Faculty of Engineering
Department of Textile Engineering

Project (Thesis) on

EFFECT OF SCOURING BLEACHING ON THE PHYSICAL CHARACTERISTICS OF WOVEN FABRIC

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A thesis submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science in Textile Engineering
Advance in Wet Processing Technology

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Mr.Tanvir Ahmed Chowdhury ,** Assistant Professor, Department of Textile Engineering, Faculty of Engineering, Daffodil International University. We also declare that, neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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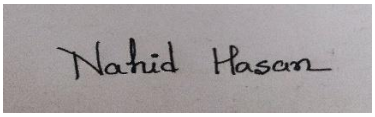
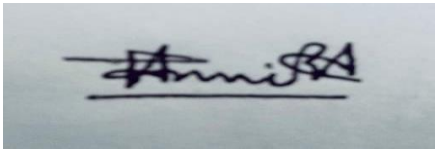


LETTER OF APPROVAL

This project report prepared by Md. Fazle Rabby (ID: 183-23-557), Nahid Hasan (ID: 183-23556) is approved in Partial Fulfillment of the Requirement for the Degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING. The said students have completed their project work under my supervision.

During the research period I found them sincere, hardworking and enthusiastic.



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Finally, we would like to express a sense of gratitude to our beloved parents and friends for their mental support, strength and assistance throughout writing the project report.

DEDICATION

This Thesis (Project) is dedicated to our beloved parents and honorable

Abstract

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Scouring and Bleaching is done commonly for the woven fabric for improving the surface of the fabric Removal of natural and added impurities using caustic soda and Hydrogen per-oxide from cotton woven fabric .The object of our project is to identify the effect of scouring and bleaching on the characteristics of woven fabric .To conduct this project work three fabrics which are 100% cotton plain woven fabric ,100% cotton satin and 100% cotton twill were taken. Moreover, some tests like GSM, Absorbency test, EPI, PPI, Tensile strength, Tear strength were done to identify the change in the characteristics of woven fabric. It has been observed that scouring and bleaching has significant impact on characteristics of woven fabric .

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CHAPTER 01

INTRODUCTION

1.Introduction:

Cotton yarn or fabric goes through many textile processing processes before being dyed or printed. Washing & bleaching is the main wet process applied to textile materials before dyeing or printing. Mainly cleaning and whitening. Natural colors and non-cellulose components are completely or partially removed by this process. During scouring, the dough acquires a high and uniform wettability and removes natural impurities from the dough. The bleaching process gives the fabric a shine and removes the natural color from the fabric. Once impurities are removed, cotton becomes absorbent. More specifically, washing and bleaching are performed to remove or destroy natural and incidental dyes, unwanted oils, fats, waxes, soluble impurities, and particulate or solid soils on the fabric. increase. We also do special needs dyeing, printing and finishing processes. The procedure basically consists of soap or detergent, treatment with hydrogen peroxide with the addition of alkali.

Scouring and bleaching of cellulose fibers is very easy. Natural impurities such as natural pigments, cotton wax, pectin substances and proteins are mainly associated with the cell wall inside the primary wall and the purification process aims to remove this wall. Bleach converts colored contaminants into colorless particles. Color is given by chromophores. H. Units usually composed of alternating carbon-carbon single and double bonds. Bleaching destroys these double bonds by addition (saturation) or cleavage. When an electron binds to a double bond through substitution or double bond scission, no electromagnetic radiation is absorbed, it is reflected in the visible part of the spectrum, and no color exists.

1.1 Objective of the study

Broad Objective :

The broad objective of this project was to know the impact of scouring -bleaching on the characteristics of woven fabric .

Specific Object :

To attain the board objective the following specific objective were achieve :

i. To learn the impact of scouring -bleaching on GSM of woven Fabric.
ii. To learn the impact of scouring -bleaching on Absorbency test of woven fabric .
iii. To learn the impact of scouring -bleaching on EPI and PPI of woven fabric.
iv. To learn the impact of scoring -bleaching on Tear and Tensile strength of woven fabric.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction of Cotton:

Cotton is a natural fiber that contains cellulose. One of the oldest fibers in the world, it is used for various purposes and is familiar to people. In cellulose, non-cellulosic materials such as sugars, starches, proteins, and some inorganics are present in cotton fibers .Although not important, lignin is also found in cotton fibers, which is a complex organic compound. A security sale that stays in the fabric works.

2.1.1 Chemistry of Cotton

Cotton is an insoluble substance. Soluble in certain solvents. The cellulose content of cotton fibers is higher than other fibers. A type of plant fiber. A predominantly cotton fiber composed of polysaccharides containing chains of glucose monomers. The cotton we get from nature is more crystalline and has a tighter molecular structure than other fibers. The major constituents of cotton cellulose chains are β-1,4-D. The free rotation of the anhydroglucopyranose C-O-C bond is stopped by steric action. Many bonds are also present because of the hydroxyl groups present and the conformation of the chain. Some weaves increase stiffness by increasing the stiffness of the cotton fiber structure.

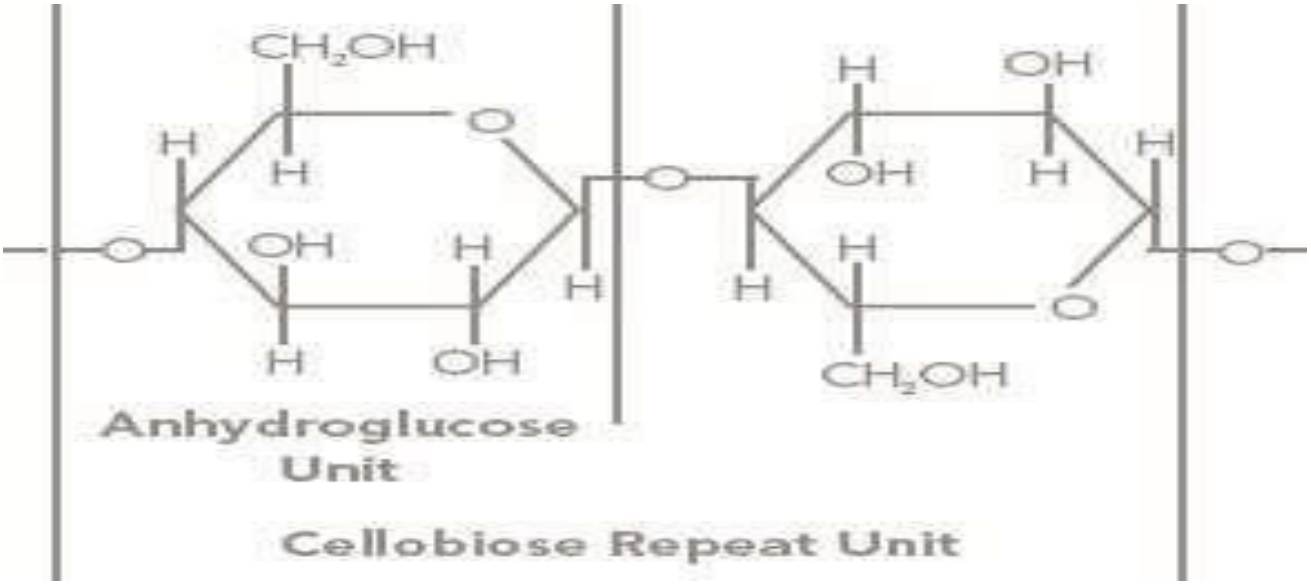


Figure 2.1 Structure of cotton cellulose.

2.1.2 Chemical Structure of Cotton

Cotton is a natural cellulose. Because it has common elements of plant cells. Proteins, oils and waxes, pectose and pectin, minerals and natural colors are components of natural fibers. Cotton

fibers also contain impurities. The percentage of impurities depends on the type of cotton and the maturity of the fiber. Immature cotton produces more impurities than mature cotton fibers. For dry cotton fibres, approximate formations are shown in Table 2.1. [3,8,10]

Table 2.1 Chemical components of cotton

Chemical	Formation (%)
Cellulose	88.0-97.0
Protein	1.0-2.0
Oil and wax	0.4-1.5
Pectin	0.4-1.5
Minerals	0.7-1.6
Others	0.5-8.0

a) Cellulose

In cotton, the maximum amount of cellulose component is obtained. Cellulose, of course, is made up of glucose molecules made using the stearic acid process, which has a molecular weight of about 2 million that of the cellulose found in cotton.

b) Protein

Cotton is a protein fiber. Proteins are usually made up of polypeptides and amino acids. They are mainly present in primary cell walls and tissue lumens. The difference between cell wall and lumen is 1-2%.

c) Oil and Wax

Oils and waxes are basically hydrophobic substances. It acts as a protective layer on the fiber surface.

They do not contain glycerides and high molecular weight fatty acids.

Wax is melted at different values. Approximate values are 68ºC-80ºC. After processing (scouring), the wax is removed from the fibers. Waste wax used in alkaline solution treatment for soap manufacturing.

d) Pectin

Cotton fibers contain approximately 0.4-1.5% pectin. These are mainly composed of calcium, magnesium and iron pectate, as well as free pectin acid and methyl pectate. Its calcium and magnesium salts are not water

soluble, as are the free acids, but are converted to soluble products in alkaline hydroxides or soda ash. can be removed.

e) Minerals

Cotton fibers contain about 0.7-1.6% minerals. These minerals are removed as ash after burning the cotton. Minerals are added to the skin of cotton fiber. Minerals include chlorides, carbonates, and sulfates of potassium, calcium, and magnesium. Mineral content is removed or reduced from cotton fibers by boiling.

2.2 Wovnen

A woven fabric is a fabric made by weaving. Textiles are often made on a loom and consist of many threads woven together in warp and weft. Technically, a woven fabric is a fabric made by interlacing two or more threads at right angles to each other.

Textiles have been around for thousands of years, handcrafting baskets, clothing and blankets with or without the help of looms. Fortunately, thanks to modern technology, most textiles no longer need to be made by hand. But the overall process for creating them is the same. Today, woven fabric is made on power looms. The process begins by placing two groups of threads perpendicular to each other. Warp threads are called warp threads, and weft threads are called weft threads. The weft threads are woven between the warp threads to complete the fabric. Using a mechanical loom makes the weaving process more efficient. You can also create large pieces of dough at once. However, some fabrics are made with finer fibers, such as certain types of silk fabrics.As you can imagine, this makes handwoven fabrics more rare and expensive, and in some cases very popular. I have.

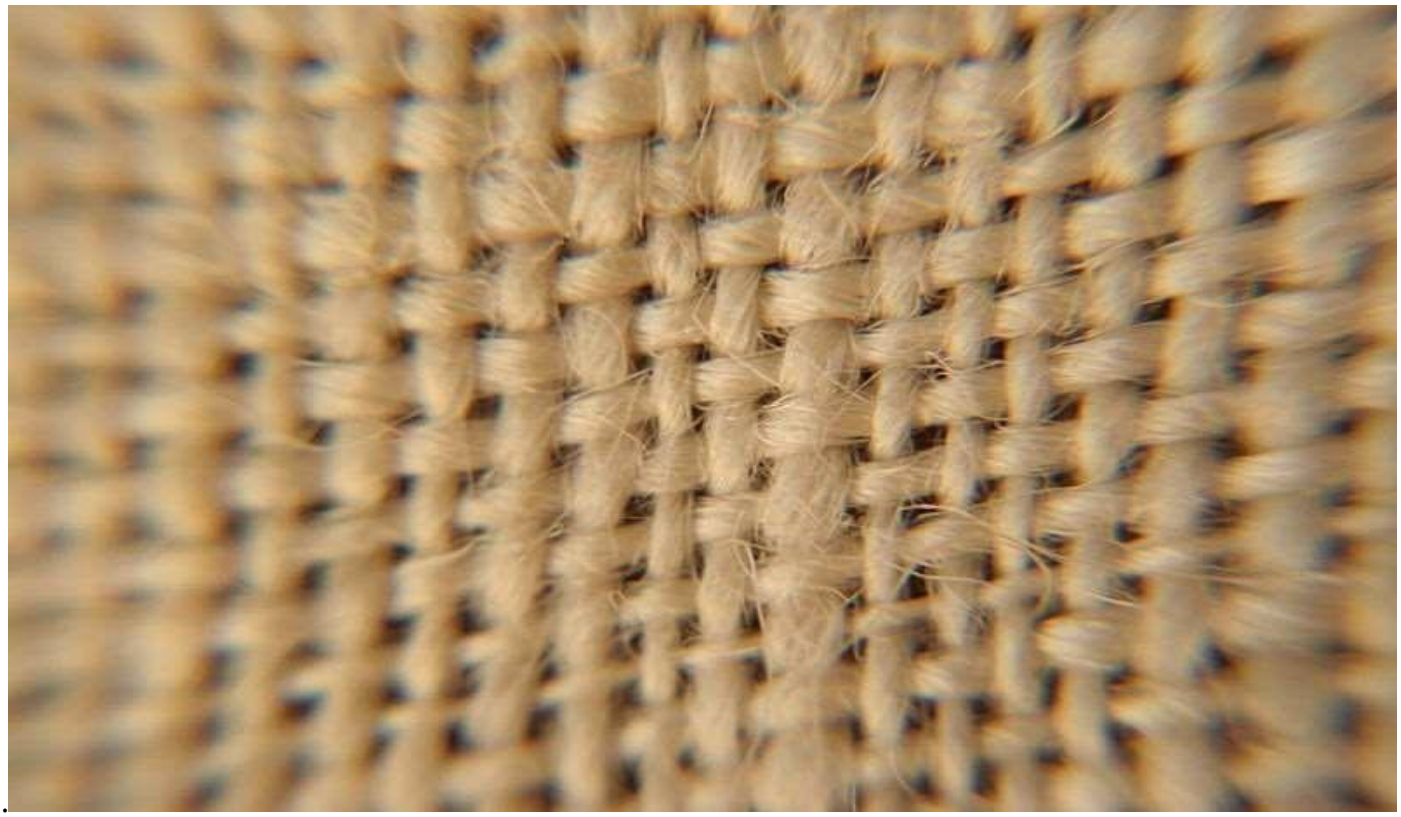


Figure: 2.2 Woven structure

Types of woven fabric:

1. Twill fabric
2. Satin fabric
3. Plain fabric
4. Dobby fabric

1.Twill fabric:

The twill weave is responsible for the diagonal pattern of the fabric. The diagonal pattern has different spots depending on the weave. Compared to plain weave, there are fewer bonding points, resulting in greater fabric thickness and mass per unit area. This weave is most commonly used for denim fabrics and in two finishes he is used for two different colored fabrics. Modifications of twill weave include gabardine, serge and drill.

2.Satin fabric:

Satin is a fabric, not a fiber. If there are non-crossing threads in the weft, the fabric is called satin. It is mainly used in apparel such as evening dresses, shirts, wedding dresses and ties, and is also used in upholstery and bedding.

3.Plain Fabric:

Plain fabrics, also known as calico, tabby or taffeta, are, as the name suggests, the simplest type of weave where the threads are woven together one at a time, meaning the threads are intertwined with each other. He is one of the strongest fabrics because the threads are always crossed. Its uses range from heavy, coarse fabrics like canvas to the lightest, finest fabrics like muslin.

4.Dobby fabric:

Dobby is an advanced design typically used to create texture with slightly raised designs on the fabric.Shaft binding is a combination of several different thread counts and weaving techniques. The warp and weft may or may not be the same color. Unlike plain weave, it is less likely to wrinkle. Kanoko fabric used for polo shirts is a typical example of dobby weaving..

2.3 Scouring

Scouring is the process of removing natural impurities and additional impurities from cotton cloth. Natural contaminants are oils, waxes, greases, etc. Additional contaminants are gear oil, grease, etc. Dirt and dust are also removed by the scrubbing process.

Flushing can be a continuous or discontinuous system. Removes dirt from the fabric and increases the absorbency of the fabric.

When it comes to in-line scouring, temperature, processing time, pH, liquor ratio, dough type, etc. must be considered. A complete scrub to help with your next process. On the other hand, unwashed fabric has a low affinity for dyes, so it has an adverse effect on subsequent processes such as dyeing and printing.

2.3.1 Scouring of Cotton

At high temperatures, cotton cellulose materials react with alkalis, soda, caustic soda, anionic and/or nonionic detergents, wetting agents, complexing agents and sequestering agents (used to remove metal ions), and polyacrylates. or treated with solutions containing polyphosphonates (as a special surfactant-free dispersant in the scrubbing process). Cleaning is performed as part of a combination or single operation such as cleaning and bleaching.

Me. Saponification of fats and oils to water-soluble soap and water-miscible glycerol under alkaline conditions.

ii. Hydrolysis of proteins to water-soluble degradation products.

iii. Dissolution of amino compounds.

IV. Solubilization of pectose and pectin by conversion to soluble salts. v. Dissolution and extraction of minerals.

vi. Emulsification and solubilization of natural oils and waxes.

vii. Removes and disperses dirt particles and Kitty with the action of alkali and detergent.

After scouring, the material is highly absorbent and free of natural impurities and dyes.

This treatment can be performed on filaments, threads and fabrics.

2.4.Bleaching:

Bleaching is the process of decolorizing textile raw materials by removing intrinsic and/or acquired color components from the fibers. Gives the textile material a basic whiteness and can be further brightened or tinted with optical brighteners. Printed according to the intended end use.

2.4.1.Bleaching of cotton:

Currently, the main method of bleaching cotton fabrics is the use of sodium hypochlorite and hydrogen peroxide. Sodium hypochlorite is being gradually restricted as it can produce more toxic chlorinated organic by-products during bleaching which can cause environmental pollution.Residue bleached with hydrogen peroxide is non-toxic. However, the strong alkalinity of hydrogen damages cotton fabrics, and peroxides become liquid at room temperature, making them difficult to transport and store. However, there are no studies or detailed studies on cotton knit fabrics. Therefore, in this article, we discuss the use of sodium percarbonate as a deinking agent for bleaching cotton knitted fabrics, and discuss bleaching factors such as sodium percarbonate concentration, bleaching time, and the effects of bleaching effects of light radiation on fabrics. Focus on process conditions. fabric. Therefore, it has important implications for developing new bleaching processes and reducing environmental pollution.

2.5.Scouring & Bleaching Machine:

KUSTERS CALICO: It's a continuous process scouring & bleaching machine. **Origin:** India **Capacity:**8000 m/day.

Figure:2.3 KUSTERS CALICO MACHINE

2.6 .Estimation of Scouring effect:

2.6.1.Absorbency Test:

a. Immersion Test

The absorbency of a fabric increased when scouring is done. First we need to cut a sample by (1x1) cm2. Then we put the sample on the water surface and time taken by it to be immersed is noted. The standard time is 5s. If it is up to 10s then we can say that the sample is well scoured.
If it higher than 10s then the scouring has not taken place properly.

b. Column Test/ Wicking length

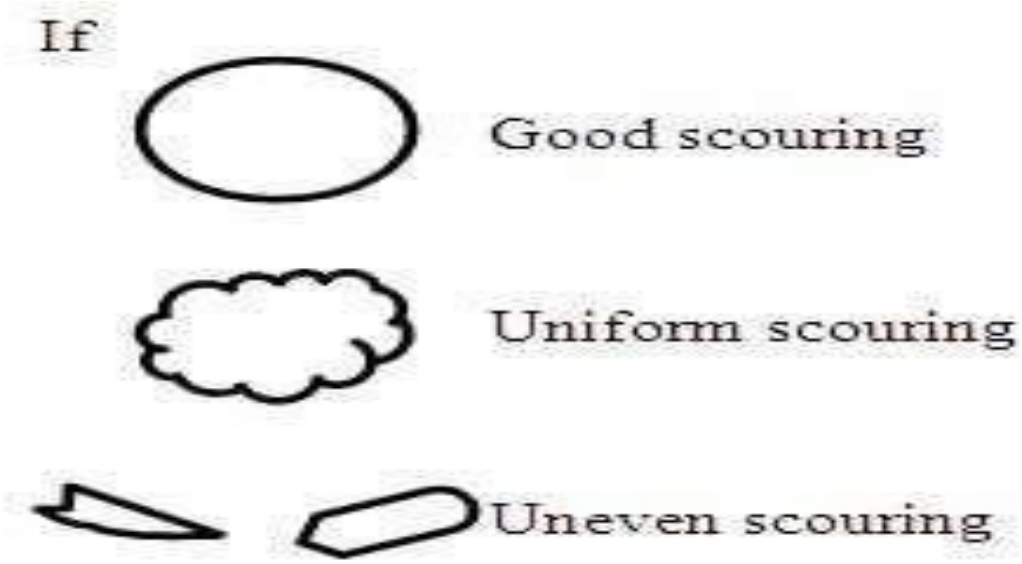
First, we need to cut a sample from scoured fabric which is 18cm x 5cm. In a beaker we have taken 0.1% direct dye red. Above from the bottom a marker is drawn about 1cm. From a wood stick the sample is hung. Then 1cm portion of fabric is immersed in the dye liquor for 5 min. Then about 1cm mark of distance traveled by the colored solution is noted. Where acceptable range is 3050mm.

c. Drop Test/ Spot Test

In this test, 0.1% direct dye red colored solution is used. Then the solution dropped on the sample by pipet and its absorbency estimated visually. The drop may have various shape when absorbed.

Two things can be measured:

1. The time is taken in s to absorb one drop of solution. Standard time is 0.5-0.8 s, up to 1s is allowed.
2. In a pipette a solution of 0.1% direct dye red is taken and droplet of solution put on the different place of the fabric. Then the shape of the absorption area on the fabric is observed.



From sample spot uniform scouring can be said.

2.7. Determination of Weight Loss Percentage

Obtain the weight loss of the unwashed and washed samples at the same moisture content and calculate the weight loss %. The weight of the washed sample will be less than the weight of the unwashed sample. A typical weight loss is 4-8%.

2.8.Estimation of Bleaching effects:

Two tests are performed for the assessment of bleaching effect.

1. Degree of whiteness
2. Permanency of whiteness

- **Degree of whiteness/Measurement of reflectance:**

When the fabric is bleached, it increases its ability to reflect incident light onto the fabric. Bleaching effect is measured in past reflectance. Reflection can hold elapsed time measured upwards

"Spectrophotometer" or "Reflectometer". Here reflection 100x is perfect white and 0x is perfect black.

Criteria for achieving remission are also considered for the trial. Reflectance 68-70 is "good", 70-72 is "very good", and 73 reflectance is "excellent" whiteness.

- **Permanency of whiteness:**

Measure the whiteness of bleached products. Therefore, if the value remains the same for 7 days, whiteness should be considered to remain the same upwards.

CHAPTER 3

EXPERIMENTAL DETAILS

3.1 Materials

For this research we took a cotton woven fabric samples. Specification of these samples is mentioned in Table 3.1

Table 3.1: Sample specification.

Sample No	Sample Name	Fabric GSM	EPI	PPI	Warp count	Weft count
1	100% Cotton Plain Woven fabric	256	84	55	12	12
2	100% Cotton Satin Woven fabric	260	84	55	14	14
3	100% Cotton Twill Woven fabric	265	84	55	13	13

For this research we have been following chemical used. About details of the chemicals used are mentioned in the Table 3.2.

Table 3.2: Types of chemicals used in the research.

Name of the Chemical	Purpose of Use
Sodium Hydroxide	To remove oil, waxes, protein, pectin
Wetting Agent	To increase absorbency
Sequestering Agent	To reduce water Hardness
Hydrogen Per Oxide	To Remove natural color
Stabilizer	For uniform Bleaching
Acetic Acid	To control pH

3.2 Methods of Scouring & Bleaching

3.2.1 Procedure of Scouring in Kusters Calico Machine

The first batcher comes in and feeds the dough through the machine. Then put the dough into her J-Box. J-Box is used to ensure a continuous process. After the J-Box, the fabric enters the washbox to remove the desizing and sizing agents. The temperature of the washing tub is always 90-95 degrees Celsius. Then pinch the dough and move it to the second wash box. The temperature and work targets for the second wash box are the same. After washing and wringing, the fabric is placed in a chemical bath in which caustic soda, wetting agents and sequestering agents are used. This process is called chemical dosing. After the chemical dosing, the dough is squeezed and moved to the steam room. The temperature in the steam chamber is 100 °C and the dough remains there for 20 minutes. During this stage, chemicals react with natural contaminants. The steamed dough goes into 3 washing boxes. Each box has a squeegee for squeezing the fabric, the temperature of the box is 90-95°C, and these three washing boxes wash away impurities on the surface of the fabric. Finally, after finishing the scouring process, the dough is prepared for the next process.

Table 3.3: Scouring Recipe.

Particular	Recipe
Caustic soda	25-30 g/l
Wetting agent	3-4 g/l
Sequestering agent	2-3 g/l
Temperature (ºC)	100ºC
Time (min)	20 min
pH	13-14

3.2.2.Procedure of Bleaching in KUSTERS CALICO machine:

After the washing process, the Kusters Calico machine begins the bleaching process. After being cleaned of scouring chemicals and natural impurities, the dough is pressed into a padder and transferred to a chemical batch. Hydrogen peroxide is mainly used in chemical batches as a bleaching agent to remove natural colors from fabrics.Other chemical caustic sodas, stabilizers, wetting agents and sequestering agents are also used in chemical baths, depending on requirements. will be used.

After infusing the chemical solution, the fabric is pushed into the foulard and moved to the steam he chamber. The temperature of the steam chamber is 100°C and the fabric remains for 18 minutes. There are 5 laundry bins for laundry, each laundry bin has a temperature of 9095°C, and 5 master padders are installed for every 5 laundry bins. Pad pressure is always 2 bar. It changes when the structure of the fabric changes. After washing and squeezing the dough, it moves to a washbox where acetic acid is used to maintain the pH of the dough.This process is called acid infusion. After acid administration, the tissue enters a squeezer to remove excess water from the tissue. The web then moves to a dryer that uses 24 drying cylinders. After drying the dough, transfer it to a cooling cylinder. Two cooling cylinders are used to cool the dough. Then put the fabric in the jbox and stack it. Finally, the bleaching process is also complete.

Table 3.4: Bleaching Recipe

Particular	Recipe
Hydrogen Per Oxide	9 g/l
Wetting agent	1 g/l
Sequestering agent	1 g/l
Caustic soda	5 g/l
Stabilizer	4.5 g/l

Process Curve

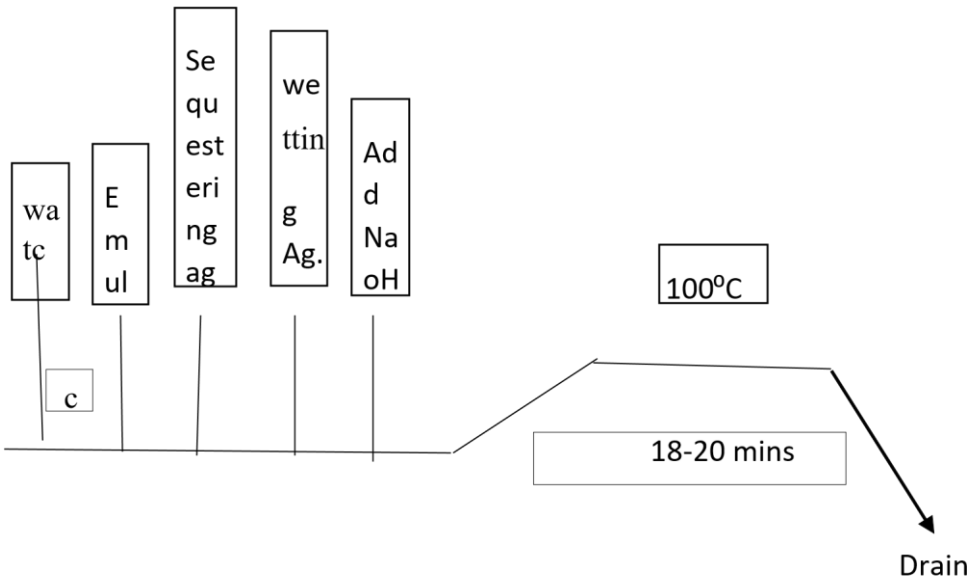


Figure: 3.1 Process curve for scouring & Bleaching

3.3 Method of Evaluation

3.3.1 Determination of fabric weight loss%

During scouring, the dough loses a large amount of oils, waxes and greases. For removing stains that cause weight reduction of textile products. The scouring effect can be evaluated by this fiber weight loss. This weight loss is calculated from the difference in weight between treated and untreated samples. It was then converted to a percentage. Unwashed and washed samples were weighed. After that, the weight loss is over.

3.3.2 Fabric strength measurement

Both warp and weft tensile strength decreased significantly. The greatest reduction occurred after bleaching treatment. Bleach attacks the outer layer of the fabric surface and slowly penetrates into the fabric structure. The protruding fibers break down and attack the yarn component of the fabric. The chemical bonds of the primary wall (outer layer) are broken by the decomposition of the hypochlorous acid bleach solution. A secondary wall is then attacked. A washing machine helps loosen and break down the primary cell walls of cotton fibers

3.3.3 GSM

GSM means grams per square meter. This is a very important parameter for textiles. After the scrubbing and bleaching process, the GSM of the fabric is reduced. To determine the GSM, samples were taken, cut with a GSM cutter, and measured with an electric scale.The GSM was then determined.

3.4 Absorbency test

- Immersion Test
- Drop Test
- Wicking Test

3.4.1 Immersion Test

For done this test, first we took (1×1) cm scoured (scouring) sample and put the sample gently on the surface of the water. Then we recorded the time in seconds by the stopwatch for submerging sample into water.

3.4.2 Drop Test

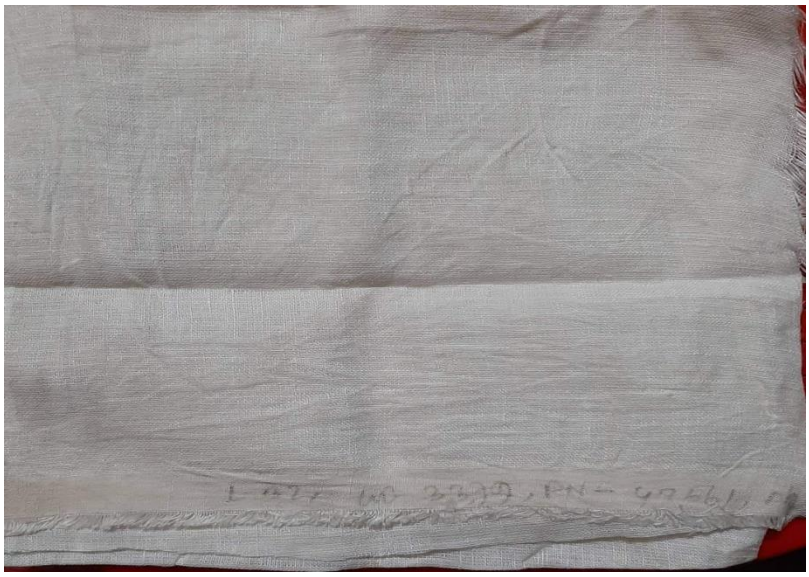
For this test, First we take scoured sample. Then we prepared 0.1% direct dye red solution. After that we fall a drop on the fabric. At that time, we record the time, whenever the drop totally absorbed.

3.4.3 Wicking Test

For this test we took a scoured sample which was (18×5) cm to immerse into a beaker of 0.1% direct dye red solution in which 1 inch bottom portion is immersed for 5 minutes. After 5 minutes we measured the dipped length. Between 30-50 mm is a standard dipped length.

3.5. SAMPLE ATTACHMENT :

Before Scouring & Bleaching :



After Scouring & Bleaching :

CHAPTER 4

DISCUSSION OF RESULTS

4.1 Change in GSM of fabric due to scouring & bleaching process:

Change found during measurement GSM show in table:

Table:4.1

Sample No	Sample Name	GSM Before Scouring & Bleaching	GSM After Scouring & Bleaching	GSM Loss%
01	Plain	256	236	7.8%
02	Satin	260	241	7.3%
03	Twill	265	243	8.3%

The change in GSM of fabric after scouring process that I found.

The GSM of the fabric decreases after scouring & bleaching process. The GSM decrease about 7.8% for plain 7.3% for Satin & 8.3% for Twill fabric after scouring and bleaching process. Weight loss of the fabric during scouring & decomposition of protruding fiber during bleaching is mainly responsible for decreasing fabric GSM.

4.2 Change in Immersion time due to scouring & bleaching process

Table:4. 2

Sample No	Sample Name	Standard Time	Result Time
01	Plain	5 Sec	4.5 Sec

02	Satin	5 Sec	4.3 Sec
03	Twill	5 Sec	4.2 Sec

Three Cotton woven Sample of 1cm × 1cm is cut and it is left on water surface. With the help of stop watch, the time of the sample for immersing is recorded. The standard immersion time is 5 second. Our tested result for 3 samples time is 4.2 Sec for Plain ,4.3 Sec for Satin ,4.5 second for twill fabric. So we say that absorbency is good and scouring is well.

4.3.Physical Change in fabric due to Bleaching:

4.3.1.EPI & PPI:

Table:4.3

Sample No	Sample Name	EPI		PPI	
01	Plain	EPI Before Scouring & Bleaching	EPI After Scouring & Bleaching	PPI Before Scouring & Bleaching	PPI After Scouring & Bleaching
		84	85	55	55
02	Satin	84	88	55	58
03	Twill	84	86	55	57

The scouring of 5 g sample is slightly compressed after bleaching. As a result EPI & PPI also increase the number. For example, scouring bleaching a sample of 84 EPI & 55 PPI, it will be compressed to 85, 88, 86 for EPI and 55, 58, 57 for PPI.

4.3.2. Change Tear & Tensile strength:

Our Tensile Strength test result shown in table:

Table:4.4

Sample No	Sample Name	Tensile Strength Before Scouring & Bleaching		Tensile Strength After Scouring & Bleaching	
01	Plain	Warp	Weft	Warp	Weft
		31	15	30	14
02	Satin	33	16	31.45	14.65
03	Twill	35	17	33.5	15.44

Our Tensile strength test result shown in table:

Table:4.5

Sample No	Sample Name	Tensile Strength Before Scouring & Bleaching		Tensile Strength After Scouring & Bleaching	
01	Plain	Warp	Weft	Warp	Weft
		805	321	793	304

02	Satin	813	333	800	310
03	Twill	819	345	810	334

Both longitudinal and longitudinal tensile strength decreased significantly. The greatest reduction occurred after bleaching treatment. Bleach Her powder attacks the outer layer of the fabric surface, breaking down the dyes and slowly penetrating the fabric structure. The protruding fibers are decomposed and the thread component of the fabric is attacked. The chemical bonds of the primary wall (outer layer) are broken by the decomposition of the hypochlorous acid bleach solution. A secondary wall is then attacked. The frictional action (mechanical force) of the rotating cylinder of the washing machine helps loosen and break down the primary cell walls of cotton fibers.

A universal strength tester machine is used for tensile strength testing, and an [Elmateel] tear strength tester is used for tear strength testing.

CHAPTER 5

CONCLUSION

Conclusion :

This project investigated the scouring and bleaching effects of 100% cotton fabrics. First, three unwashed and unbleached cotton fabric samples are taken out of the batcher. Then we test absorption test, tensile strength and tear strength. Also determine the GSM, EPI, and PPI of the sample. The GSM of the fabric will decrease after the process of scrubbing and bleaching. GSM reduction is about 6-7 washes and bleaching processes. Fabric weight loss during washing and degradation of protruding fibers during bleaching are the main causes of fabric GSM loss. Cut three 1 cm x 1 cm samples and place them on the water surface to test the immersion test. Use a stopwatch to record the time it takes to soak the sample.

The default time is 5 seconds for 3 samples. The test result times for the three samples are 4.2, 4.1 and 4.5 seconds. Therefore, it is said that the absorption is good and the scrub is good. Both longitudinal and longitudinal tensile strength decreased significantly. The chemical bonds of the primary wall (outer layer) are broken by the decomposition of the hypochlorous acid bleach solution. A secondary wall is then attacked. The frictional action (mechanical force) of the rotating cylinder of the washing machine helps loosen and break down the primary cell walls of cotton fibers. A 5g scrub sample is slightly compressed after bleaching. As a result, EPI and PPI also increase in number. I finally reached the following result -

The scrubbing and bleaching process transforms the GSM fabric.

The scouring process changes the absorbency of the fabric

• The bleaching process changes the tear strength and tensile strength of the fabric.

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FacultyofEngineering DepartmentofTextileEngineering Project(Thesis)on EFFECTOFSCOURINGBLEACHINGONTHE PHYSICALCHARACTERISTICSOFWOVEN FABRIC Coursecode:TE4214 Coursetitle:Project(Thesis) Submitedby: Md.FazleRabby ID:183-23-557 NahidHasan ID:183-23-556 Supervisedby: Mr.TanvirAhmedChowdhury AssistantProfessor DepartmentofTextileEngineering FacultyofEngineering DafodilInternationalUniversity Athesissubmitedinpartialfulfilmentoftherequirementsforthedegreeof BachelorofScienceinTextileEngineering AdvanceinWetProcessingTechnology Summer,2022 DECLARATION Weherebydeclarethat,thisprojecthasbeendonebyusunderthesupervisionof Mr.TanvirAhmedChowdhury,AssistantProfessor,DepartmentofTextileEngineering, FacultyofEngineering,DafodilInternationalUniversity.Wealsodeclarethat,neither thisprojectnoranypartofthisprojecthasbeensubmitedelsewhereforawardofany degreeordiploma. Md.FazleRabby ID:183-23-557 DepartmentofTE DafodilInternationalUniversity NahidHasan ID:183-23-556 DepartmentofTE DafodilInternationalUniversity i LETTEROFAPPROVAL ThisprojectreportpreparedbyMd.FazleRabby(ID:183-23-557),NahidHasan(ID:183- 23556)is approved in PartialFulfilmentofthe Requirementforthe Degree of BACHELOROFSCIENCEINTEXTILEENGINEERING.Thesaidstudentshavecompleted theirprojectworkundermysupervision. Duringtheresearchperiodifoundthem sincere,hardworkingandenthusiastic. Mr.TanvirAhmedChowdhury ASSISTANTPROFESSOR DEPARTMENTOFTEXTILEENGINEERING FACULTYOFENGINEERING DAFFODILINTERNATIONALUNIVERSITY i ACKNOWLEDGEMENT Firstly,weexpressourgratefulnesstoalmightyAlahforhisdivineblessingmakesuspossible tocompletethisprojectsuccessfuly. WearegratefultooursupervisorMr.TanvirAhmedChowdhuryAssistantProfessor, Department of Textile Engineering,Faculty of Engineering,DafodilInternational University .Deepknowledgeandkeeninterestsofoursupervisorinthefieldoftextile dyeingandfinishinginfluencedustocaryoutheprojectwork.Hisendlesspatience, scholarly guidance,continualencouragement,energetic supervision,constructive criticism,valuableadvice,readingmanyinferiordraftandcorectingtheseatalstages havemadeitpossibletocompletethisproject. Wewouldliketoexpressourthankstoass.Prof.Mr.Md.MominurRahman,Head[In-charge],DepartmentofTextileEngineering,FacultyofEngineering,Dafodilinternational Universityforhiskindhelptofinishourprojectreport. WewouldliketodeliverthankstoourentirecoursematesinDafodilInternationalUniversity, whotookpartinthediscussionwhilecompletingthecoursework. Finaly,wewouldliketoexpressasenseofgratitudetoourbelovedparentsandfriendsfor theirmentalsupport,strengthandassistancethroughoutwritingtheprojectreport. i DEDICATION ThisThesis(Project)is dedicatedtoourbeloved parentsandhonorable iv Abstract . ScouringandBleachingisdonecommonlyforthewovenfabricforimprovingthesurfaceof thefabricRemovalofnaturalandaddedimpuritiesusingcausticsodaandHydrogenper- oxidefrom cotonwovenfabric.Theobjectofourprojectistoidentifytheefectofscouring andbleachingonthecharacteristicsofwovenfabric.Toconductthisprojectworkthree fabricswhichare100% cotonplainwovenfabric,100% cotonsatinand100% cotontwil weretaken.Moreover,sometestslikeGSM,Absorbencytest,EPI,PPI,Tensilestrength,Tear strengthweredonetoidentifythechangeinthecharacteristicsofwovenfabric.Ithasbeen observedthatscouringandbleachinghassignificantimpactoncharacteristicsofwoven fabric. v TABLEOFCONTENTS Contents PageNo. Declaration . LeterofApproval . Acknowlegwment . Dedication..... . Abstract..... . ListofContents..... . ListofFigures..... . ListofTables..... . i i i iv v vi-vi ix x 2.2.2Woven..... 6-8 vi 2.3 Scouring Chapter-01:Introduction(1-2) 1.0Introduction..... 1 1.1Objectivesofthestudy..... 2 Chapter-2:LiteratureReview(3-15) 2.1Introductionofcoton..... 3 2.1.1Chemistryofcoton..... 3 2.1.2Chemicalcompositionofcoton..... 4 -6 ..... 8 2.3.1Scouringofcoton..... 9 2.4Bleaching ..... 10 2.41BleachingofCoton ..... . 10 2.5Scouring&BleachingMachine..... 11-12 2.6Estimationofscouringefect . 13 2.2.2Woven..... 6-8 2.3Scouring..... 8 2.3.1Scouringofcoton..... 9 vi 2.4Bleaching ..... 10 2.41BleachingofCoton ..... . 10 2.5Scouring&BleachingMachine..... 11-12 2.6Estimationofscouringefect . 13 2.7Determinationofweightloss%. 2.8EstimationofBleachingefect .14 .14-15 Chapter-3:ExperimentalDetails (16-22) 3.1Materials..... 16 3.2MethodsofscouringBleaching..... 17 3.2.1ProcedureofscouringinKusterCalicoMachine ..... 17 3.2.2ProcedureofBleachinginKusterCalicoMachine..... 18 3.3Methodofevaluation..... 19 3.3.1 Determinationoffabricweightloss%..... 19 3.3.2FabricStrengthMeasurement..... 20 3.3.3TestofGSM ..... 20 3.4Absorbencytest..... 20 20 3.4.1Immersiontest..... 3.4.2Droptest..... 20 3.4.3Wickingtest.....21 3.5SampleAtachment .21-22 vi Chapter-4:DiscussionofResults(34-45) 4.1ChangeinGSM offabricduetoscouring&bleachingprocess . 23 4.2Changein Immersiontimeduetoscouringbleaching process . 24