, Deemed
University, Gandhigram,
Tamil Nadu, India

Correspondence

R Saranya

Assistant Professor,
Department of Home Science,
Gandhigram Rural Institute,
Deemed University,
Gandhigram, Dindigul, Tamil
Nadu, India

Designing and development of batik dyeing on khadi fabric

R Saranya, C Viji Sheema and TR Asha

Abstract

Batik is one of the oldest methods of dyeing fabrics for surface design, using hot liquid wax as a resist for dyeing, batik yields beautiful patterns and rich in colours, this study describe the design and development of the khadi fabric using batik design, paraffin wax, azoic dyes, khadi fabric were used the traditional batik technique.

Keywords: Batik, Paraffin wax, Khadi fabric, Azoic dyes

1. Introduction

The term of 'Batik' refers both to the method of producing colored designs on textiles by applying wax to the fabric to be left uncolored and the price of fabric treated in this way^[1]. Batik is an Indonesian word, derived from the word "titik" or tik, meaning "a little bit" or a "drop". The word batik actually means 'wax writing'^[2, 3]. The term 'Batik' refers both to the method of producing colored designs on textiles by applying wax to the fabric to be left uncolored and the price of fabric treated in this way. Textile embellishment, a creative form of self-expression in fabric design, uses countless media and procedures to produced dyed and printed fabric^[5].

Batik as a form of resisting decorative technique is a fabric dyeing method which uses wax or paste to create patterns and design. It is well known throughout Japan, India, and Indonesia^[4]. It is a decorating cloth by covering a part it with a coat of wax and then dyeing the cloth. The pattern for batik is artistic designs drawn by hand. The patterns are generally in geometrical, floral, bird or animal motifs, and other stylized forms. The dyeing and printing of textiles with natural dyes is one of the oldest known to man and was practiced dates back to the dawn of human civilization. Colouring textile material with azoic dyes involves the reaction within the fibre polymer system of the two components which constitute the azoic dye. These two components are the naphthol, and the base or diazo component. Dyeing or printing with azoic dyes is a two stage process^[5]. In earlier days natural dyes extracted from vegetable sources were used for batik work, but after the advent of synthetic dyes and its subsequent commercialization the use of natural dyes presently the batik work is mainly done with naphthol (azoic). The fabric can also be crumpled by hand before dyeing, to achieve a textured look. The fabric is often dried outdoors, where the dyes react to the heat of the sun and become increasingly vibrant. In the final process, the wax is then melted away when the fabric is immersed in a vat of hot water. On the handloom being the traditional device of manufacturing simple and decorative fabrics meant mostly for apparel and home furnishing. Hence the product various form of printing, stitching, embroidery, innovative designs development etc.

In this present study the above mentioned synthetic (Azoic) dyes used on khadi fabric through batik techniques in order to produce khadi fabric used for apparel. These results of visual evaluating and fastness properties were recorded.

2. Materials and Methods

2.1 Selections of materials

100% khadi fabric 30s count 12 mtrs and 40s count 2.5 mtrs were purchased from Gandhigram khadi Trust, Gandhigram, Dindigul, Tamil Nadu. We are selected the natural motifs such as flowers and leaves for single color batik saree.

2.2 Selection of motifs

Natural motifs inspired from the nature such as leaves and flowers.

2.3 Selection of Dye

Azoic dyes (blue) were purchased from the present study.



Plate 2.1: Selection of khadi fabric



Plate 2.2: Selection of motifs

2.4 Preparatory process

2.4.1 Desizing

The process of remove the starch from the fabric is known as desizing [6]. Desizing of hand loom khadi fabric was performed using wetting oil (4ml/l) with water at a temperature of 90°C for 5-10min keeping a fabric-to- liquor ratio of 1:20(w/v). The desized fabric was washed using hot water, which is followed by cold wash.

2.4.2 Scouring

The process of remove the dirt, oil and stain from the fabric is known as scouring [6]. In this scouring process the solution made with soap oil (250ml), caustic soda (2kg) silicate (1kg), hydrogen peroxide (1ltr) and ultra wet oil (250ml) and the liquor is heated with up to a temperature of 90° c. at this temperature the desized khadi fabric was immersed and boiled for 10 min. The scoured fabric was then washed thoroughly with hot water, followed by cold wash and neutralized with dilute acetic acid (1ml/l), washed again with cold water and dried in air.

2.4.3 Batik dyeing

Azonic dye recipe

Parameters

Material liquor ratio	-	1:20
Temperature	-	0-50°C

Coupling component

AsBo	-	15g
Caustic	-	15g
Black (B base)	-	8g
Blue (B base)	-	7g

Diazo base component

Hydrochloric acid	-	15g
Nitrate	-	8g

Alumina	-	15g
Acetate	-	15g

2.4.4 Processing of batik

2.4.4.1 Waxing

Batik technique involves four steps of drawing, waxing, dyeing and wax removing. The selected designs are transfer to the fabric using yellow carbon sheet. Waxing process was done from light shade to dark shade. The designs consist of single color so the wax is applied to the white portion and it is immersed in the blue dye. Higher concentrations of paraffin wax result in more crocks because it is more brittle than the bee wax so we used 100% paraffin wax. Before dyeing the wax coated on the body part of the saree was then crushed for crocking effect.



Plate 2.4.4.1: Wax Coating

2.4.4.2 Dyeing

AsBo was insoluble in water and they are converted into water soluble compound by treating with caustic soda and this is known as Naphtholation. The AsBo, Black (B base) and Blue(B base) stuff with little amount of wetting agent – Caustic soda and small amount of hot water used for soluble the dye make it as a paste form. 1:20 (M:L:R) of water were taken to mix the dye paste stir well without lumps. The combination of naphtholation and the base such as blue (B base) and black (b base) is called coupling.

The diazo base was prepared by adding hydrochloric acid, nitrate, alumina and acetate and the solution added with water and maintained at temperature 0-50°C for 20-30 minute. The saree treated in a bath containing diazonium solution to carry out coupling and blue color produced inside the fabric.

2.4.4.3 Wax removing

After completion of waxing and subsequent dyeing process wax was removed by the single colour batik saree immersed the soap oil solution heated at 100° C and washed again with cold water and dried. The single colour batik saree was pressed under the 120° C.



Plate 2.4.4.3: Drying

2.5 Visual Evaluation

The single colour Batik Saree was evaluated. The evaluation induces visual inspection for analyzing. A panel of 100

Gandhigram students were analyzed and suggested. General Appearance, Brilliance in colour, Evenness, Texture aspects were categorized for visual evaluation.



Plate 2.5: Visual Evaluation

2.6. Assessment of Color fastness

The test specimen were cut according to the dimensions required for color fastness namely, Crocking (dry and wet), Perspiration (acid), sunlight and laundering for all color fastness tests a dye specimen was kept a side as the control of evaluation.

2.6.1. Color fastness to crocking (Dry/ Wet)

Paramount crock meter was used for testing rubbing fastness. The test samples of 5x5 inch size were prepared from dyed yarns and rubbed against standard crocking cloth provides with the equipment. Each sample was given ten stocks and the color change and staining on the white cloth were graded.



Plate 2.6.1: Colour Fastness to crocking (Dry/Wet)

2.6.2. Color fastness of sunlight

The color fastness of sunlight test dyed samples is taken mid of the saree 5x5 inches sizes were mounted on a A4 sheet. This A4 sheet covered with black sheet in such a manner that all the samples were half exposed and half covered. The samples were graded for color fastness.

2.6.3. Color fastness to washing (laundrometer)

Each dyed samples were placed between a piece of dyed cotton fabrics both measuring 5inch length & 5inch width. There three fabrics were stitched together to form composite samples. The washing solution was prepared with 5ml liquid soap/1 of water. Laundrometer of 45 minutes and then color change and staining on the adjacent fabrics were graded using grey scale.

3. Result and Discussion

3.1. Visual evaluation

Visual inspection, used in maintenance of facilities, mean inspection of equipment and structures using either or all of raw human senses such as vision, hearing, touch and smell and/ or any non- specialized inspection equipment. Visual inspection was conducted to find out the general appearance, evenness, and brilliancy. The developed single colour batik saree of fabric purposively for visual evaluation.

Table 1: Visual Evaluation of single colour batik saree

S.No	Visual evaluation	Single colour batik saree	
1	General Appearance	Good	99
		Fair	1
		Poor	-
2	Brilliance of colour	Bright	82
		Medium	18
		Dull	-
3	Evenness	Good	95
		Fair	5
		Poor	-
4	Texture	Good	97
		Fair	3
		Poor	-

The table 1 and figure 3.3.1 shows that visual evaluation, 99% of the judges rate the Single colour Batik Saree of general appearance for good. And 1% of judges rate the general appearance for fair. And 82% of judges rate the brilliance of colour for bright. 18% of the judges brilliance of medium for colour. In case of 95% the judges rates the evenness for good. And 5% of judges rate the evenness for fair. 97% of the judges rates for the texture good. And 3% of judges rate the texture for fair.

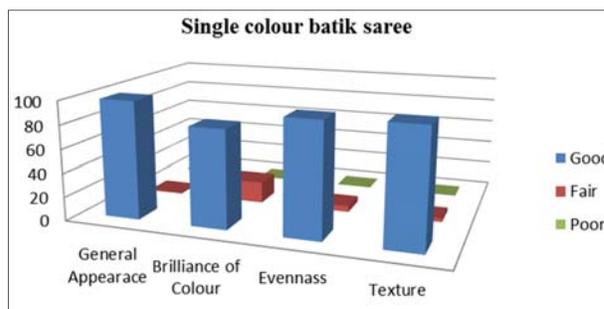


Fig 3.1.1: Single colour batik saree

3.2 Colour Fastness Properties of Azoic Dyed Fabric

Table 2: Colour fastness properties of Azoic dyed fabric

Azoic Blue dyed fabric		Grey Scale rate
Colour fastness to crocking (Dry)	Colour change	4
	Colour transference	4
Colour fastness to crocking (Wet)	Colour change	4
	Colour transference	4
Colour fastness to sunlight	Day 1	3
	Day 2	3
Colour fastness to washing	After 5 wash	3
	After 10 wash	3
	After 15 wash	4



Fig 3.2: Colour Fastness Properties of Azoic dyed fabric

3.2.1 Colour fastness to crocking meter (Dry/Wet)

The ability of withstanding or colour in a fabric/yarn/fiber is known as colour fastness. Colour fastness test were carried out to the permanency of colour when subjected to sun light, launder meter, crocking meter (dry and wet).

Dry Crocking

Colour change: The table 2. and figure regarding colour changes by crock meter used for dry condition. It is observed sample AB was rated as “4” show that as very little rate of colour change.

Colour transference: The Table 2 and Figure 3.2.1.1.1 regarding colour transference by crock meter used for dry condition. It is observed sample AB was rated as “4” show that as very little rate of colour transference.

Wet crocking

Colour change: The Table 2 and Figure 3.2.1.1.1 Colour fastness test on wet crocking the value if rating indicated as the sample AB was rated as “4” shoe that as very little rates of colour change.

Colour transference: The Table 2 and Figure 3.2.1.1.1 Colour fastness test on wet crocking the value if rating indicated as the sample AB was rated as “4” shows that as very little rates of colour transference.

Colour fastness to sunlight

Day 1: The Table 2 and Figure 3.2.1.1.1 indicates that the samples AB shows rating “3” conform little rate of the colour change or colour transference.

Day 2: The Table 2 and Figure 3.2.1.1.1 Sample AB, AO, AY and AM shows the value of rating was as “3” reveals a little rate of colour range.

Colour fastness to washing

After 5 wash: The Table 2 and Figure 3.2.1.1.1 shows that the sample AB refers as “3” reveals a little rate of colour change.

After 10 wash: The Table 2 and Figure 3.2.1.1.1 the sample AB shows rating “3” conforms little rate of change.

After 15 wash: The Table 2 and Figure 3.2.1.1.1 the sample AB was rated as “4” shows that as very little rate of colour change.

4. Summary and Conclusion

The study focused on the batik dyeing of Khadi fabrics with Azoic dyes. And to see the effect of various influences on the designs and colours of dyed Khadi fabric. For research purpose khadi fabric was purchase from the Gandhigram trust used Azoic blue was dyed the samples and evaluated for colour fastness properties.

The khadi fabric was then compared for general appearance, evenness, brilliance of colour, texture through visual inspection. The sample was analyzed for testing to crocking (dry and wet), Sunlight and washing. Tests and evaluated using AATCC Standard grey scale. The cost involved for developing the designs by khadi fabric also calculated.

Visual evaluation

The visual inspections of Single colour Batik Saree was scored good result with respect of appearance evenness and texture of colour.

Colour fastness to crocking dry and wet

Regarding the colour fastness to crocking dry and wet. It was observed the dye sample Azoic Blue dyed fabric showed Very little rate of colour change.

Colour fastness to sunlight

Regarding the colour fastness to sunlight. It was observed that the sample Azoic Blue dyed fabric is clearly the ability of colour with stand with the fabric structure as good.

Colour fastness to washing

Regarding the colour fastness to washing it was noticed that the sample. Azoic Blue dyed fabric are clearly the ability of colour withstand with the fabric appreciable rate of colour change.

5. Conclusion

In the conclusion based on the experiment work using traditional batik technique using the khadi fabric

discovering the aesthetic beauty of the end product and good in colour strength.

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