



Faculty of Engineering

Department of Textile Engineering

Project (Thesis) Report on the effect of after treatments on cotton fabric dyed with reactive dye

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A Thesis submitted in partial fulfillment of requirements for the degree of

Bachelor of Science in Textile Engineering

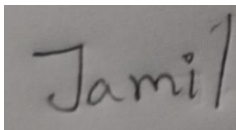
Major in Wet Processing Technology

Fall-2022

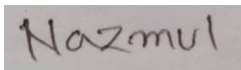
DECLARATION

I hereby announce that this Project (Thesis) report has been prepared by me under the supervision of **Mr.Tanvir Ahmed Chowdhury** , Assistant Professor , Department of Textile Engineering, Faculty of Engineering, Daffodil International University. I also declare that either this report or any part of it has been submitted for the award of any degree.

Submitted by:

A rectangular box containing a handwritten signature in black ink that reads "Jamil".

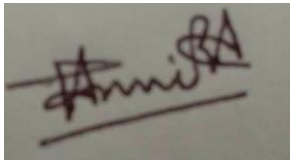
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LETTER OF APPROVAL

This Project (Thesis) report has been prepared by **Jamil Sharker Joy** whose ID: **191-23-5560 & Md. Nazmul Hasan** whose ID: **191-23-5595** has been partially approved to meet the requirements for the degree of **Bachelor of Science in Textile Engineering**. The mentioned students have completed their Project (Thesis) work under my supervision. During the research I found them sincere, hardworking and enthusiastic.



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Abstract

Reactive dyeing for cotton fabrics is the main topic of this study. production of dye. The Art of Color-Making It has been shown how the complete reactive dye process works (Pre-Treatment After treatment,). We gathered samples from the dyeing production after reading After Dyeing & After Treatment. We evaluated the wash ability, abrasiveness, and perspiration of the sample. Three different shade-dyed fabrics were exhibited together with information about their wash ability, resistance to abrasion (rubbing), and perspiration of this sample.

Key words: Cotton fabric , Reactive dyes, Shade, Dyeing Production, Pre Treatment, After treatment, Colorfastness tests

CHAPTER:-01

1.1 Introduction

Reactive Dye Reactive dye is which contain reactive group. This dye is a water soluble dye. It is a anionic dye which is used for dyeing of cellulosic fiber. Reactive dye is a mostly used for its excellent properties. Cotton fiber is mostly dyeing with reactive dye. Reactive Dye React with fabric directly that the means reactive reaction with dye & molecules Of the fabric.

Shade is term that's indicate the depth of the color. Shade mainly physical test that are maintain quality assurances of the fabric. Sometime shade matching with visual (man's eye) & sometime matching with Computer Color Matching System (CCMS).

Cotton We know cotton is natural fiber. That's mostly used fabric after Polyester fabric. That's fabric get from seed fluff of cotton fibers. Cotton fabric anything wear very comfortable. In addition, cotton is very soft that why cotton fabric maintain soft feel. Cotton fabric is good Moisture regain percentage that is why absorbent is good. Cotton fabric durability is good & cotton fabric wearable long time. Cotton fabric is good for fashion.

Spectrophotometer it is an ingredient in the spectrophotometer. It is a device that is frequently used for molecular spectroscopy that can identify and study various electromagnetic radiation wavelengths. To produce the desired light spectrum, it is used in spectrophotometers. The spectrometer therefore makes use of electromagnetic radiation to examine sample materials spectroscopically.

A photometer can be found inside the spectrophotometer. With a photometer, one may gauge light intensity. Either a detector or a digital display is present. It is an ingredient in the spectrophotometer. It is a device that is frequently used for molecular spectroscopy that can identify and study various electromagnetic radiation wavelengths. To produce the desired light spectrum, it is used in spectrophotometers. For this reason, the spectrometer uses electromagnetic radiation. It is an ingredient in the spectrophotometer. It is a device that is frequently used for molecular spectroscopy that can identify and study various electromagnetic radiation wavelengths. To produce the desired light spectrum, it is used in spectrophotometers. The spectrometer therefore makes use of electromagnetic radiation to examine sample materials spectroscopically.

Color fastness is change the characteristics of color to transfer of others materials. That's the fabric are not fading or changing when it Washing, cleaning & Visible to lighter, Heat & other Impact.

Rubbing Test is testing fabric color fastness Dry & Wet process. After Complete, process the grading with gray scale. That's physically test is important. Most of time rubbing test did with lengthwise.

Perspiration test mainly doing with alkali, acid or Mineral water. It's mainly checking what happen with human sweating with fabric. Because we used dyes & chemical after complete the dyeing. It is important fastness test.

1.2 Objective

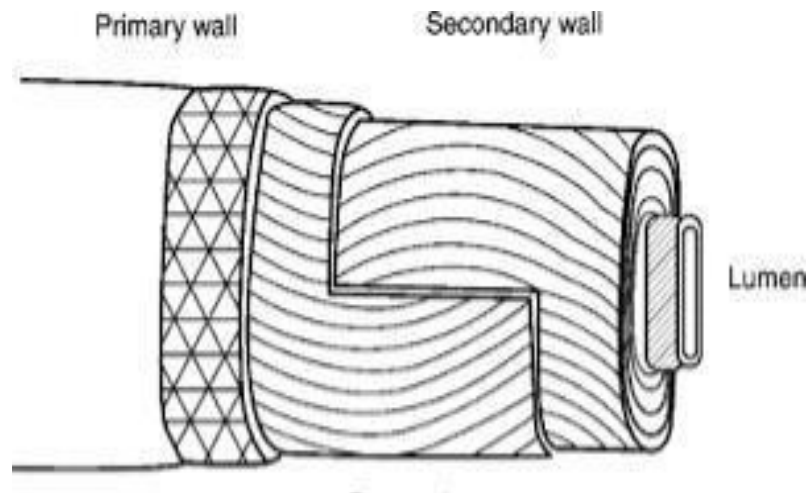
1. To know about Reactive Dye dyeing with cotton fabric.
2. To know about Colour Fastness.
3. To know about Rubbing Test.
4. To know about Spectrophotometer.
5. To know about Perspiration.

CHAPTER:02

Literature & Review

2.1 Cotton Fiber: is a Natural fiber. It soft & cellulose fiber of our textile industry. That is mostly used fiber in the textile company. That are mainly use for apparel, home textile & industrial production. It's fabric wear comfortable is good then other fiber fabric. Most of the buyer requirement of cotton fiber fabric. Cotton fiber is highly strong fiber. That's breakage percentage is low when it manufacturing Process.

2.1.1 Structure of Cotton fiber:



The primary wall of cotton fiber is protected from moisture by the cuticle, which is composed of proteins, waxes, and pectins.

Secondary Wall:- While the secondary wall's shape and thickness determine its performance qualities,

Primary wall:- the primary wall safeguards the integrity of the fiber.

Lumen:- Due to the presence of a lumen, a hollow channel-like structure, the fiber collapses after drying.

2.1.2 History Of Cotton:

Cotton gets its name from the Arabic word "quton." Cotton was initially produced in India, dating back to the fifth millennium B.C.

India invented the first cotton gin, a machine that separates cotton fluff from plant seeds, in the

thirteenth century. Cotton gin production grew more faster and more efficient, allowing the fiber to grow as a widely used textile.

Because to the advent of new technologies such as the spinning jenny, spinning frame, and spinning mule, Britain became one of the top cotton producers throughout the Industrial Revolution. All of these spinning devices allowed companies to produce cotton more quickly.

But, an American called Eli Whitney created the automated cotton gin.

2.1.3 Properties of Cotton

- Length: 0.5" – 2.5"
- Strength, tenacity (gm per denier): 3 – 5
- Dimensional stability: medium
- Heat preventive power: medium
- Moisture regain: 8.5%
- Stiffness: 57-60 g/d due to high crystallinity
- Elasticity: 1.50- 1.58
- Resiliency: low
- Abrasion resistance: medium
- Density (gm/cc): less than silk
- Color: cream or yellowish like clean white.
- Specific gravity: 1.52-1.55

2.2 Reactive Dye:

Reactive dye is water soluble & anion dye. It has directly affinity to the fiber. It make strong covalent bond react with fiber. It complete with three process Exhaustion, Fixation, Wash-off. Reactive dye mainly use in cellulose fiber. It good for cotton dyeing.

2.2.1. Reactive Dye Structure

The general structure of reactive dye is: D-B-G-X.

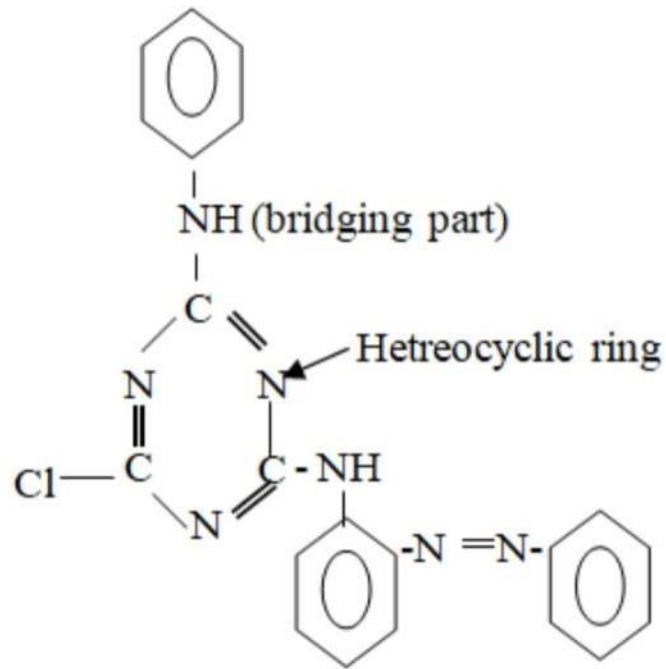


Fig: Chemical structure of reactive dyes

Here,

D = Dye part or chromogen (color producing part).

Dyes may be direct, acid, disperse, premetallised dye etc.

B = Bridging part.

Bridging part may be -NH- group or -NR- group.

G = Reactive group bearing part.

X= reactive group.

2.1.3. Properties of Reactive Dye

1.Reactive Dye is anion dye

1. It water soluble Dye.
2. This Dye used for coloration of the cellulose fiber.
3. It done by alkali condition.
4. This dye use for Brighter Shade.
5. Wash fastness is good. mordarate rubbing fastness
6. Perspiration fastness is very good for reactive dye

2.1.3 Mechanism of Reactive dye:

There are 3 way to reactive dye:

1. Exhaustion
2. Fixation
3. Wash off

1. When cotton fiber immersed on dye bath, that time creates negative charge .In this process we as a electrolyte NaCl. That electrolyte neutralize the negative charge from the cotton fiber surface. Then the increase the dye absorption.

2. Fixation: is means reaction of reactive group of the –OH, -NH₂ group creates strong covalent bond with fiber. Reactive dye happen with alkali condition & PH is 10-12.3.In this part we used caustic soda, soda ash on NaHCO₃.This is control dye bath PH act as fixing agent. That happen in the fixation.

3. Wash off: This process is used for removing unfixed dye and chemicals from the fiber. By using soap wash off process is done.

2.3 Color fastness: Color fastness is a term which indicates the change of the characteristics of colour to transfer of others materials. That's the fabric are not fading or changing when it washing, cleaning. The characteristic of dyes known as color fastness directly correlates with the bonding strength between the fiber and the photochromic dye. The processing methods used, the compounds selected, and the option of axillaries can all have an impact on color fastness.

Color is a key component of fashion and clothing aesthetics, and it has significant worth for both the consumer and the company. One of the most important factors in drawing consumers and encouraging them to purchase a product or clothing is color. One of the crucial quality criteria for colored fabrics is the preservation of the original color. If color fastness fails tests after being exposed to washing, light, rubbing, and other agents like perspiration, it is given a bad ratio.

The ability of a substance to retain any of its color traits after cleaning with regular detergent is known as color fastness to wash. For Lab-dip in a dyeing facility, colorfastness to cleaning is crucial. One of the most significant and frequently used colorfastness tests is this one

CHAPTER: 03

3.1 Material

This study done by 100% single jersey knitted cotton fabric. The GSM is 180. The sample has been taken from dyeing production of Pakiza knit composite Ltd. Dye & chemical which given dyeing production section for there are buyer requirement .We take 10 gm fabric from dyeing production.

3.2 Table: Sample Specification

Sample No	Sample Type	Sample GSM
1	100% knitted S/J cotton fabric	180
2	100% knitted S/J cotton fabric	180
3	100% knitted S/J cotton fabric	180
4	100% knitted S/J cotton fabric	180
5	100% knitted S/J cotton fabric	180
6	100% knitted S/J cotton fabric	180

3.3 Table: Different chemical used in this study

Name of the chemical	Function
Detergent	To remove the dirt, dust, oil from the fibre
Sequestering agent	To reduce water hardness
Caustic soda	To maintain alkaline condition during dyeing
Hydrogen peroxide	It is a bleaching agent which is used to white the cotton fibre by removing natural color from the textile material
Anti-creasing agent	To minimize the crease mark during dyeing
Levelling agent	It gives the level of dye during dyeing process. Evenly dyeing is carried out by using levelling agent.
Enzyme	To remove hairy fibre from the fiber
Salt	To improve the exhaustion rate of the cotton fiber by neutralizing negative charge which creates on cotton fibre surface during dyeing
Soda ash	To maintain alkaline condition during dyeing
Peroxide stabilizer	To stabilize peroxide during peroxide during the bleaching.

3.4 Dyes Name:

Light Shade Dyes:

1. Remazol Brilliant Yellow 3GR
2. Remazol Yellow RR
3. Remazol Blue RR

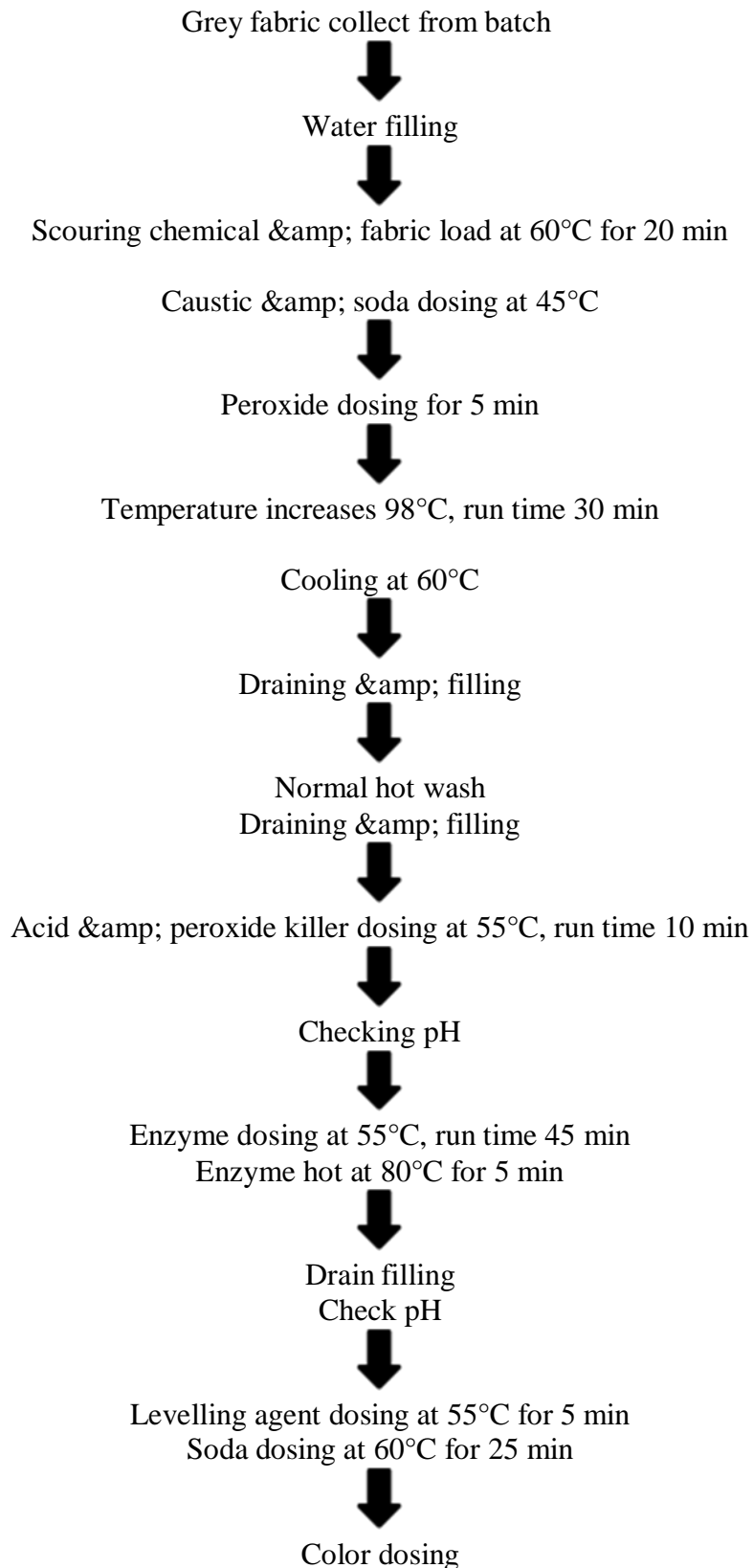
Medium Shade Dyes:

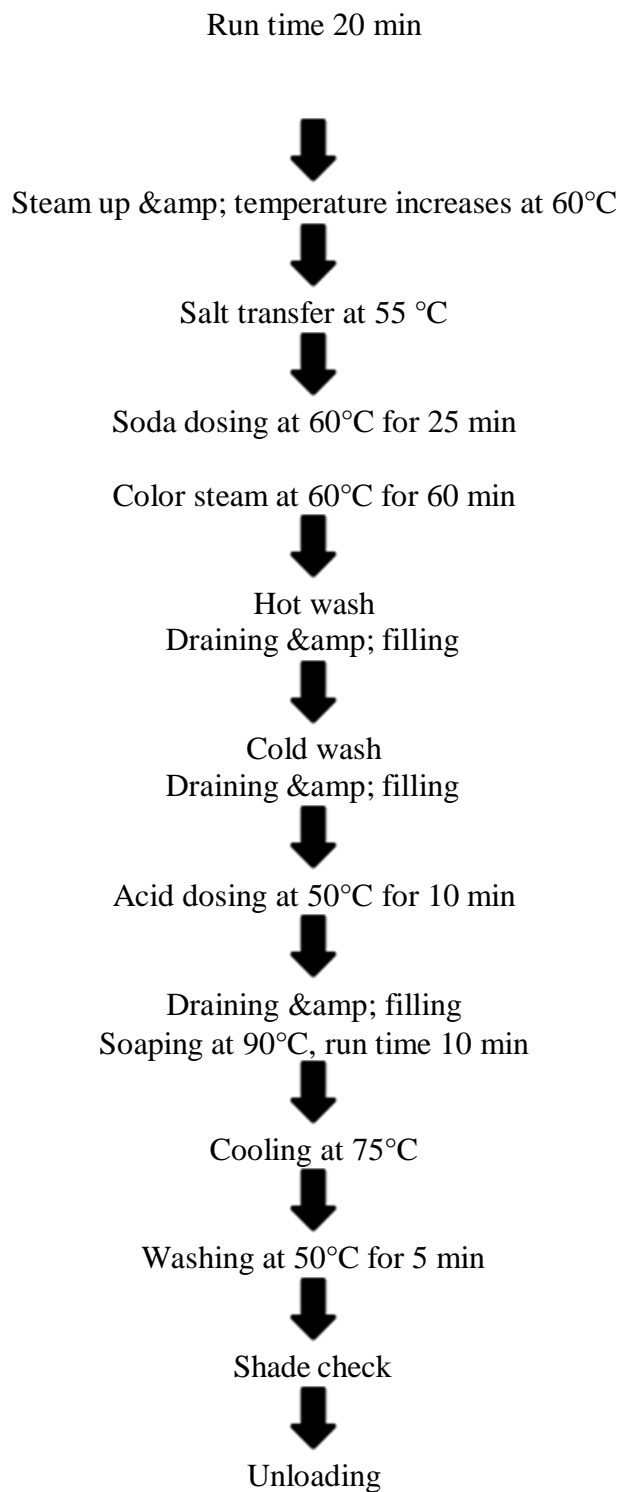
- 1.Synozol Yellow K-3RC
- 2.Synozol Red K-BC
- 3.Synozol Blue-BR

Dark Shade Dyes:

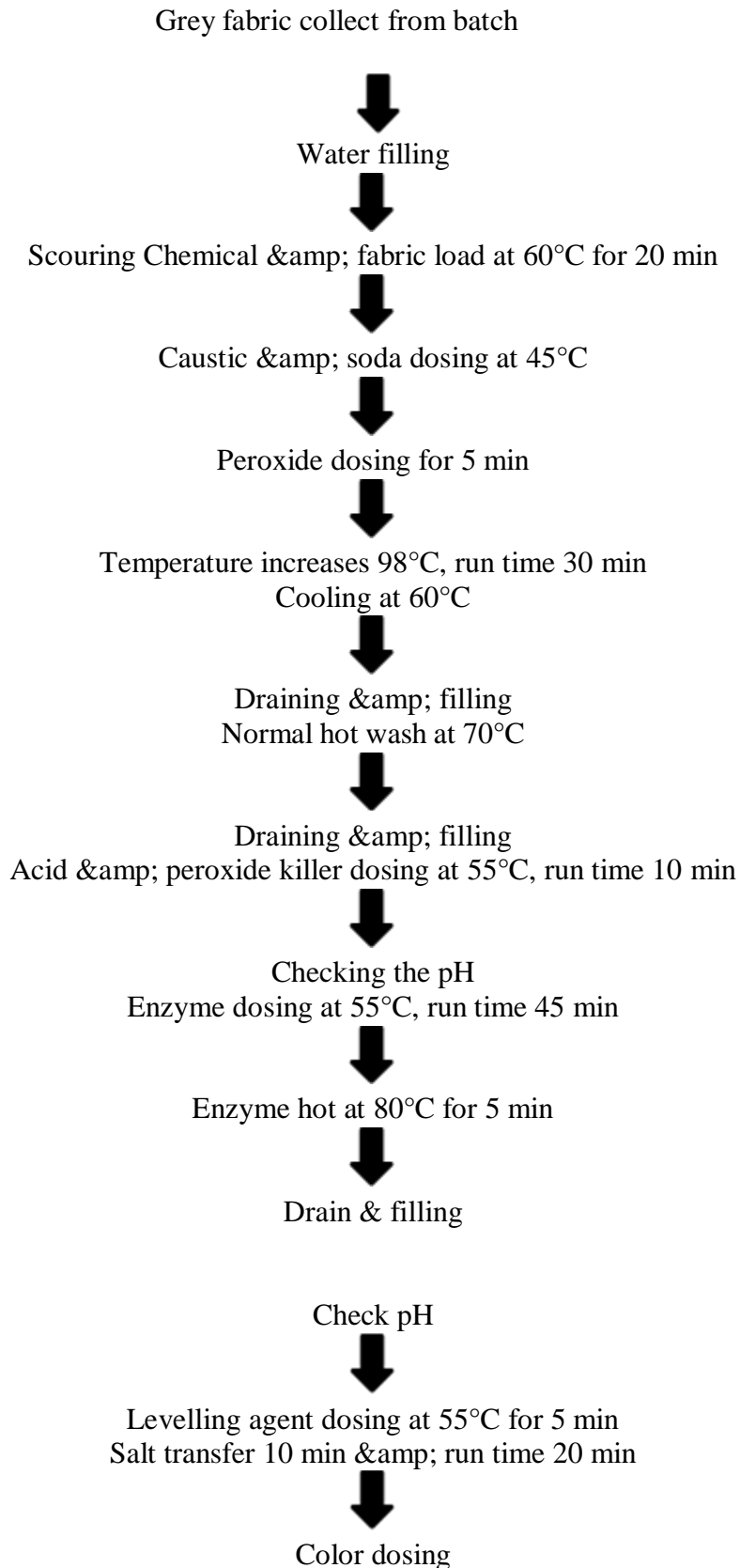
- 1.Suncron Yellow Brown T-FW
- 2.Suncron Rubine T-FW
- 3.Suncron Black T-FW

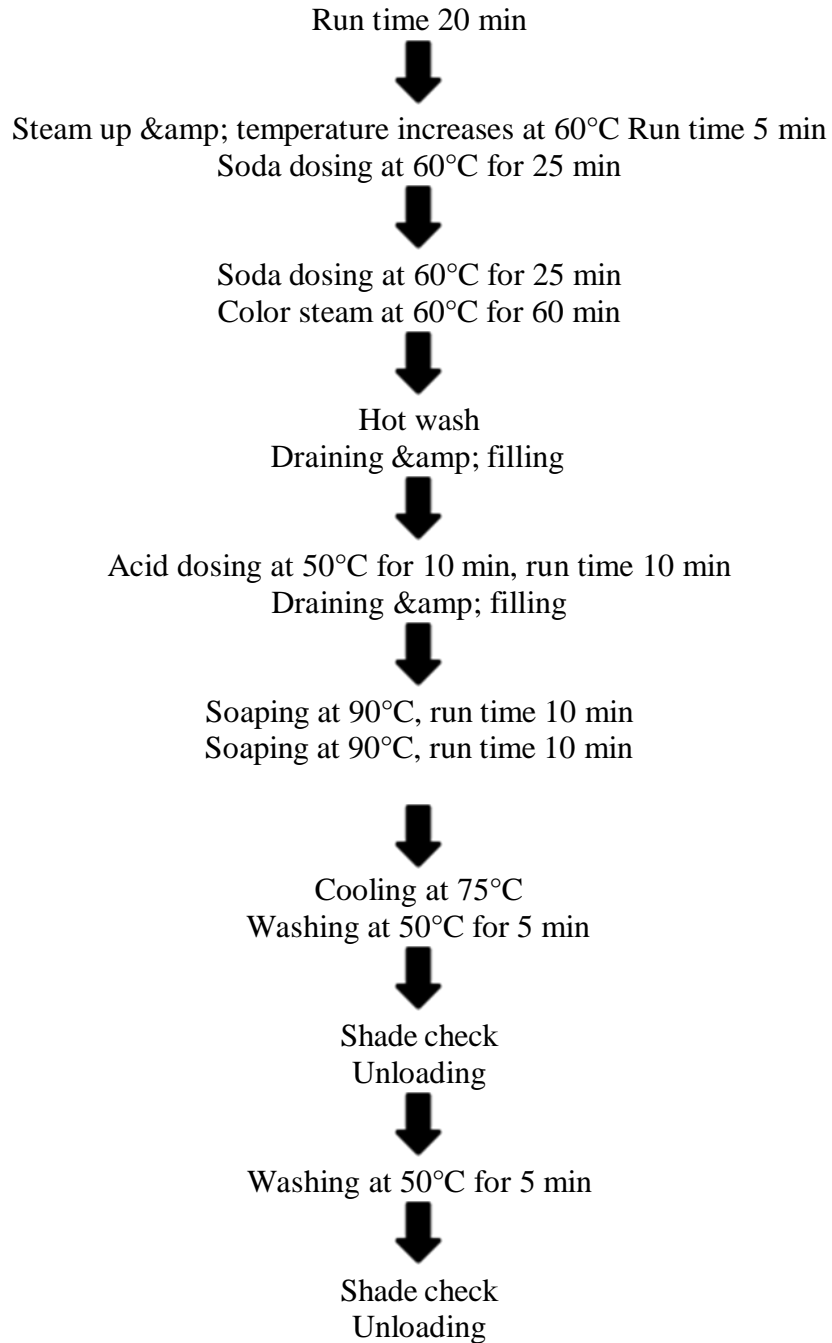
3.5 Dyeing Process for Reactive dye with cotton (Light & Medium)





3.6 Dyeing Process for Reactive dye with cotton (Dark shade)





3.7 Color Fastness to Gyro Wash

This operation is done by following ISO standard. Then we cut the sample by a 10×4 cm ratio. Then we sew the fabric with multi fiber which we will test later. For per liter Distilled water contained in stainless steel pot we needed 4 g/l ECE (European Colorfastness Establishment) and 1 g/l Sodium Perborate. Then sink the sample fabric with the 25 steel balls into the pot. Then we pour 150 ml of solution and raise the temperature at 50°C for

30 minutes. We shinker a total of 6 sample fabrics. Then we took out the sample from Gyro Machine and washed them with cold water. By squeezing we took out extra water. Then we have to use a dryer machine so that the fabrics don't stick with each other. Then the balls are given to remove unfixed color from the fabric. Then with the help of gray scale we rated the Multi Fiber.

3.8 Color Fastness to Rubbing

James Heal's Crock Master is an instrument that measures the color fastness to both wet and dry rubbing. We worked in the warp direction when rubbing. called the fabric in the lower plate. With this, the fabric was covered; the cover's dimensions are 25 x 6 cm. Amount of

A 14 x 5 cm rubbing fabric is used for the rubbing action. Bleaching and scouring must be done by the rubbing fabric. The wet rubbing in the ISO method needs to be moistened between 95 and 100 percent. With the aid of a finger, this fabric must be attached using a needle hook. The finger hook needs to be used to secure the rubbing cloth. We then received the results for the Dry and Wet Fabric values. The range we obtained from the color. The hue spectrum we were given turned into a grayscale.

3.9 Color Fastness to Perspiration

ISO Method is followed to determine the perspiration test of the fabric. At first we cut the fabric by 10×4 cm. Then we sew the fabric with multi fiber. The Perspiration Test was done in Alkaline and Acidic condition. Here the pH condition was 4.5-5.5 and used 100 ml solution for each sample. Sinking each sample in 100 ml solution in a perspirometer with pressure of 12.5 kPa. Raised the temperature to 37°C for 4 hours. Then by Gray Scale and Color Staining we related in between 1 to 5.

3.10 Spectro-photometer

At first we collected colored fabric from the dyeing section. Then we collected the fabric or swatch of that fabric. There we also collected Light, Medium, Dark shade total of fabric or Swatch from the Dyeing Production. Total 3 colors of fabric we collected. These are-

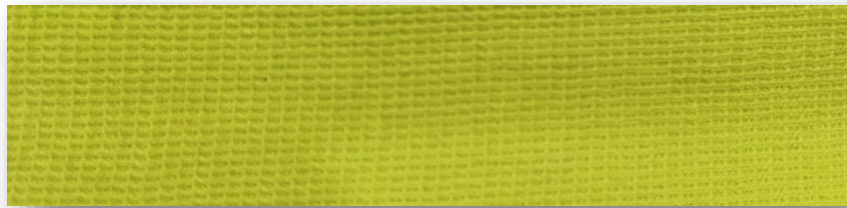
1. Lime (Light Shade)
2. Orange (Medium Shade)
3. Black (Dark Shade)

Color comparison of these are done by CMC. After treatment of Swatch the Swatch that we collected we selected it as Standard then compared it after dyeing the fabric by Spectrophotometer.

3.11 Sample Attachment :

1. Light Shade (Lime)
2. Medium Shade (Orange)
3. Dark Shade (Black)

Light Shade before (Original)



Light Shade after (original)



Medium Shade Before (Original)



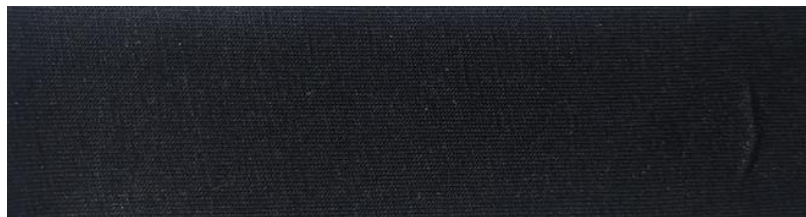
Medium Shade after (Original)



Dark Shade before (Original)

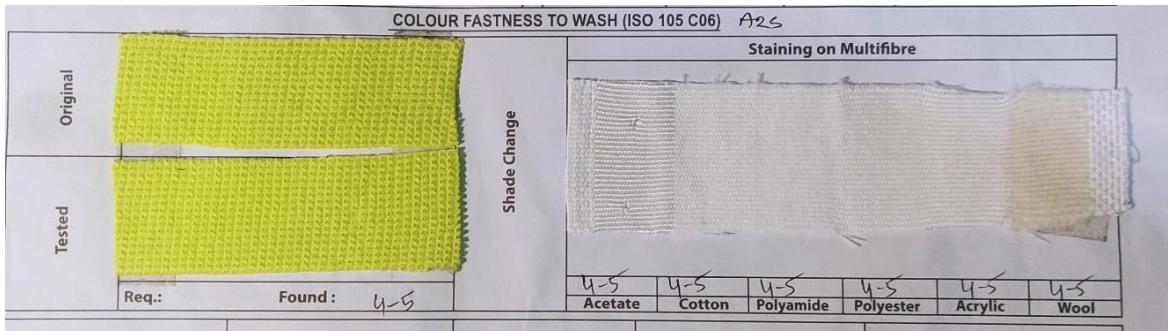


Dark Shade after (Original)

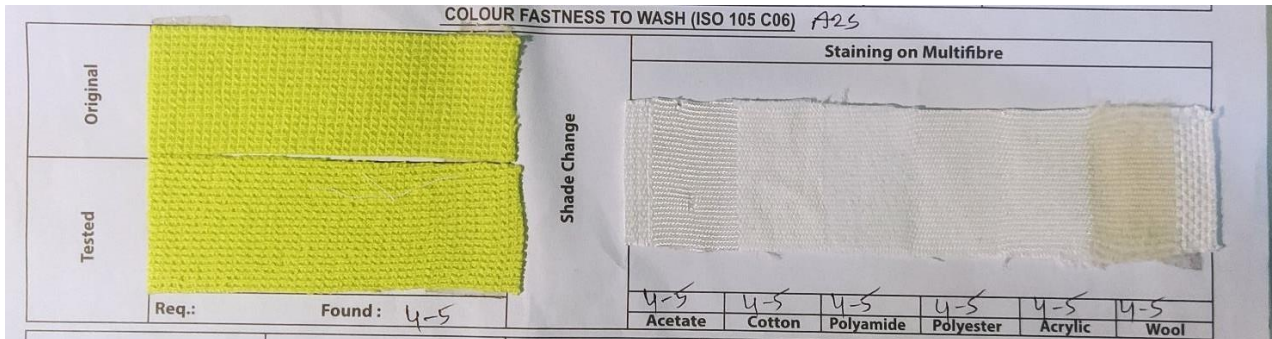


3.12 Sample Attachment Of the color fastness of wash

Light Shade: (Before)



Light Shade: (After)



Medium Shade: (Before)

		COLOUR FASTNESS TO WASH (ISO 105 C06) A23					
Original		Staining on Multifibre 					
Tested							
Req.:	Found: 4-5	4-5	4	4-5	4-5	4-5	4-5
		Acetate	Cotton	Polyamide	Polyester	Acrylic	Wool

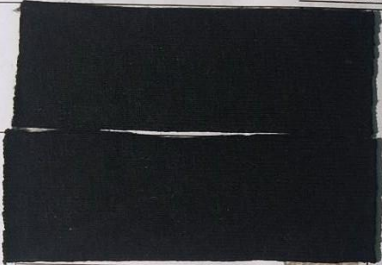

Medium Shade: (After)

		COLOUR FASTNESS TO WASH (ISO 105 C06) A23					
Original		Staining on Multifibre 					
Tested							
Req.:	Found: 4-5	4-5	3-4	4-5	4-5	4-5	4-5
		Acetate	Cotton	Polyamide	Polyester	Acrylic	Wool

Dark Shade: (Before)


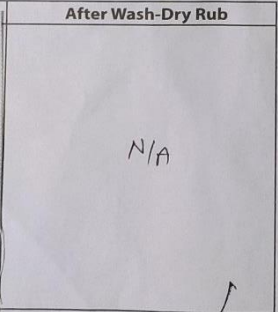
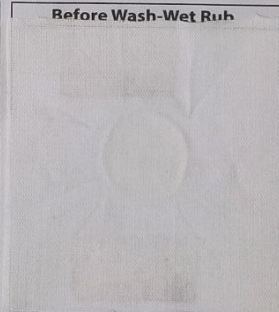
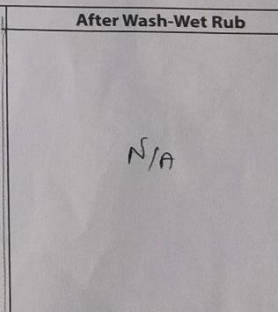
		COLOUR FASTNESS TO WASH (ISO 105 C06) <i>A25</i>						
Original		Shade Change	Staining on Multifibre					
Tested								
	Req.:	Found: <i>4-5</i>	<i>4-5</i>	<i>4-5</i>	<i>4-5</i>	<i>4-5</i>	<i>4-5</i>	
			Acetate	Cotton	Polyamide	Polyester	Acrylic	Wool

Dark Shade: (After)

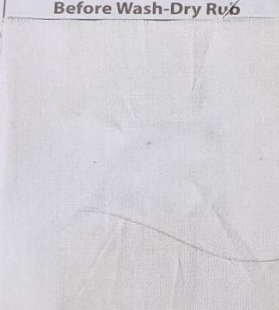
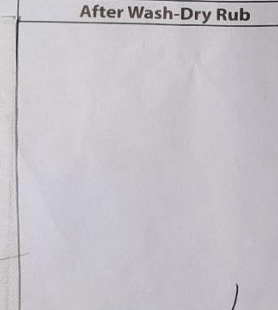
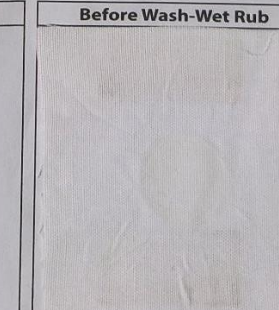
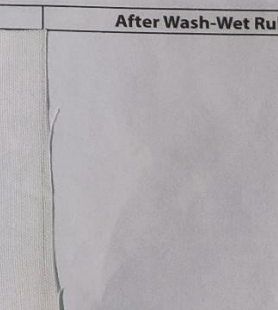
		COLOUR FASTNESS TO WASH (ISO 105 C06) <i>A25</i>						
Original		Shade Change	Staining on Multifibre					
Tested								
	Req.:	Found: <i>4-5</i>	<i>4-5</i>	<i>4-5</i>	<i>4-5</i>	<i>4-5</i>	<i>4-5</i>	
			Acetate	Cotton	Polyamide	Polyester	Acrylic	Wool

3.12 Rubbing to Color fastness test:

Light Shade (Lime): (Before)

COLOUR FASTNESS TO RUBBING (ISO 105 X 12)			
Before Wash-Dry Rub	After Wash-Dry Rub	Before Wash-Wet Rub	After Wash-Wet Rub
			
Req: Found: 4-5	Req: Found: /	Req: Found: 4	Req: Found: /

Light Shade (Lime): (After)

COLOUR FASTNESS TO RUBBING (ISO 105 X 12)			
Before Wash-Dry Rub	After Wash-Dry Rub	Before Wash-Wet Rub	After Wash-Wet Rub
			
Req: Found: 4-5	Req: Found: /	Req: Found: 4	Req: Found: /

Medium Shade (Orange): (Before)

COLOUR FASTNESS TO RUBBING (ISO 105 X 12)			
Before Wash-Dry Rub	After Wash-Dry Rub	Before Wash-Wet Rub	After Wash-Wet Rub
	N/A		N/A
Req: Found: 4-5	Req: Found: /	Req: Found: 4-5	Req: Found: /

Medium Shade (Orange): (After)

COLOUR FASTNESS TO RUBBING (ISO 105 X 12)			
Before Wash-Dry Rub	After Wash-Dry Rub	Before Wash-Wet Rub	After Wash-Wet Rub
	N/A		N/A
Req: Found: 4-5	Req: Found: /	Req: Found: 4-5	Req: Found: /

Dark Shade Black): (Before)

COLOUR FASTNESS TO RUBBING (ISO 105 X 12)			
Before Wash-Dry Rub	After Wash-Dry Rub	Before Wash-Wet Rub	After Wash-Wet Rub
	N/A		N/A
Req: Found: 4.5	Req: Found: /	Req: Found: 2	Req: Found: /

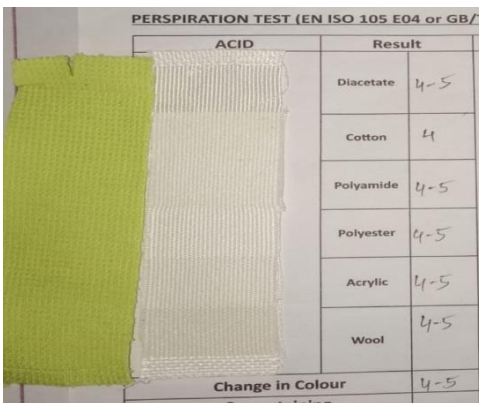
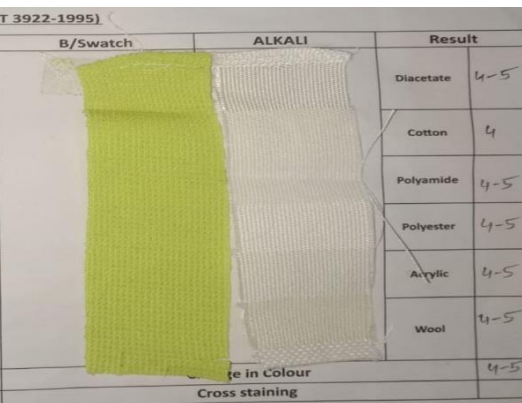
Dark Shade(Black): (After)

COLOUR FASTNESS TO RUBBING (ISO 105 X 12)			
Before Wash-Dry Rub	After Wash-Dry Rub	Before Wash-Wet Rub	After Wash-Wet Rub
	N/A		N/A
Req: Found: 4.5	Req: Found: /	Req: Found: 2	Req: Found: /

3.13 Color Fastness to Perspiration test: (Acid & Alkali)

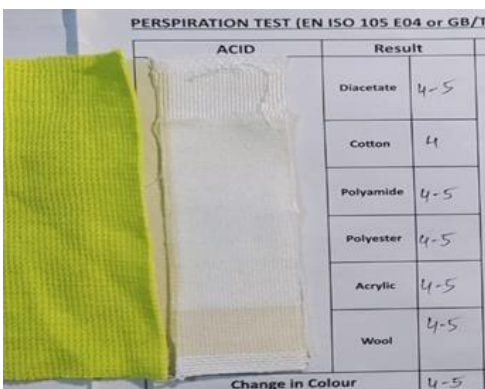
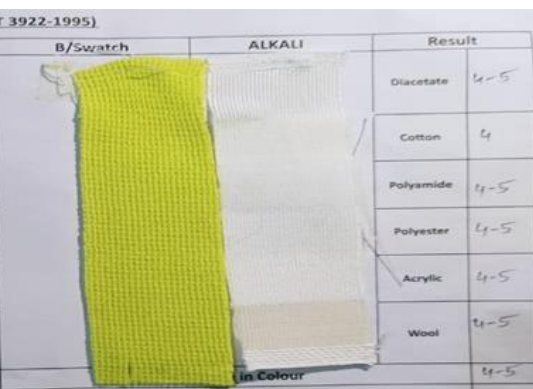
Light Shade (Before)

PERSPIRATION TEST (EN ISO 105 E04 or GB/T 3922-1995)

ACID		Result	B/Swatch	ALKALI	Result	
	Diacetate	4-5		Diacetate	4-5	
	Cotton	4		Cotton	4	
	Polyamide	4-5		Polyamide	4-5	
	Polyester	4-5		Polyester	4-5	
	Acrylic	4-5		Acrylic	4-5	
	Wool	4-5		Wool	4-5	
Change in Colour		4-5	Change in Colour		4-5	
Cross staining			Cross staining			

Light shade (After)

PERSPIRATION TEST (EN ISO 105 E04 or GB/T 3922-1995)

ACID		Result	B/Swatch	ALKALI	Result	
	Diacetate	4-5		Diacetate	4-5	
	Cotton	4		Cotton	4	
	Polyamide	4-5		Polyamide	4-5	
	Polyester	4-5		Polyester	4-5	
	Acrylic	4-5		Acrylic	4-5	
	Wool	4-5		Wool	4-5	
Change in Colour		4-5	Change in Colour		4-5	
Cross staining			Cross staining			

Medium shade(Before)

PERSPIRATION TEST (EN ISO 105 E04 or GB/T 3922-1995)

ACID		Result	B/Swatch	ALKALI	Result
		Diacetate			Diacetate
		Cotton		Cotton	
		Polyamide		Polyamide	
		Polyester		Polyester	
		Acrylic		Acrylic	
		Wool		Wool	
Change in Colour		4-5		Change in Colour	
Cross staining				Cross staining	


Medium shade(After)

PERSPIRATION TEST (EN ISO 105 E04 or GB/T 3922-1995)

ACID		Result	B/Swatch	ALKALI	Result
		Diacetate			Diacetate
		Cotton		Cotton	
		Polyamide		Polyamide	
		Polyester		Polyester	
		Acrylic		Acrylic	
		Wool		Wool	
Change in Colour		4-5		Change in Colour	
Cross staining				Cross staining	


Dark shade (Before)

PERSPIRATION TEST (EN ISO 105 E04 or GB/T 3922-1995)

ACID	Result	B/Swatch	ALKALI	Result
Diacetate	4-5		Diacetate	4-5
Cotton	4		Cotton	4
Polyamide	4-5		Polyamide	4-5
Polyester	4-5		Polyester	4-5
Acrylic	4-5		Acrylic	4-5
Wool	4-5		Wool	4-5
Change in Colour Cross staining	4-5		Change in Colour Cross staining	4-5

Dark shade (After)

PERSPIRATION TEST (EN ISO 105 E04 or GB/T 3922-1995)

ACID	Result	B/Swatch	ALKALI	Result
Diacetate	4-5		Diacetate	4-5
Cotton	3-4		Cotton	3-4
Polyamide	4-5		Polyamide	4-5
Polyester	4-5		Polyester	4-5
Acrylic	4-5		Acrylic	4-5
Wool	4-5		Wool	4-5
Change in Colour Cross staining	4-5		Change in Colour Cross staining	4-5

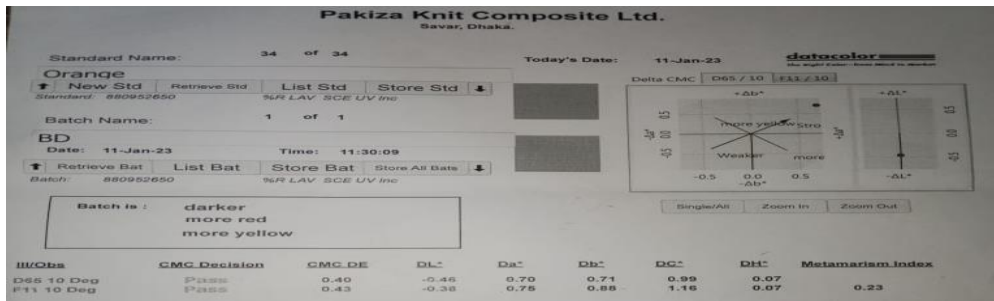
3.14 Color Comparison by Spectrophotometer

After (Standard) then we compare with Before Treatment Sample

Light Shade



Medium shade



Dark shade



CHAPTER:04 Result & Discussion

4.1 Rating of color staining test to washing

Before:

The changes fibers	Acetate	Bleached Cotton	Polyamide	Acrylic	Wool
Light Shade	4-5	4-5	4-5	4-5	4-5
Medium Shade	4-5	3-4	4-5	4-5	4-5
Dark Shade	4-5	4-5	4-5	4-5	4-5

After:

The changes fibers	Acetate	Bleached Cotton	Polyamide	Acrylic	Wool
Light Shade	4-5	4-5	4-5	4-5	4-5
Medium Shade	4-5	4	4-5	4-5	4-5
Dark Shade	4-5	4-5	4-5	4-5	4-5

In this table we see that (Dyeing) & After Treatment color fastness to wash rating are same for light, medium, dark shade. Wash fastness is good from this dyeing production sample.

4.2 Rating of color staining test to rubbing:

Before:

Rubbing test	Dry	Wet
Light Shade	4-5	4
Medium Shade	4-5	2-3
Dark Shade	4-5	2

After:

Rubbing test	Dry	Wet
Light Shade	4-5	4
Medium Shade	4-5	3
Dark Shade	4-5	2

In this table (dyeing) & After treatment that rubbing fastness for light,medium,dark shade rating are same for dry & wet rub process.That`s Rubbing test result are same for all Shade.

**4.3 Rating of color staining test to perspiration
Before (Alkaline & Acid):**

The changes in Fibers	Solution	Acetate	Bleached Cotton	Polyamide	Polyester	Acrylic	Wool
Light Shade	Acid	4-5	4	4-5	3-4	4-5	4-5
	Alkali	4-5	4	4-5	4-5	4-5	4-5
Medium Shade	Acid	4	4	4-5	4-5	3-4	4-5
	Alkali	4-5	4	4-5	4-5	4-5	4-5
Dark Shade	Acid	4-5	4	4-5	4-5	4-5	4-5
	Alkali	4-5	4	4-5	4-5	4-5	4-5

After: (Alkaline & acid)

The changes in Fibers	Solution	Acetate	Bleached Cotton	Polyamide	Polyester	Acrylic	Wool
Light Shade	Acid	4-5	4	4-5	4-5	4-5	4-5
	Alkali	4-5	4	4-5	4-5	4-5	4-5
Medium Shade	Acid	4-5	4	3-4	4-5	4-5	4-5
	Alkali	4-5	4	4-5	4-5	4-5	4-5
Dark Shade	Acid	4-5	3-4	4-5	4-5	4-5	4-5
	Alkali	4-5	3-4	4-5	4-5	4-5	4-5

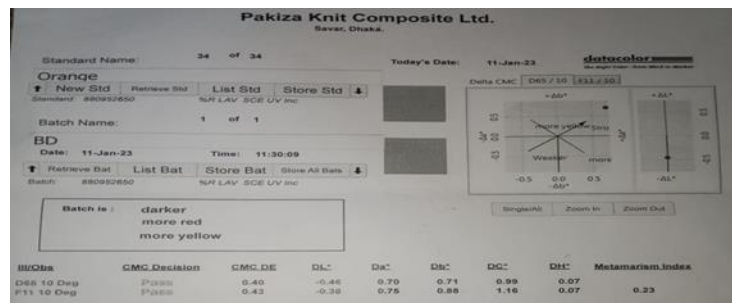
In this table, dyeing & After treatment for light, medium, dark shade acid & alkali result are same for all shade.

4.4 Spectrophotometer Result:

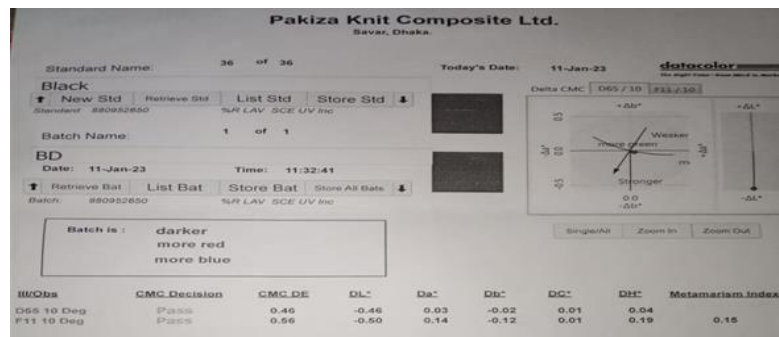
Light Shade



Medium shade



Dark shade



By selecting After treatment as standard it should be Lighter if the value of Color Deference (DE), Day and Light is positive '+', and it should be Darker if the value of Color Deference (DE), Day and Light is negative '-'. If the value of Deviation Axis (Da) is '+' then there is more Shade

Reddish and if the value of Deviation Axis (Da) is '-' then there is less greenish. If the value of Deviation Axis (Da) is '+' and the value of Yellowish is '-' then the color should be Blueish. If the value of Delta Chroma (DC) is '+' and the value of Brighter '-' then the color should be lighter.

By Delta Hue (DH) we have got the color tune composition. When the value of DH is '+' that means color tone is better but when the value of DH is '-' that means color tone is worse. The value of the metamerism Index we got doesn't make any difference in shade tone. The value of MI is accepted up to ± 1 .

The value of Color Difference (CMC DE) pass is 0- 0.75 against the light. If the value is 0.75-1 then warrant and it is more than 1 then it is considered a failure.

CHAPTER: 05

CONCLUSION

In this experiment we have find out the effect of after treatments on reactive dye with cotton fabric. We have collect dyed knitted cotton fabric sample from the bulk production of the dyeing. We have find out the wash fastness properties of the dyed knitted cotton sample. The rating of the color fastness to wash is same for each dyed knitted cotton fabric. The wash fastness properties is good for each sample which ranges from 4-5. The rating of the wet rubbing fastness is very poor which is not acceptable to the buyer. In dry rubbing fastness, fastness properties is good which ranges from 4-5. The perspiration fastness for each sample is good which ranges from 4-5. Furthermore we also find out the color comparison of dyed knitted fabric with standard sample. According to the measurement which carried out the spectrophotometer the result is good. Meta merism index is acceptable.

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[Faculty of Engineering Department of Textile Engineering](#) Project (Thesis) Report on the effect of after treatments on cotton fabric dyed with reactive dye [Course Code: TE-4214 Course Title: Project \(Thesis\) Submitted by: Jamil Sharker Joy ID: 191-23-5560 MD. Nazmul Hasan ID: 191-23-5596 Supervised by: Mr. Tanvir Ahmed Chowdhury Assistant Professor Department of Textile Engineering Daffodil International University A Thesis submitted in partial fulfillment of requirements for the degree of Bachelor of Science in Textile Engineering Major in Wet Processing Technology Fall -2022](#) DECLARATION I hereby announce that this Project (Thesis) report has been prepared by me under the supervision of Mr. [Tanvir Ahmed Chowdhury, Assistant Professor, Department of Textile Engineering, Faculty of Engineering, Daffodil International University](#). I also declare that either this report or any part of it has been submitted for the award of any degree. Submitted by: Jamil Sharker Joy ID: 191-23-5560 Nazmul Hasan ID:-191-23-5595 Department of Textile Engineering Daffodil International University LETTER OF APPROVAL This Project (Thesis) report has been prepared by Jamil Sharker Joy whose ID: 191-23- 5560 & Md. Nazmul Hasan whose ID: 191-23-5595 has been partially approved to meet the requirements for the degree of Bachelor of Science in Textile Engineering. The mentioned students have completed their Project (Thesis) work under my supervision. During the research I found them sincere, hardworking and enthusiastic. [Tanvir Ahmed Chowdhury Assistant Professor Department of Textile Faculty of Engineering Daffodil International University ACKNOWLEDGEMENT](#) First, we would like to thank Almighty Allah for his wonderful blessings, which made it possible for us to successfully accomplish this Project (Thesis). We appreciate the guidance of our supervisor, [Mr. Tanvir Ahmed Chowdhury](#), an assistant professor in the department of textile engineering at the [Daffodil International University](#) faculty of engineering. The extensive expertise and intense interest of our supervisor in textile dyeing and finishing, together with his unending patience, academic guidance, continual encouragement, active supervision, constructive criticism, and helpful suggestions, all encouraged us to complete the project (the thesis). This Project (Thesis) was accomplished by drafting and modifying at every level. We gratefully acknowledge [Md. Mominur Rahman, Head \(In-Charge\) of Daffodil International University and Department of Textile Engineering, Faculty of Engineering, for his kind assistance in bringing our Project \(Thesis\) report to a conclusion](#). Finally, we would like to extend our gratitude to all of our classmates at [Daffodil International University who took part in the conversation while the Project \(Thesis\) report was being completed and written](#). This Project (Thesis) report honors our love. We have been able to attain such achievement and respect because to the kindness, love, inspiration, and prayers of my father, mother, sisters, and instructors. Table of the content Contents Abstract [Chapter 1: Introduction 1.1](#), Objective [Chapter 2: Literature review 2.1](#). Cotton fiber [2.1.1](#). Structure of the cotton fiber [2.1.2](#). History of cotton fiber [2.2.3](#). Properties of the cotton [2.2](#). Reactive dye [2.2.1](#). Structure of reactive dye [2.2.2](#) Properties of reactive dye [2.2.3](#) Mechanism of the reactive [2.3](#) Color fastness Chapter [3: Materials & method... 3.1: Materials 3.2](#). Table: Sample specification [3.3](#). Different types of Chemical used [3.4](#). Name of the dyes [3.5](#). Dyeing process for reactive dye with cotton (light & medium shade) [3.6](#). Dyeing process for reactive dye with cotton (dark shade) [3.7](#). Color fastness to Gyro wash [3.8](#). Color fastness to rubbing [3.9](#). Color fastness to perspiration [3.10](#). Spectro-photometer Page no vii 1 2 3-6 3 3 3 5 6 6 6 7-25 7 7 8 9 10 12 13 13 13 3.11. Sample attachment (light, medium, dark shade) [3.12](#). Sample attachment of the color fastness to wash [3.13](#). Sample attachment of the color fastness to rubbing [3.14](#) Sample attachment of the color fastness to perspiration [3.15](#) Color comparison by spectrophotometer Chapter 4: Result & discussion 4.1 Rating of color staining test to washing 4.2 Rating of color staining test to rubbing 4.3 Rating of color staining test to perspiration 4.4 Spectrophotometer result Chapter: 5 Conclusion Reference 14 16 19 22 25 26-31 26 27 28 30 32 33 Abstract Reactive dyeing for cotton fabrics is the main topic of this study. production of dye. The Art of Color-Making It has been shown how the complete reactive dye process works (Pre-Treatment After treatment,). We gathered samples from the dyeing production after reading After Dyeing & After Treatment. We evaluated the wash ability, abrasiveness, and perspiration of the sample. Three different shade-dyed fabrics were exhibited together with information about their wash ability, resistance to abrasion (rubbing), and perspiration of this sample. Key words: Cotton fabric , Reactive dyes, Shade, Dyeing Production, Pre Treatment, After treatment, Colorfastness tests CHAPTER:-01 1.1 Introduction Reactive Dye Reactive dye is which contain reactive group. This dye is a water soluble dye. It is a anionic dye which is used for dyeing of cellulosic fiber. Reactive dye is a mostly used for its excellent properties. Cotton fiber is mostly dyeing with reactive dye. Reactive Dye React with fabric directly that the means reactive reaction with dye & molecules Of the fabric. Shade is

term that's indicate the depth of the color. Shade mainly physical test that are maintain quality assurances of the fabric. Sometime shade matching with visual (man's eye) & sometime matching with Computer Color Matching System (CCMS). Cotton We know cotton is natural fiber. That's mostly used fabric after Polyester fabric. That's fabric get from seed fluff of cotton fibers. Cotton fabric anything wear very comfortable. In addition, cotton is very soft that why cotton fabric maintain soft feel. Cotton fabric is good Moisture regain percentage that is why absorbent is good. Cotton fabric durability is good & cotton fabric wearable long time. Cotton fabric is good for fashion. Spectrophotometer it is an ingredient in the spectrophotometer. It is a device that is frequently used for molecular spectroscopy that can identify and study various electromagnetic radiation wavelengths. To produce the desired light spectrum, it is used in spectrophotometers. The spectrometer therefore makes use of electromagnetic radiation to examine sample materials spectroscopically. A photometer can be found inside the spectrophotometer. With a photometer, one may gauge light intensity. Either a detector or a digital display is present. It is an ingredient in the spectrophotometer. It is a device that is frequently used for molecular spectroscopy that can identify and study various electromagnetic radiation wavelengths. To produce the desired light spectrum, it is used in spectrophotometers. For this reason, the spectrometer uses electromagnetic radiation. It is an ingredient in the spectrophotometer. It is a device that is frequently used for molecular spectroscopy that can identify and study various electromagnetic radiation wavelengths. To produce the desired light spectrum, it is used in spectrophotometers. The spectrometer therefore makes use of electromagnetic radiation to examine sample materials spectroscopically. Color fastness is change the characteristics of color to transfer of others materials. That's the fabric are not fading or changing when it Washing, cleaning & Visible to lighter, Heat & other Impact. Rubbing Test is testing fabric color fastness Dry & Wet process. After Complete, process the grading with gray scale. That's physically test is important. Most of time rubbing test did with lengthwise. Perspiration test mainly doing with alkali, acid or Mineral water. It's mainly checking what happen with human sweating with fabric. Because we used dyes & chemical after complete the dyeing. It is important fastness test. 1.2 Objective 1. To know about Reactive Dye dyeing with cotton fabric. 2. To know about Colour Fastness. 3. [To know about Rubbing Test](#). 4. [To know about Spectrophotometer](#). 5. [To know about Perspiration](#). CHAPTER:02 [Literature & Review 2.1 Cotton Fiber: is a Natural fiber.](#) It soft & cellulose fiber of our textile industry. That is mostly used fiber in the textile company. That are mainly use for apperal,home textile & industrial production. It's fabric wear comfortable is good then other fiber fabric. Most of the buyer ar requirement of cotton fiber fabric.Cotton fiber is highly strong fiber. That's breakage percentage is low when it manufacturing Process. 2.1.1 Structure of Cotton fiber: The primary wall of cotton fiber is protected from moisture by the cuticle, which is composed of proteins, waxes, and pectins. Secondary Wall:-While the secondary wall's shape and thickness determine its performance qualities, Primary wall:- the primary wall safeguards the integrity of the fiber. Lumen:-Due to the presence of a lumen, a hollow channel-like structure, the fiber collapses after drying. 2.1.2 History Of Cotton: Cotton gets its name [from the Arabic word "quton."](#) Cotton was initially [produced in India, dating back to the fifth millennium B.C.](#) India invented the [first cotton gin, a machine that separates cotton fluff from plant seeds, in the thirteenth century.](#) Cotton gin production grew more faster and more efficient, allowing the fiber to grow [as a widely used textile.](#) Because to [the advent of new technologies such as the spinning jenny, spinning frame, and spinning mule, Britain became one of the top cotton producers](#) throughout the Industrial Revolution. [All of these spinning devices allowed companies to produce cotton more quickly.](#) But, an American called Eli Whitney created the automated cotton gin. 2.1.3 Properties of Cotton • [Length: 0.5" - 2.5"](#) • [Strength, tenacity \(gm per denier\): 3 - 5](#) • [Dimensional stability: medium](#) • [Heat preventive power: medium](#) • [Moisture regain: 8.5%](#) • [Stiffness: 57-60 g/d due to high crystallinity](#) • [Elasticity: 1.50- 1.58](#) • [Resiliency: low](#) • [Abrasion resistance: medium](#) • [Density \(gm/cc\): less than silk](#) • [Color: cream or yellowish like clean white.](#) • [Specific gravity: 1.52-1.55](#) 2.2 Reactive Dye: Reactive dye is water soluble & anion dye. It has directly affinity to the fiber. It make strong covalent bond react with fiber. It complete with three process Exhaustion, Fixation, Wash-off. Reactive dye mainly use in cellulose fiber. It good for cotton dyeing. 2.2.1. Reactive Dye Structure [The general structure of reactive dye is: D-B-G-X. Here, D = Dye part or chromogen \(color producing part\). Dyes may be direct, acid, disperse, premetallised dye etc. B = Bridging part. Bridging part may be -NH- group or -NR- group. G = Reactive group bearing part. X= reactive group.](#) 2.1.3. [Properties of Reactive Dye 1.Reactive](#) Dye is anion dye 1. It water soluble Dye. 2. This Dye used for coloration of the cellulose fiber. 3. It done by alkali condition. 4. This dye use for Brighter Shade. 5. Wash fastness is good. mordarate rubbing fastness 6. Perspiration fastness is very good for reactive dye 2.1.3 Mechanism of Reactive dye: There are 3 way to reactive dye: 1. Exhaustion 2. Fixation 3. Wash off 1. When cotton fiber immersed on dye bath, that time creates negative charge .In this process we as a electrolyte NaCl. That electrolyte neutralize the negative charge from the cotton fiber surface. Then the increase the dye absorption. 2. Fixation: is means [reaction of reactive group of the -OH, -NH2 group](#) creates strong covalent bond with fiber. Reactive dye happen with alkali condition & PH is 10-12.3.In this part we used caustic soda, soda ash on NaHCO3.This is control dye bath PH act as fixing agent. That happen in the fixation. 3. Wash off: This process is used for removing unfixed dye and chemicals from the fiber. By using soap wash off process is done. 2.3 Color fastness: Color fastness is a term which indicates the change of the characteristics of colour to transfer of others materials. That's the fabric are not fading or changing when it washing, cleaning. [The characteristic of dyes known as color fastness directly correlates with the bonding strength between the fiber and the photochromic dye. The processing methods used, the compounds selected, and the option of axillaries can all have an impact on color fastness.](#) Color is a key component of fashion and clothing aesthetics, and it has significant worth for both the consumer and the company. One of the most important factors in drawing consumers and encouraging them to purchase a product or clothing is color. One of the crucial quality criteria for colored fabrics is the preservation of the original color. If color fastness fails tests after being exposed to washing, light, rubbing, and other agents like perspiration, it is given a bad ratio. The ability of a substance to retain any of its color traits after cleaning with regular detergent is known as color fastness to wash. For Lab-dip in a dyeing facility, colorfastness to cleaning is crucial. One of the most significant and frequently used colorfastness tests is this one CHAPTER: 03 3.1 Material This study done by 100% single jersey knitted cotton fabric. The GSM is 180.The sample has been taken from dyeing production of Pakiza knit composite Ltd. Dye & chemical which given dyeing production section for there are buyer requirement .We take 10 gm fabric from dyeing production. 3.2 Table: Sample Specification Sample No Sample Type Sample GSM 1 100% knitted S/J cotton fabric 180 2 100% knitted S/J cotton fabric 180 3 100% knitted S/J cotton fabric 180 4 100% knitted S/J cotton fabric 180 5 100% knitted S/J cotton fabric 180 6 100% knitted S/J cotton fabric 180 3.3 Table: Different chemical used in this study Name of the chemical Function Detergent To remove the dirt, dust, oil from the fibre Sequestering agent To reduce water hardness Caustic soda To maintain alkaline condition during dyeing Hydrogen peroxide It is a bleaching agent which is used to white the cotton fibre by removing natural color from the textile material Anti-creasing agent To minimize the crease mark during dyeing Levelling agent It gives the level of dye during dyeing process. Evenly dyeing is carried out by using levelling agent. Enzyme To remove hairy fibre from the fiber Salt To improve the exhaustion rate of the cotton fiber by neutralizing negative charge which creates on cotton fibre surface during dyeing Soda ash To maintain alkaline condition during dyeing Peroxide stabilizer To stabilize peroxide during peroxide during the bleaching. 3.4 Dyes Name: Light Shade Dyes: 1. Remazol Brilliant Yellow 3GR 2. Remazol Yellow RR 3. Remazol Blue RR Medium Shade Dyes: 1.Synozol Yellow K-3RC 2.Synozol Red K-BC 3.Synozol Blue-BR Dark Shade Dyes: 1.Suncron Yellow Brown T-FW 2.Suncron Rubine T-FW 3.Suncron Black T-FW 3.5 Dyeing Process for Reactive dye with cotton (Light & Medium) Grey fabric collect from batch Water filling Scouring chemical & fabric load at 60°C for 20 min Caustic & soda dosing at 45°C Peroxide dosing for 5 min Temperature increases 98°C, run time 30 min Cooling at 60°C Draining & filling Normal hot wash Draining & filling Acid & peroxide killer dosing at 55°C, run time 10 min Checking pH Enzyme dosing at 55°C, run time 45 min Enzyme hot at 80°C for 5 min Drain filling Check pH Levelling agent dosing at 55°C for 5 min Soda dosing at 60°C for 25 min Color dosing Run time 20 min Steam up & temperature increases at 60°C Salt transfer at 55 °C Soda dosing at 60°C for 25 min Color steam at 60°C for 60 min Hot wash Draining & filling Cold wash Draining & filling Acid dosing at 50°C for 10 min Draining & filling Soaping at 90°C, run time 10 min Cooling at 75°C Washing at 50°C for 5 min Shade check Unloading 3.6 Dyeing Process for Reactive dye with cotton (Dark shade) Grey fabric collect from batch Water filling Scouring Chemical & fabric load at 60°C for 20 min Caustic & soda dosing at 45°C Peroxide dosing for 5 min Temperature increases 98°C, run time 30 min Cooling at 60°C Draining & filling Normal hot wash at 70°C Draining & filling Acid & peroxide killer dosing at 55°C, run time 10 min Checking the pH Enzyme dosing at 55°C, run time 45 min Enzyme hot at 80°C for 5 min Drain & filling Check pH Levelling agent dosing at 55°C for 5 min Salt transfer 10 min &

run time 20 min Color dosing Run time 20 min Steam up & temperature increases at 60°C Run time 5 min Soda dosing [at 60°C for 25 min](#) Soda dosing [at 60°C for 25 min](#) Color steam [at 60°C for 60 min](#) Hot wash Draining & filling Acid dosing at 50°C [for 10 min, run time 10 min](#) Draining & filling Soaping at 90°C, [run time 10 min](#) Soaping at [90°C, run time 10 min](#) Cooling at 75°C [Washing at 50°C for 5 min](#) Shade check Unloading [Washing at 50°C for 5 min](#) Shade check Unloading 3.7 Color Fastness to Gyro Wash This operation is done by following ISO standard. Then we cut the sample by a 10×4 cm ratio. Then we sew the fabric with multi fiber which we will test later. For per liter Distilled water contained in stainless steel pot we needed [4 g/l ECE](#) (European Colorfastness Establishment) [and 1 g/l Sodium Perborate](#). Then sink the sample fabric with the 25 steel balls into the pot. Then we pour 150 ml of solution and [raise the temperature at 50°C for 30 minutes](#). We shinker a total of 6 sample fabrics. [Then we took out the sample from Gyro Machine and washed them with cold water](#). By squeezing we took out extra water. Then we have to use a dryer machine so that the fabrics don't stick with each other. Then the balls are given to remove unfixed color from the fabric. Then with the help of gray scale we rated the Multi Fiber. 3.8 Color Fastness to Rubbing James Heal's Crock Master is an instrument that measures the [color fastness to both wet and dry rubbing](#). We worked in the warp direction when rubbing. called the fabric in the lower plate. With this, the fabric was covered; the cover's dimensions are 25 x 6 cm. Amount of A 14 x 5 cm rubbing fabric is used for the rubbing action. Bleaching and scouring must be done by the rubbing fabric. The wet rubbing in the ISO method needs to be moistened between 95 and 100 percent. With the aid of a finger, this fabric must be attached using a needle hook. The finger hook needs to be used to secure the rubbing cloth. We then received the results for the Dry and Wet Fabric values. The range we obtained from the color. The hue spectrum we were given turned into a grayscale. 3.9 [Color Fastness to Perspiration](#) ISO [Method is](#) followed to determine [the](#) perspiration test [of the](#) fabric. At first we cut the fabric by 10×4 cm. Then we sew the fabric with multi fiber. The Perspiration Test was done in Alkaline and Acidic condition. Here the pH condition was 4.5-5.5 and used 100 ml solution for each sample. Sinking each sample in 100 ml solution in a perspirometer with [pressure of 12.5 kPa](#). Raised the temperature [to 37°C for 4 hours](#). Then by Gray Scale and Color Staining we related in between 1 to 5. 3.10 Spectro-photometer At first we collected colored fabric from the dyeing section. Then we collected the fabric or swatch of that fabric. There we also collected Light, Medium, Dark shade total of fabric or Swatch from the Dyeing Production. Total 3 colors of fabric we collected. These are- 1. Lime (Light Shade) 2. Orange (Medium Shade) 3. Black (Dark Shade) Color comparison of these are done by CMC. After treatment of Swatch the Swatch that we collected we selected it as Standard then compared it after dyeing the fabric by Spectrophotometer. 3.11 Sample Attachment : 1. Light Shade (Lime) 2. Medium Shade (Orange) 3. Dark Shade (Black) Light Shade before (Original) Light Shade after Medium Shade Before Medium Shade after (Original) Dark Shade before (Original) Dark Shade after (Original) 3.12 Sample Attachment Of the color fastness of wash Light Shade: (Before) Light Shade: (After) Medium Shade: (After) Dark Shade: (After) Dark Shade: (Before) Dark Shade: (After) 3.12 Rubbing to Color fastness test: Light Shade (Lime): (Before) Light Shade (Lime): (After) Medium Shade (Orange): (Before) Medium Shade (Orange): (After) Dark Shade Black): (Before) Dark Shade(Black): (After) 3.13 Color Fastness to Perspiration test: (Acid & Alkali) Light Shade (Before) Light shade (After) Medium shade(Before) Medium shade(After) Dark shade (Before) Dark shade (After) 3.14 Color Comparison by Spectrophotometer After (Standard) then we compare with Before Treatment Sample Light Shade Medium shade Dark shade CHAPTER:04 Result & Discussion 4.1 Rating of color staining test to washing Before: The changes fibers Acetate Bleached Cotton Polyamide Acrylic Wool Light Shade 4-5 4-5 4-5 4-5 4-5 Medium Shade 4-5 3-4 4-5 4-5 4-5 Dark Shade 4-5 4-5 4-5 4-5 4-5 After: The changes fibers Acetate Bleached Cotton Polyamide Acrylic Wool Light Shade 4-5 4-5 4-5 4-5 4-5 Medium Shade 4-5 4 4-5 4-5 4-5 Dark Shade 4-5 4-5 4-5 4-5 4-5 In this table we see that (Dyeing) & After Treatment color fastness to wash rating are same for light, medium ,dark shade. Wash fastness is good from this dyeing production sample. 4.2 Rating of color staining test to rubbing: Before: Rubbing test [Dry Wet Light Shade 4-5 4](#) Medium [Shade 4-5](#) 2-3 Dark [Shade 4-5](#) 2 After: Rubbing test [Dry Wet Light Shade 4-5 4](#) Medium [Shade 4-5](#) 3 Dark [Shade 4-5](#) 2 In this table (dyeing) & After treatment that rubbing fastness for light,medium,dark shade rating are same for dry & wet rub process.That`s Rubbing test result are same for all Shade. 4.3 Rating of color staining test to perspiration Before (Alkaline & Acid): The change s in Fibers Solution Acetate Bleached Cotton Polyamide Polyester Acrylic Wool Light Shade Acid 4-5 4 4-5 3-4 4-5 4-5 Alkali 4-5 4 4-5 4-5 4-5 4-5 Medium Shade Acid 4 4 4-5 4-5 3-4 4-5 Alkali 4-5 4 4-5 4-5 4-5 4-5 Dark Shade Acid 4-5 4 4-5 4-5 4-5 4-5 Alkali 4-5 4 4-5 4-5 4-5 4-5 After: (Alkaline & acid) The changes in Fibers Solution Acetate Bleached [Cotton Polyamide Polyester Acrylic Wool](#) Light Shade Acid [4-5 4](#) 4-5 [4-5 4-5 4-5](#) Alkali [4-5 4](#) 4-5 [4-5 4-5 4-5](#) Medium Shade Acid 4-5 4 3-4 4-5 4-5 4-5 Alkali 4-5 4 4-5 4-5 4-5 4-5 Dark Shade Acid 4-5 3-4 4-5 4-5 4-5 4-5 Alkali 4-5 3-4 4-5 4-5 4-5 4-5 In this table, dyeing & After treatment for light, medium, dark shade acid & alkali result are same for all shade. 4.4 Spectrophotometer Result: Light Shade Medium shade Dark shade By selecting After treatment as standard if the value of Color Deference (DE), Day and Light is positive '+' and it should be Darker if the value of Color Deference (DE), Day and Light is negative '-'. If the value of Deviation Axis (Da) is '+' then there is more Shade Redish and if the value of Deviation Axis (Da) is '-' then there is less greenish. If the value of Deviation Axis (Da) is '+' and the value of Yellowish is '-' then the color should be Blueish. If the value of Delta Croma (DC) is '+' and the value of Brighter '-' then the color should be lighter. By Delta Hue (DH) we have got the color tune composition. When the value of DH is '+' that means color tone is better but when the value of DH is '-' that means color tone is worse. The value of the metamerism Index we got doesn't make any difference in shade tone. The value of MI is accepted up to ±1. The value of Color Difference (CMC DE) pass is 0- 0.75 against the light. If the value is 0.75-1 then warrant and it is more than 1 then it is considered a failure. CHAPTER: 05 CONCLUSION In this experiment we have find out the effect of after treatments on reactive dye with cotton fabric. We have collect dyed knitted cotton fabric sample from the bulk production of the dyeing. We have find out [the wash fastness properties of](#) the [dyed](#) knitted cotton sample. [The rating of](#) the color fastness to wash is same for each dyed knitted cotton fabric. The wash fastness properties is good for each sample which ranges from 4-5. The rating of the wet rubbing fastness is very poor which is not acceptable to the buyer. In dry rubbing fastness, fastness properties is good which ranges from 4-5. The perspiration fastness for each sample is good which ranges from 4-5. Furthermore we also find out the color comparison of dyed knitted fabric with standard sample. According to the measurement which carried out the spectrophotometer the result is good. Meta merism index is acceptable. 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