



Review Article

Effect of Process (Desizing, Scouring and Bleaching) Chemicals on the Properties of the Fabrics used (Cotton and Viscose) during Pre-Treatment

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Abstract

Many times it has been found that due to inaccurate shade matching and many correction required in textile wet processing industry affecting the quality and efficiency. Most of the time it has been observed that most of the textile industry are trying to achieve perfect shade matching at right first time dyeing. The key role is of pre-treatment process in shade matching and due to correct procedure and optimized selection of the chemicals this can be achieved in first attempt only. When the fabric is given proper pre-treatment process with improved favourable properties then there are very less chances of having difference in shade matching, so if we emphasize on proper selection of the chemicals and process parameters, we can focus on the quality of the product along with good efficiency. In this research work grey cotton and viscose fabric was given pre-treatment process to know the effect of chemicals on various properties of the cotton. The behavioural changes observed in cotton and viscose was different for some properties. This showed that by selection of the chemical and process parameters there was improvement in some properties of cotton whereas there was deterioration of other properties for the same fibres whereas it also showed that viscose showed enhancement in some properties which we were not knowing and this make this research work to be carried out with more energy and efforts were put into it. This Study helps to make it firm to know the reason for the changes observed in the properties with difference in selection of the chemicals and other processing parameters. By optimization of the chemicals along with process parameters it has been found that the properties of the fabric improved in performance and also showed removal of impurities much easier during the process of desizing, scouring and bleaching. There is a reduction in the width of the fabric observed after the bleaching process for both the fabric, but however it showed the increase in the absorbency of the fabric due to removal of the impurities along with the removal of some cellulosic content which might have contributed towards the deterioration of some physical properties. This study specifies that with optimum selection of the chemicals and process parameters we can improve the quality of the fabric along with the efficiency of the process.

Keywords: Absorbency; Bleaching; optical brightening; Tensile strength; Whiteness Index

Introduction

There are many chemicals and process to improve the whiteness of the fabric, but when the process of bleaching is carried out it shows loss of colouring matter with improved whiteness. This process helps to remove the natural colouring matter from the cellulosic content. We all know that cotton is a natural fibre and the source of cotton is nature and viscose is regenerated fibres having the source from wood pulp which is also having cellulosic content with difference in the variation in alignment in structure. Intermolecular arrangement in both cotton and viscose fabric makes a difference in physical and chemical properties and some favourable properties were found towards cotton side and some towards viscose side. This dissimilarity in cotton and viscose were studied on the platform of many trials and experimental work and finally it was found that both cotton and viscose fabric which are natural and regenerated fibres behaves in different manner but show many properties which are trying to prove them far better from one another. It is our comfort point that looking to the favourable property we can choose which type of fibre to choose for better future performance. In this work many trials were performed and based on the results the parameters were set which finalised the usage of chemicals and along with that all other process parameters make a perfect enhancement in the quality and efficiency of the product. The methods which specified by this study are related to the selection of the chemicals, process parameters and running speed for giving the optimised contact time of the fabric with the solution used in pre-treatment. The study doesn't showed any drawback except the one which we can't neglect for considering the load of effluent plant. The chemicals used in this study are mostly commercialised and this showed less effect of human-being. The use of the chemicals and auxiliaries used in these trials are not creating adverse effect on the health of the human being because after washing and rinsing process these chemicals are completely drain out, however care is required to be taken while using this chemical in the industry as all the chemicals are strictly been used under the passing certificate provided by standardised institutes and firms which are doing this certification. It is advisable at some places to go for bio-enzymes and other bio-washes so as to completely eradicate the possibilities of any harm to human being or reducing too much effluent load on plant. Industries are providing special training about how to use the chemicals and auxiliaries for better performance and zero accidents at the plant. The aim of this study was to make it aware to the industry that viscose is also a very important fibre which can give some favourable properties equivalent to cotton. It has been observed that many times viscose fabric showed higher absorbency than cotton similarly there were some other properties like tearing and tensile strength which showed fluctuation before and after treatment of the fabric with chemicals and processes. In this work it is explained very clearly step by step about the selection of the chemicals with all required running conditions specifying the changes observed which are favourable towards the properties of the fabric.

Literature Review

In this research paper author had discussed about the effect of chemicals in Pre-treatment of cotton fabric prior to dyeing which

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involves a combined process of scouring and beaching , the study deals with the Pre-treatment process that is having great impact on fabric in relation removal; of impurities and enhancing the whiteness index of the fabric with more accuracy in shade matching of fabrics and also the impact of the chemicals on the environment. There are two process of pre-treatment which is alkaline and enzymatic process used for scouring and bleaching process, between this two processes comparison is done to know the effects on whiteness of fabric and other properties. It is observed that hydrogen peroxide and sodium hydroxide give good result on fabric whiteness with low environmental impact it also produced low BOD, COD and TOC impact on ecological factor [1].

Bleaching is a very important process in pre-treatment because it helps to whiten the fabric by removing all other impurities and undesired inherent colouring components. Natural fibers and blends consisting of 50% of textile substrate are bleached, while regenerated and polyester are treated with other specific chemicals. Depending on the fabric, chemicals and application methods are varied to give optimum bleaching effect, however care is required to be taken to remove excess and leftover bleaching agents from the textile goods before further processing to effluent treatment plant. The author attempted to review the effect of various bleaching chemicals and the methods of removal and cleaning of this impurities after usage during the pre - treatment process [2].

Hydrogen Peroxide is been used for combined scouring and bleaching process at lower temperature in presence of bleaching activators like potassium persulphate and eco-friendly commercialised stabiliser. The author in this study the author had shown very clearly that the assessment of various quality parameters like tensile strength and whiteness index does not showed any adverse effect of new process as compared to conventional process which is carried out at high temperature. The amount of hydrogen peroxide has a great effect on the whiteness of cotton and due to less consumption of steam and saving in time; this method was found to be very efficient in successfully saving the revenue and energy [3].

Loss of natural colour may be due removal of dirt, dust, insects, from harvesting or from processing equipment in the form of oils

and greases. Bleaching is destroying natural and yellowish- colour from the fabric with minimum loss to the textile material. Minimum degradation of fibres with improved whiteness are the point highlighted by the author in this paper. The optimum selection of this bleaching agent decided the correct action of whiteness occurring on the fabric and this influences the author to select the range of chemicals to justify the process of bleaching. The bleaching agents either oxidize or reduce the colouring matter which was washed out and thus whiteness obtained was of permanent nature. To improve the whiteness index of the fabric it is further aided by addition of optical brighteners [4].

Material and Methods

The material selected for this work is 100 % Cotton and viscose fabric with plain weave. In Singeing and Desizing processes fabric speed is 120 mtr/min. Chemical and physical testing have been done on Bleached Fabric (Tables 1 and 2).

Raw material

1. Particulars of Machine :-Singeing+Desizing Process

Make: - Osthoff Senge.

Model: - Germany

Year: -2015.

Speed – 120 mtr/min

Temperature – 70Degree.

2. Particulars of Machine :-Bleaching Process

Make - Benninger

Model – Switzerland

Year-2015

Speed – 90 meter/min.

Temp – 80 to 90.

3. Particulars of Machine:- Merceriser.

Make - Benninger

Table 1: Details of Cotton fabric.

Fabric Supplier	Company A Textile Limited*
Customer	XYZ Fashion Export*.
Material	100% Cotton
Weave	Plain
Grey Fabric Construction	40X40/120*72
Grey Fabric Width.	160.
After Finish Construction	40X40/132*72

Table 2: Details of Viscose Fabric.

Fabric Supplier	Company B Textile Limited*
Customer	PQR Fashion Export*.
Material	100% Viscose
Weave	Plain
Grey Fabric Construction	60X60/120*72
Grey Fabric Width.	193.
After Finish construction	60X60/142*70

* All measures are taken to ensure that confidential information regarding fabric supplier and chemical supplier is well protected as per the instruction received from the company.

Model – Switzerland
 Year-2016
 Speed – 70 meter/min.
 Exhaust Fan-3.
 Dwell Time-30 seconds.
 Caustic Concentration-24-30.
 Total fabric in Machine-250 mtr
 Temp – 80 to 90° Celsius.

4. Other Particulars.

Burner (In-Use) - 04.
 Flame Intensity – 10 to 12 mbar
 Speed 150 mt/min
 Flame intensity – 20mbar
 Gas used LPG
 Type of Singeing Single & Double side
 Distance bet burner & fabric 58mm

Desizing box Temp 70°C
 Desizing box capacity 700lit
 COC (cold oxidative cracking) Temp – cold (Room temp)

The experiment is based on the studies carried out in chemical wet processing industry and all the reading are standardised as per generated by the standard instrument and standard procedure. There are not much more reading so as to use statistical values for each properties and each fabric [5] taken the average reading to make a judgemental statement for the behavioural changes observed in the fabric after applying testing parameters. This test was carried out in standard textile lab and as per standard prescribed by atcc methods.

Standard testing parameters for time and instruments have been selected as mentioned in Tables 3 and 4.

Results

Tegewa Solution Testing has been done to determine the traces of size paste present in the fabric. This Tegewa Testing is very important method for the rapid determination of textile fabric absorption. It is tested to know the comfort of today’s clothing, especially in sportswear. This method helps to know the liquid

Table 3: Chemical used in Singeing + Desizing Process.

S.no	Process	Chemicals	Function	Cotton ml/kg.	viscose ml/kg
1	Singeing and Desizing.	Forylsc AC	Enzyme	03	03
		Cottochlorin PRC	Wetting agent	03	03
		Proenhance	Sequestering Agent	02	02
2	Bleaching	NaoH	Scouring Agent (100%LYE)	18	35
		H ₂ O ₂	Bleaching agent	20	20
		Stabilol UCIN	Stabilizer	03	Not required.
		Proenhance	Sequestering Agent	04	1.5
		Cottochlorin PRC	Wetting Agent	03	03
3	Mercerisation	NaOH (Liquid from)	Mercerising(10% Lye)	24	24

Table 4: Standard Testing Time & Instrument.

Testing	Time	Testing Instrument.	Make and Model.
Tegewa Rate	2 min	Tegewa Solution & Scale	Chemical testing Method.
Absorbency	2 min	Testex&Water Drops	Make- TF167 Model- Manufacturer- Testex
Tearing Strength	15 min	Paramount (Tearing Strength Tester)	Make-Paramount Model-i9 (6.4 KGS) Manufacturer: - Labthink Instruments Co., Ltd. China
Tensile Testing	20 min	Tensile Strength Tester	Make-TF002 Model- M-series. P- series Manufacturer-Testex.
Whiteness Index	45 min	Spectro Photo Meter	Make-Data Colour 800 Model-CS-801 Manufacture- Mettler Toledo
Fabric GSM	10 min	Paramount GSM Tester	Make- Paramount Model- GSM Cutter i2TM Manufacturer- Paramount Instrument pvt Ltd
Fabric Width	03 min	Scale &Tepa	Make-Digital thickness tester. Model-IK/DFTT/01 Manufacturer-Ikon Industries.
Fabric Length	25 min	Inspection Table / Measuring Table	Scale and Measuring tape.

moisture management properties. Presence of starch in fabric make the difficulties in further process so all the trace of the starch content is strictly removed and this enhances the performance of the next process.

We all are knowing the importance of cotton along with its properties and all its comfort zone, but this paper enlightened the other fabric viscose though it is regenerated fibres but still is holding some properties which are equivalent to cotton. After application of the chemicals and treatment in the process it is found that the viscose fabric is showing increase absorbent than cotton [6]. Tearing and tensile strength was found good for viscose fabric this can help us to make very clear after giving pre-treatment process there is loss in strength in case of cotton but for viscose fabric there is not so much falling of this values. So we can use viscose fabric instead of cotton which is required to have more strength value. Whiteness index showed increase in the viscose fabric [7] as compared to cotton, thus we can say that to get more brightness we can consider viscose fabric for more brighter value.

The other properties are not showing that much difference in fabric gsm, width and length of the fabric, cotton and viscose fabric are found somewhat similar in behaviour for all this property. The novelty of this research work can be summarised to the fact about

the use of cotton and viscose fabric which can be selected for more generous use leading to its application areas. The reader gets the expanded view about the reading obtained for both the types of the fabric and due this it is making very clear to choose among the fabric for its best quality and also the manufacture can make the product by utilising the combination of cotton and viscose in particular composition so as to enhance the value of fabric used in garments or household product according to its end use.

Chemicals are harmful to human being if they are coming in contact with the human being but if we take proper care while using it in the process then there is not any harmful effect observed on human being. It is observed that if we use Bio-enzymes for the process then there is not any harmful effect observed neither on human being nor on environment, but this enzymes are found less effective then commercialised chemicals used.

The results are given in Table 5 for Tegewa solution testing followed as per the standard. Absorbency Test for the process of Cotton [8] and Viscose fabric have been done and the results are given in Table 6. Physical Testing of Cotton and viscose fabric have been done and the results are shown in Table 7. Fabric Properties for cotton and viscose fabric before bleaching and after bleaching have been performed and the results are given in Table 8.

Table 5: Tegewa Solution Testing.

Types of Fabric	Before Bleaching	After Bleaching
Cotton	02	05
Viscose	03	06

Table 6: Absorbency Test for Cotton and viscose fabric.

S.no	Testing	Fabric	Tegewa rating	Absorbency (%)
1	Singeing + Cold Oxidation Cracking	Cotton	2	40%
2	Bleaching		5	65%
3	Mercerization		7	75%
4	Singeing + Desizing	Viscose	3	50%
5	Bleaching		6	70%
6	Optical Brightening Agent.		8	80%

Table 7: Physical Testing of Cotton and viscose fabric.

Testing	Tearing Strength(gm)				Tensile Strength (cN)				Whiteness Index				Gsm		Width		Length	
	Cotton		Viscose		Cotton		Viscose		Cotton		Viscose		Cotton	Viscose	Cotton	Viscose	Cotton	Viscose
	Warp	Weft	Warp	Weft	Warp	Weft	Warp	Weft	Whiteness (%)	Tint	Whiteness	Tint						
Grey	1840	1260	2120	1820	419.52	406.2	478.5	469.7	10.4	80.53	44.23	9.4	91	107	160	193	5055	3053
Singeing + Cold Oxidation Cracking	1680	1040	1710	1630	377.41	305.2	512	470	62.21	12.7	64.28	7.2	89.4	105	154	189	5057	3054
Singeing + Desizing	1725	1140	1840	1660	342	295	439.3	433.11	64.15	12.4	60.43	6.10	90.4	104	153	172	5056	3055
Bleaching	1560	980	1580	1210	270	296.56	383.3	375.53	69.70	10.3	74.5	4.01	90.7	102.5	150	165	5058	3058
Mercerization	1420	920	Not Done	Not Done	267.76	258.3	373	340	71.10	2.0	Na		84.2	106	146	161	5058	3056
Optical Brightening Agent(%)	1260	850	1420	1060	240	215	366.89	352.89	130	3	141.0	0.71	79	100.5	142	158	5056	3057

*cN- Centi Newton,
Gm-Gram,
Na-Not applicable
Gsm-grams per square metre.

The below mentioned Table 6 describes the testing carried out for both cotton and viscose fabric with relation to absorbency as per the standard testing methods prescribed by AATCC Test Method 22:2014, UNI 4920.

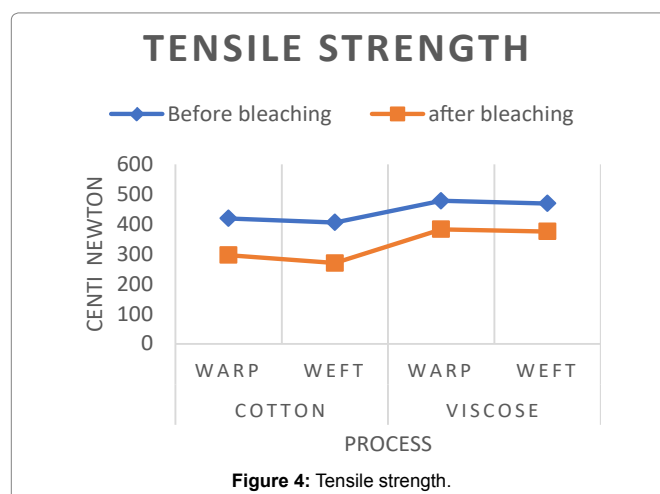
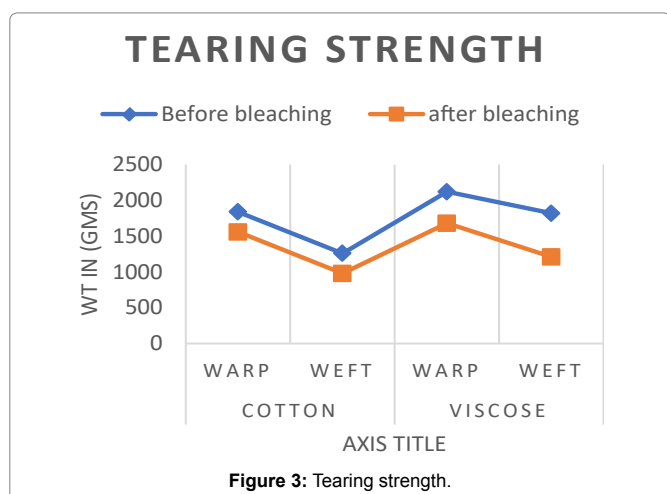
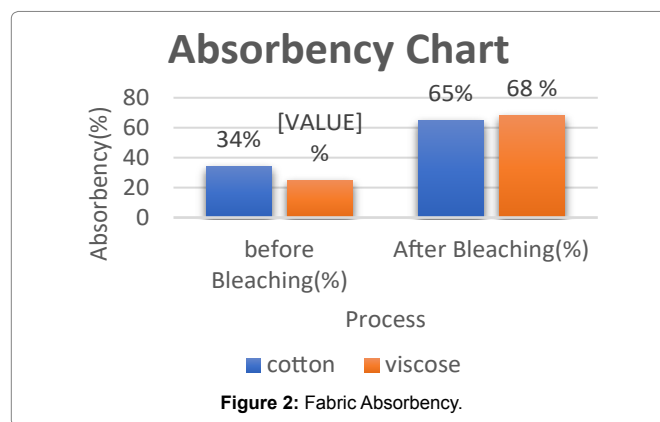
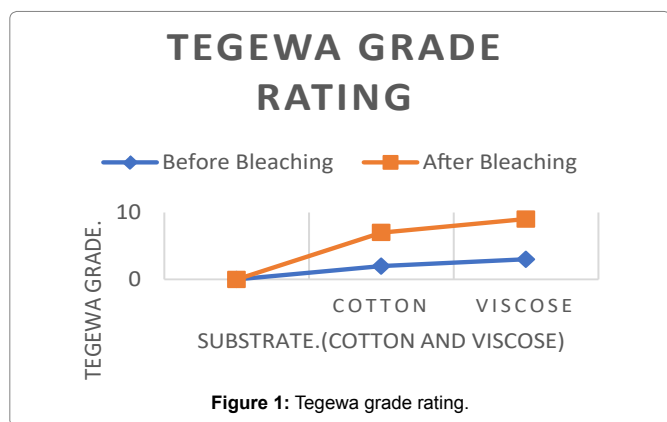
The list of testing fabric is according to the properties required to study for each individual properties and other parameters. Testing is required to be carried out after each process and the evaluation of the testing parameters are given in below Table 7. It is clearly understood that the comparison of two properties are done according to their behavioural changes observed after each trial and this is a

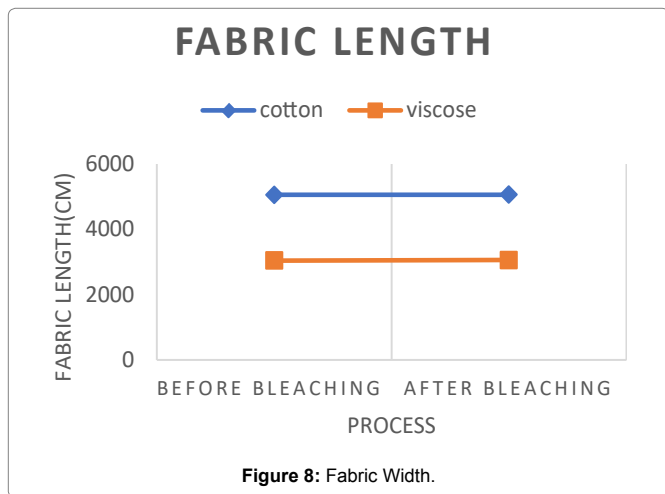
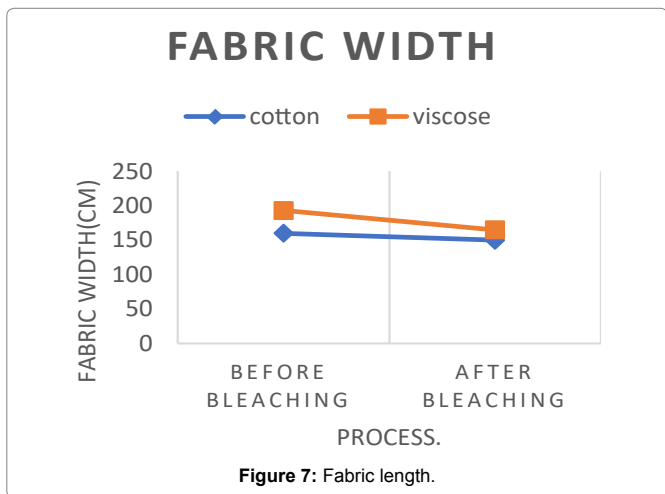
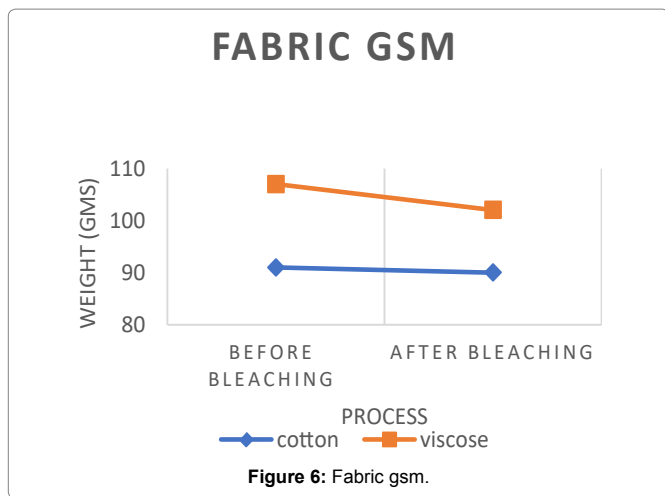
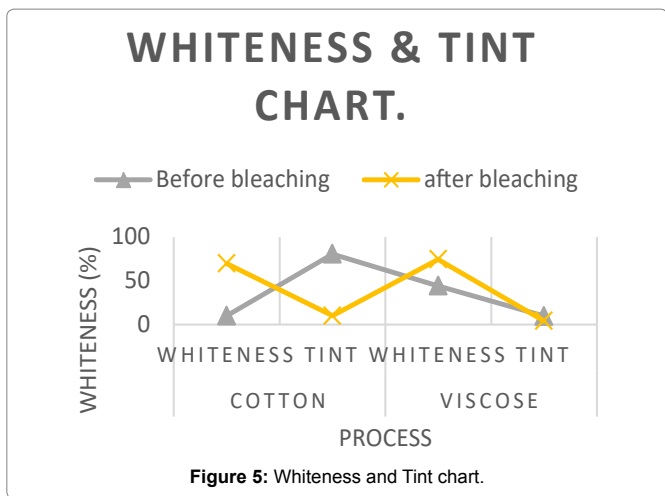
very significant values which are obtained and are justifying about the favourable and desirable properties of both the fabric.

Graphical representation: The Graphical representation of table 3 is shown in Figure 1. The graphical presentation of table 4 in the form of bar graph for absorbency of cotton and viscose fabric is shown in Figure 2 below. The graphical representation of table no 6 for all the properties like tearing strength, tensile strength, whiteness index, gsm, width and length for both cotton and viscose fabric before bleaching and after bleaching is shown in Figures 3-8 respectively.

Table 8: Fabric properties for cotton and viscose.

Properties of Fabric	Cotton				Viscose			
	Before Bleaching		After Bleaching		Before Bleaching		After Bleaching.	
Absorbency (%)	40		65		50		70	
Tearing Strength (gms)	Warp	Weft	Warp	Weft	Warp	Weft	Warp	Weft
	1840	1260	1560	980	2120	1820	1580	1210
Tensile Strength(cN)	419.52	406.02	270	296.56	478.05	469.07	383.03	375.53
Whiteness Index(%)	Whiteness	Tint	Whiteness	Tint	Whiteness	Tint	Whiteness	Tint
	10.04	80.53	69.70	10.03	44.23	9.4	74.5	4.01
Fabric GSM(Gms)	91.00		90.07		107.00		102.05	
Fabric width(cm)	160		150		193		165	
Fabric Length(cm)	5055		5058		3053		3058	





Discussion

Tegewa solution Testing for cotton and viscose fabric

Cotton fabric: Tegewa rating for Cotton fabric before bleaching was 2 showing the presence of starch content to be 1%, and after bleaching it is found to be 5, thus showing the presence of starch content to be 0.2% allowing maximum removal of starch content after bleaching process.

In this process the better efficiency for removing the starch content was found with the chemicals used during the process. According to Tegewa rating scale it was found that the reading above 5 showed a sky-blue appearance of the drop falling on the surface of the fabric indicating negligible amount thus showing some traces of starch content, whereas before bleaching process it was found 2 which means that the presence of starch in the fabric was 1 percent.

Tegewa (viscose fabric): The viscose fabric before bleaching showed the rating of 3 and after bleaching it was found to be 6, which may be due to the removal of starch content from the fabric. According to Tegewa rating scale it was found that the reading above 6 showed a sea blue appearance of the surface of the fabric after falling of the drop of tegewa solution thus showing a very less content of starch contributing to 0.125 percent of presence of starch whereas for unbleached viscose fabric it was found 3 which means that the presence of starch in the fabric was 0.6 percent, thus showing less traces of starch in this viscose fabric [9].

From the above discussion the process of desizing was carried out with good efficiency in case of viscose rather than cotton fabric. The amount of removal of starch and hence more cleaning action is found in viscose fabric rather than cotton fabric.

Fabric properties of cotton and viscose fabric

Absorbency Test of cotton and viscose fabric

cotton fabric: It is also found that the average absorbency of cotton fabric after bleaching improved from 34 to 65 percent, which may be due the reason that more amount of space created in between the warp and weft yarn allowing water to get absorbed, thus we can say that after processing the absorbency is increased.

Viscose fabric: It is also found that the average absorbency of viscose fabric after bleaching is improved from 25 percent to 68, which may be due the reason that more amount of space created in between the warp and weft yarn allowing water to get absorbed, thus we can say that though initially viscose fabric showed less absorbency but after bleaching it showed a remarkable increase in the absorbency as compared to cotton.

Tearing Strength of Cotton and Viscose fabric

Cotton Fabric: The tearing strength was found to be decreased from 1840 gms to 1560 gms for grey warp whereas for grey weft it reduces from 1260 gms to 980 gms which may be due to the reason

that after removing all the impurities and colouring matter from the fabric there are chances of loosing the strength in the inter fiber arrangement and because of this we get reduced values of strength.

Viscose Fabric: The tearing strength was found to be decrease from 2120 gms to 1680 gms for grey warp whereas for grey weft it was reduces from 1820 gms to 1210 gms which may be due to the reason that after removing all the impurities and colouring matter from the fabric there are chances of loosing the strength in the inter fiber arrangement and because of this we get reduced values of strength.

From the above discussion, it is observed that viscose fabric is more prone to lose strength as compared to cotton because of cellular structure in the inter fiber arrangement which leads to more amount of strength loss in warp wise and weft wise direction. It also means that during the process of pre-treatment there are chances of loss of more amount of cellulosic content, in case of viscose fabric and this leads to reduction in tearing strength of the viscose fabric.

Tensile Strength of cotton and viscose fabric

Cotton Fabric: The value of tensile strength was decreased from 419.52cN to 296.5cN for warp direction and 406.2cN to 270cN for weft direction which clearly indicates that inter molecular spaces formed after bleaching was increased which causes reduction in the tensile strength. The more amount of cleaning impurities and removal of colouring matter also reduces tensile strength; thus, we can say that there is reduced strength observed in cotton fabric after bleaching.

Viscose Fabric: The value of tensile strength decreased from 478.5 cN to 383.3 cN for warp direction and 469.7 to 375.53 in weft direction which clearly indicates that inter molecular spaces formed after bleaching was increased which causes reduction in the tensile strength. Reduction in the tensile strength occurred may be due cleaning of impurities along with colouring matter, thus we can say that there is reduced tensile strength observed in viscose fabric after bleaching.

The overall observation showed that there was reduction in the tensile strength in same pattern for warp and weft direction. Cotton and viscose fabric showed nearly similar strength before bleaching but after this bleaching process it showed a remarkable drop in strength

Whiteness Index of cotton and viscose fabric

Cotton Fabric: It was found that after removing the colouring matter from the fabric the value of whiteness index was increased from 10.04 to 69.70 and again after mercerization this value was increased to 71.10 which may be due to the effect of bleaching agent which has a possibility of removing all colouring matter and turning the grey fabric into white and further when applying the mercerisation process make it more lustrous and also increased whiteness index up to 71.10 in case of cotton fabric.

Viscose Fabric: It was found that after removing the colouring matter from the fabric the value of whiteness index was increased from 44.23 to 74.54 and again after mercerisation the value increased to 75. which may be due to effect of bleaching agent having the possibility of removing colouring matter and turning this into brighter in white shade and further mercerisation make it more lustrous and increased whiteness index up to 75 in case of viscose fabric.

From the above discussion, it is said that bleaching is the process of making cotton and viscose fabric whiter, but to get whiter and lustrous effect in the fabric we can apply mercerisation process. It is also observed that after giving OBA treatment this value was increased

to 130 for cotton and to 141.2 for viscose fabric which indicates that viscose produces more whiteness as compared to cotton fabric.

Fabric GSM

Cotton Fabric

The cotton fabric showed the reduction in gsm from 91 gms to 90.7 gms after the bleaching process, indicating that due to loss of content of colouring matter and removal of impurities there is some loss of weight in cotton fabric.

Viscose Fabric

The viscose fabric showed the reduction in gsm from 107 gms to 102.5 gms after bleaching process, indicating that due to loss of content of colouring matter and removal of impurities there is some loss of weight in viscose fabric however the viscose fabric showed much more loss of weight as compared to cotton after bleaching process which may be due to removal of more amount of impurities and colouring matter with the help of chemicals.

From the above discussion, it may be stated that viscose fabric is having more amount of loss in gsm as compared to cotton fabric which specifies that viscose fabric is reducing more amount of impurities and colouring matter leading to loses in content, resulting in a reduction of the GSM value.

Fabric width of cotton and viscose fabric

Cotton Fabric

The cotton Fabric width is reduced after bleaching process due to shrinkages occurring in the weft wise direction. It is found that the width of Cotton fabric before bleaching was 160 meters and after bleaching width of Cotton fabric is reduced to 150 meters, which may be due to contraction occurring in cotton fabric after putting it to a relaxed state.

Viscose Fabric

Viscose Fabric width is reduced after bleaching process due to shrinkages occurring in the weft wise direction. It was found that the width of viscose fabric before bleaching was 193 meters and after bleaching width of viscose fabric was 165 meters, thus it can be seen that more amount of width reduction occurred due to more shrinkage occurring in case of viscose fabric as compared to cotton fabric.

From the above discussion it is observed that viscose fabric is more prone to reduction of width as compared to cotton which may be due to the resanon tht more amount of swelling occurred in case of viscose fabric in bleaching process and after completion of this process the more contraction and less relaxation occurred which resulted in reduction of width in this fabric.

Fabric Length of cotton and viscose fabric

Cotton Fabric

It is found that some amount of elasticity has been incorporated into the process of bleaching for both cotton and viscose fabric. Excessive swelling was observed lengthwise direction which causes an increase in the length after the bleaching process for cotton fabric, when this cotton fabric was put to relaxed state it showed an increase in length.

Viscose Fabric

Similarly in case of viscose fabric it is found that there was much more increase in length as compared to cotton because viscose have more amount of water holding capacity and this lead to excessive swelling than cotton and hence when putting it to relaxed state it showed more amount of increased in length with reduced shrinkage than cotton.

From the above discussion it is observed that there is not much difference in length observed in case of cotton and viscose fabric during this bleaching process, thus we can say that, length of the cotton and viscose fabric does not show any specific change in the length of the fabrics.

Conclusion

1) This paper covers the optimum usage of the chemicals for treating of cotton as well as viscose fabric, innovative thing in this paper is regarding the performance observed in case of fabric properties which are favouring to cotton in some cases and favouring to viscose in another cases.

2) It is well known that cotton is superior fibre tremendously used due to its favourable properties and other benefits but there is also viscose fabric which is holding some properties which are superior than cotton which was tried to explain by this research work, now this depends on an individual to select the fibre according to its end use depending on the properties which are favouring for the usage.

3) The overall performance of the fabric during pre-treatment is improved by maintaining all the parameters in optimum level during desizing, scouring, bleaching and whiteness index process and this not only increase the efficiency but also improved the quality of the product. Application of bleaching process in controlled conditions with a pH around 8 to 9 gives good amount of whiteness index, counting to 69.70 for cotton fabric and 74.54 for viscose fabric, thus showing good results for viscose fabric than cotton fabric.

4) This study is very helpful to find out that the optimum selection of the chemicals which not only improved the whiteness index but also other properties (Physical & chemical) along with the removed the impurities for both cotton and viscose fabric, this justifies the difference between both showing improved performance in case of absorbency with less shrinkage in viscose fabric.

5) The future recommendation of these studies can be broadly classified into selection of the fabric according to their properties

and applying the treatment for cleaning the impurities and applying the required finishing process so as to make it more comfortable in various other fields. Composition of two or more fibres for making one fabric can give multiple properties in one final fabric and this can be used for many other applications for commercialising in daily use or in household furnishing.

6) It is observed that the absorbency of both cotton and viscose fabric is improved with the use of these chemicals in optimized condition. More absorbency was observed in viscose fabric which may be due to more holding capacity in between the spaces created in viscose fabric leading to increased absorbency.

7) It is found that there was reduction in the width of the fabric observed in weft wise direction after bleaching process in viscose fabric as compared to cotton because of shrinkage occurring in the weft wise direction, resulting in reduction in width after relaxation.

8) Minimum increased in the length of the fabric observed due to the inherent property of elasticity and also providing some elastomeric effect due to a chemical used in processing, which not only increases length to a minimum value but also maintain the dimensional stability of the fabric in warp wise and weft wise direction.

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