CHAPTER – 8
EFFECT OF MERCERIZING CONDITIONS ON DYEING BEHAVIOUR OF RING & COMPACT YARN FABRICS

8.1 Introduction:

Behaviour of fabrics in the subsequent processes and end product is decisively influenced by their performance characteristics. The process of Mercerization [106, 165-171] enhances tensile strength, dyeing behaviour and lustre of cotton fabrics. Extensive research work has been carried out on yarn and fabrics. It is reported in various journals by research workers [149 - 124]. However, very less research work is available on mercerization of compact yarn fabric. It has been found recently that hot mercerization by Caustic Soda gives better Comfort properties to the ring yarn fabric.

In this connection, an understanding of the behaviour of mercerized fabrics under different conditions and their interaction effects are of fundamental importance. The present study therefore, was aimed at investigating the effect of mercerization under different conditions of temperature, concentration, time of impregnation, stretch percentage on colour absorption, scattering values (K/S), and CIE whiteness of the fabric samples.

8.2 Materials and Experimental Methods:

8.2.1 Materials-

Ring and Compact yarn of 40s (Ne) count were spun under identical conditions keeping same fibre mixing and spinning machine parameters. Weaving conditions and machine parameters were maintained identical.
A] Fabric:

Fabric samples of following specification were manufactured.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warp count (Ne)</td>
<td>40tex</td>
</tr>
<tr>
<td>Weft count (Ne)</td>
<td>40tex</td>
</tr>
<tr>
<td>Ends/Cm</td>
<td>35</td>
</tr>
<tr>
<td>Picks/Cm</td>
<td>25</td>
</tr>
<tr>
<td>Weight (gm.m(^{-2}))</td>
<td>92</td>
</tr>
<tr>
<td>Weave</td>
<td>Plain</td>
</tr>
</tbody>
</table>

A stainless steel frame having dimension of 440 mm x 440 mm was fabricated. Provision was made for easy handling and keeping the fabric under tension. Fixed pins were provided on sides of the frame to maintain same dimensions of the fabric. Two trays were also fabricated, one for Sodium Hydroxide impregnation and another for washing.

B] Chemicals:

Following Commercial grade chemicals were used.

- Caustic Soda,
- Acetic acid,
- Sodium Carbonate,
- Sodium Chloride,
- Sulphuric acid,
- Hydrogen peroxide,
- Hydrochloric acid,
- Enzyme- Amylase.

C] Method and Processing Sequence:

- **Desizing:**
  Grey fabric was desized with 5 grams per litre of Enzyme at 60°C for 4 hours at 6.5 pH. Fabric was given a hot wash followed by cold wash.

- **Combined Scouring and Bleaching:**
  The desized fabric was subjected to combined scouring and bleaching using the following recipe on the weight of fabric (owf).
  
  - Sodium hydroxide: 2.00 %
  - Sodium carbonate: 0.50 %
  - Hydrogen peroxide (50%): 1.50 %
  - Peroxide stabilizer AWNI: 0.50 %
  - Temperature: 85°C
  - Time: 4 hours.
  Fabric was subjected to hot wash, cold wash.

- **Mercerization:**
  The above fabric samples were mercerized at various concentrations, temperature, impregnation time, and stretch percentage as per the design of experiment given below.
  After hot wash and cold wash, fabrics were neutralized and dried.
8.2.2 Design of Experiment:

It was tried to optimize the mercerizing conditions of cotton fabric using NaOH by means of statistically designed experiments. The effect of different temperature, concentration, time of impregnation and stretch percentage on K/S value and CIE whiteness of fabric was studied.

Most reliable mathematical based evaluation is necessary along with interaction between the variables. It also studies statistical significance of the results.

A fully factorial experiments setup was used to study effect of one variable on different levels of other factors and to obtain valid conclusion.

Table 8.1

<table>
<thead>
<tr>
<th>Factors / Levels</th>
<th>-1</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>20</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Concentration (%)</td>
<td>18</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>Time (seconds)</td>
<td>30</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>Stretch (%)</td>
<td>-2</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

This design of experiment as shown in Table 8.1 increases the trials to 81. These numbers of trials are very high. Therefore, Taguchi method is used for reduction in number of trials to nine. The levels of trials are given in the Table 8.2.
Table -8.2
Level of Factors

<table>
<thead>
<tr>
<th>Trial Number</th>
<th>X-1</th>
<th>X-2</th>
<th>X-3</th>
<th>X-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: One is the lowest and three is the highest level of each factor.

Results collected from samples (as per Taguchi technique) were analyzed with the help of statistical software ‘MINITAB’.

- **Dyeing:**

The above fabric samples were dyed with Reactive Red HE 8B (CI 152) for 0.5% shade in Rota dye, keeping Material to Liquor Ratio (MLR) 1: 20 at 80°C for 60 Minutes. Salt and Soda ash were added for exhaustion and fixation of a dye respectively.
8.3 Testing of Fabric:

Fabric samples were conditioned at 65\(^\circ\)C R.H. and 27\(^\circ\)C for 48 hours.

8.3.1 Testing of Colour Absorption and scattering (K/S):

The development of the Kubelka-Monk equation in 1931 is as under.

\[
\frac{K}{S} = \frac{(1 - R)^2}{2R}
\]

K = absorption coefficient,

S = scattering coefficient

R = reflectance,

This measures the colour absorption and scattering values of dyed textiles. The utility and application of this important equation has been critically reviewed by many researchers.

The colour absorption and scattering value (K/S) were measured using Premier scan colour matching system “Colour Eye 300” and chosen maximum wavelength. K / S values were calculated by built-in software of colour matching system.

8.3.2 Whiteness Index: (AATCC Method 110-1995)

This method measures the whiteness of textiles as appeared to average viewer. The formulas used for calculations are those recommended by the CIE. The reflectance values are affected by the nature of surface and therefore same type of textiles can be compared well. The CIE tristimulus values are measured using a reflectance spectrophotometer and whiteness is calculated from the formulas based on CIE chromaticity co-ordinates.

Whiteness is attribute by which an object colour is judge to approach a preferred white. CIE specified geometry of 45/0 is used for measurement, D65
illumination standard 1964, $10^0$ observer and chromaticity co-ordinates for $Y_{10}$, $X_{10}$ and $Z_{10}$ are determined and whiteness index $W_{10}$ is found out by the inbuilt software. Higher the values greater is the whiteness.

### 8.4 Results and Discussions:

Mercerization is known to strengthen the weak links in the fibres and improves crystalline orientation. The tension applied during the process brings about structural changes. If there is no tension then the new stage is likely to be transitory. Therefore, time of impregnation, concentration of Caustic soda, stretch % and temperature of Caustic soda were varied and their effects, on colour reflectance value and whiteness were studied with statistical based design of experiment. These experiments are carried out as per the Taguchi Technique of statistical design of experiments, for each type of fabric, ring yarn fabric and compact yarn fabric under investigation. Results were analyzed using Mini-Tab computer software.

#### 8.4.1 Colour absorption and scattering value (K/S):

**Graph – 8.1: - Main Effects Plot – Data Means of the colour absorption and scattering value (K/S) for Mercerized Ring Yarn Fabric.**
It can be observed from the Graph – 8.1 the effect of various parameters on colour absorption and scattering value (K/S) on Ring yarn fabric. The above graph shows that, in case of ring yarn fabric, as temperature increases from $20^\circ C$ to $40^\circ C$ the colour absorption and scattering value (K/S) for Ring yarn fabric also increases from 2.0 to 2.19. However, further increase in temperature to $60^\circ C$ the (k/s) value reduces to 2.10. Similarly, as concentration of sodium hydroxide increases from 18 % to 24%, (k/s) value increases from 1.95 to 2.27. However, further increase in concentration of sodium hydroxide decreases the viscosity of solution, causing decrease in penetration of sodium hydroxide in the fabric. This increase in concentration to 30 % causes to decrease in (k/s) value to 2.10. The time of impregnation raises from 30 seconds to 60 seconds and further to 90 seconds the colour absorption and scattering value (K/S) for Ring yarn fabric, increases from 1.95, to 2.20 and 2.27, respectively. Fabric was allowed to shrink up to 2%, also it was stretched to 0% and 2% percent during mercerization. It can be seen that (K/S) for Ring yarn fabric are 2.05, 2.16 and 2.00 for 2% shrinkage, 0% shrinkage and 2% stretch, respectively. This shows that stretching the fabric to original dimensions of (0%) shows higher (k/s) value. The colour absorption and scattering mean value (K/S) of 2.09 is obtained at $40^\circ C$ temperature, 24% concentration of Caustic Soda, 90 seconds time of impregnation and 0% stretch to the ring yarn fabric.
Graph 8.2 Main Effects Plot – Data Means for the colour absorption and scattering value (K/S) of Mercerized Compact Yarn Fabric.

It can be observed from the Graph – 8.2 the effect of various parameters on colour absorption and scattering value (K/S) on Mercerized Compact yarn fabric. The above graph shows that, in case of compact yarn fabric, as temperature increases from 20°C to 40°C the colour absorption and scattering value (K/S) for compact yarn fabric also increases from 1.85 to 2.00. Further increase in temperature to 60°C the (k/s) value also raises to 2.10. Similarly, as concentration of sodium hydroxide increases from 18% to 24% the colour absorption and scattering value (K/S) for compact yarn fabric also increases from 2.00 to 2.12. However, further increase in concentration of sodium hydroxide to 30% decreases the viscosity of solution, causing decrease in penetration of sodium hydroxide in the fabric. This increase in concentration to 30% causes to decrease in (k/s) value to 1.90. As the time of impregnation rises from 30 seconds to 60 seconds and further to 90 seconds the colour absorption and scattering value (K/S) for compact yarn fabric, increases from 1.80 to 1.84 and then it further rises to 2.28. Fabric was allowed to shrink up to 2%, also it was stretched to 0% and 2% percent during mercerization. It can be seen that (K/S) for compact yarn fabric are 2.04, 2.16 and 1.80 for 2% shrinkage, 0% shrinkage and 2% stretch, respectively. This shows that stretching the fabric to original dimensions of (0%) shows higher (k/s) value. The colour absorption and scattering mean value (K/S) of 2.00 is obtained at
60°C temperature, 24% concentration of Caustic Soda, 90 seconds time of impregnation and 0% stretch to the compact yarn fabric.

8.4.2 CIE Whiteness:

The increase in lustre and whiteness is due to deconvolutions as the cellulose fibres are swollen after mercerization, becoming more circular. Stretching enhances lustre and surface of the hair becomes smooth, aligning the fibres to the axis of yarn from the fabric improves it further.

Graph – 8.3 - Main Effects Plot – Data Means for Whiteness Index CIE

(Mercerized Ring Yarn Fabric)

It can be observed from the Graph – 8.3 the effect of various parameters on Whiteness Index of Mercerized ring yarn fabric. The above graph shows that, in case of ring yarn fabric, as temperature increases from 20°C to 40°C Whiteness Index also increases from 73.3 to 74.6. However, further increase in temperature to 60°C Whiteness Index reduces to 73.1. Similarly, as concentration of sodium hydroxide increases from 18% to 24% Whiteness Index increases from 73.8 to 74.1. However, further increase in concentration of sodium hydroxide decreases the viscosity of solution, causing decrease in penetration of sodium hydroxide in the fabric. This increase in concentration to 30% causes the decrease in Whiteness Index to 73.1. The time of impregnation rises from 30 seconds to 60 seconds and further to 90 seconds,
Whiteness Index increases from 73.1 to 73.8 and 74.1, respectively. Fabric was allowed to shrink up to 2% and also it was stretched to 0% and 2% percent during mercerization. It can be seen that Whiteness Index for Ring yarn fabric are 74.1, 72.6 and 74.10 for 2% shrinkage, 0% shrinkage and 2% stretch, respectively. This shows that stretching the fabric to (+2%) gives higher Whiteness Index. Whiteness Index of CIE 73.8 is the mean value observed at mercerizing process conditions of 40°C temperature, 24% concentration, 90 seconds time and 2% stretch.

Graph – 8.4 - Main Effects Plot – Data Means for Whiteness Index CIE

It can be observed from the Graph – 8.4 the effect of various parameters on the Whiteness Index of Mercerized Compact yarn fabric. The above graph shows that, in case of compact yarn fabric, as temperature increases from 20°C to 40°C Whiteness Index also increases from 85.3 to 85.8. Further increase in temperature to 60°C Whiteness Index decreases to 84.00. Similarly, as concentration of sodium hydroxide increases from 18 % to 24% Whiteness Index increases from 85.5 to 85.7. However, further increase in concentration of sodium hydroxide decreases the viscosity of solution, causing decrease in penetration of sodium hydroxide in the fabric. This increase in concentration to 30 % causes the decrease in Whiteness Index to 83.8. As the time of impregnation rises from 30 seconds to 60 seconds and further to 90 seconds Whiteness Index increases from 83.5, 85.7 to 85.9, respectively. Fabric was
Studies In Mercerization

allowed to shrink up to 2% and also it was stretched to 0% and 2% percent during mercerization. It can be seen that Whiteness Index for compact yarn fabric are 85.7, 83.7 and 85.70 as stretch % is raised from (-2%) to 0% and 2%, respectively. This shows that stretching the fabric to (2%) gives to higher Whiteness Index.

As shown in the graph compact yarn fabric mean value of Whiteness Index CIE is observed 85.10 at mercerizing processing conditions of 40°C temperature, 24% caustic soda concentration, 90 seconds time of impregnation, and 2% stretch.

After mercerization, deconvoluted fibres swell and therefore elliptical surface changes to round cross section. Crystalline orientation is better. In compact yarn fabric, the alignment of fibres to the axis of yarn during spinning and their higher packing density with further stretching the fabric, compact yarn fabric shows better Whiteness Index.

8.5 Conclusions:

i) Ring yarn fabric shows Mean value (K/S) of 2.09 at mercerizing process conditions of 40°C temperature, 24% Sodium Hydroxide concentration, 90 seconds time of impregnation and (0%) stretch. While Compact yarn fabric shows mean value (K/S) of 2.00 at mercerizing process conditions of 60°C temperature, 24% concentration of Sodium Hydroxide, 90 seconds time of impregnation and (0%) stretch.

ii) Ring yarn fabric shows Mean value of whiteness is 73.80 and compact yarn fabric shows Mean value of whiteness is 85.70, at the same mercerizing process conditions of 40°C temperature, 24% concentration of Sodium Hydroxide, (2%) stretch and 90 seconds time of impregnation.
BULK TRIAL

1. INTRODUCTION:

   In the present research work, an attempt has been made to find out the effect of mercerization on fabric properties using compact yarn fabric and ring yarn fabric.

   Having got the encouraging Laboratory results, bulk trials were conducted in Industry.

2. Materials & Methods:

2.1 Materials:

   Woven cotton Ring Yarn and compact yarn fabric each of 500 meters was prepared with following specifications from commercial production line for bulk trial.

   - Warp Count - 40³ (Ne) Ring Yarn and compact yarn
   - Weft Count - 40³ (Ne) Ring Yarn and compact yarn
   - Ends per Cm - 42
   - Picks per Cm - 28
   - Weave - Plain

   The fabrics were woven on Air jet Weaving Machine of 323 Cm cloth width at reed.

2.2 Chemicals:

   The following auxiliaries were used.

   - Dilute Bactesol PHC (enzyme),
   - Sanelozin MRN (Wetting Agent),
   - Sirix ZUDI (Chelating Agent),
   - Complex former (Chelating agent),
   - Wetting agent and Peroxide Stabilizer.
The following commercial grade chemicals were used
Acetic Acid, Hydrogen Peroxide (50%), Sodium Hydroxide,

2.3 Methods:-

2.3.1 Processing Sequence:

2.3.2 Singeing and Desizing:

Grey fabric was singed and desized on Osthoff Senze, Germany, machine at a speed of 80 meters per minute with 16 cm flame intensity. Desizing was carried out using 5 grams per litre enzyme, at 60°C for 4 hours followed by hot wash at 60°C and cold wash conditions were kept same as in the laboratory.

2.3.3 Scouring and Bleaching:

Desized fabric was padded through

- Hydrogen Peroxide (50%) - 35 ml / kg of fabric
- Sodium Hydroxide - 25 ml / kg of fabric
- Complex former (Chelating agent) - 2.5 ml / kg of fabric
- Wetting agent - 4 ml / kg of fabric
Peroxide Stabilizer - 7 ml/kg of fabric

The impregnated fabric was then steamed at 98°C for 25 minutes in Benninger machine followed by hot wash and cold wash.

### 2.3.4 Mercerization:

Mercerization was carried on Benninger AGCH 9240, a chain mercerizing machine at 24% NaOH concentration with dwell period of 90 seconds at 60°C.

### 2.3.5 Dyeing:

The above samples were dyed with Reactive Red HE8B (C.I. Red 152) on Jigger machine for 0.5% shade using normal procedure for dyeing.

### 3. Physical Testing of Fabric:

The samples were conditioned at 27°C & 65% R.H. for 48 hours and then tested for following parameters.

*Tensile testing* was carried on Titan Tensile Strength Tester using ASTM D5034 Standard Method with gauge length of 75mm.

*Crock meter* was used for testing rubbing fastness.

K/S values were found out with the help of *Computer Colour matching software*. 
4. Results and Discussion:

Table –8.3
Comparison of Tensile strength kgf of Ring yarn Fabric & Compact yarn fabric before and after Hot Mercerization

<table>
<thead>
<tr>
<th></th>
<th>Ring Yarn Fabric Tensile Strength in kgf</th>
<th>Compact Yarn Fabric Tensile Strength in kgf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Hot Mercerization</td>
<td>58.64</td>
<td>61.69</td>
</tr>
<tr>
<td>After Hot Mercerization</td>
<td>65.36</td>
<td>68.60</td>
</tr>
<tr>
<td>% increase after Mercerization</td>
<td>11.46 %</td>
<td>11.20 %</td>
</tr>
</tbody>
</table>

Graph – 8.5 — Comparison of Tensile strength kgf of Ring yarn Fabric & Compact yarn fabric before and after Hot Mercerization
Studies In Mercerization

Table -8.3 and Graph –8.5 show comparison of Tensile strength kgf of Ring yarn Fabric & Compact yarn fabric before and after Mercerization. The tensile strength before mercerization of ring yarn fabric was 58.64 kgf and after mercerization the strength increases to 65.36 kgf. It shows that strength increases by 11.46 % after mercerization. While the tensile strength before mercerization of compact yarn fabric was 61.69 kgf and after mercerization the strength increases to 68.60 kgf. It shows that tensile strength for compact yarn fabric increases by 11.20 % after mercerization. Maximum tensile strength is observed with compact yarn fabric after mercerization. However, both fabrics have shown significant increase in tensile strength 11.46 % and 11.20 % for ring yarn fabric and compact yarn fabric respectively. It can be observed that laboratory trials as well as bulk trials show similar results.
**Table – 8.4**

Comparison of Barium Activity Number of Ring yarn Fabric and Compact yarn Fabric before & after Hot Mercerization

<table>
<thead>
<tr>
<th></th>
<th>Ring Yarn Fabric Barium Activity Number</th>
<th>Compact Yarn Fabric Barium Activity Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Hot Mercerization</td>
<td>141</td>
<td>148</td>
</tr>
<tr>
<td>After Hot Mercerization</td>
<td>154</td>
<td>163</td>
</tr>
<tr>
<td>% increase after Mercerization</td>
<td>9.21 %</td>
<td>10.13 %</td>
</tr>
</tbody>
</table>

**Graph 8.6** - Comparison of Barium Activity Number of Ring yarn Fabric & Compact yarn Fabric before and after Hot Mercerization
Table- 8.4 and Graph –8.6 show comparison of Barium Activity Number for Ring yarn Fabric & Compact yarn fabric before and after Mercerization. The Barium Activity Number before mercerization of ring yarn fabric was 141 and after mercerization the Barium Activity Number increases to 154. It shows that Barium Activity Number increases by 9.21 % after mercerization. While the Barium Activity Number before mercerization of compact yarn fabric was 148 and after mercerization the Barium Activity Number increases to 163. It shows that Barium Activity Number of compact yarn fabric increases by 10.13 % after mercerization. Maximum Barium Activity Number is observed with compact yarn fabric after mercerization. However these both fabrics have shown significant increase in Barium Activity Number by 9.21 % and 10.13 % for ring yarn fabric and compact yarn fabric respectively. It can be observed that laboratory trials as well as bulk trials show similar results.
Table – 8.5
Comparison of k/s Value of Ring yarn Fabric and Compact yarn Fabric before & after Hot Mercerization

<table>
<thead>
<tr>
<th></th>
<th>Ring Yarn Fabric K/S Value</th>
<th>Compact Yarn Fabric K/S Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Hot Mercerization</td>
<td>8.49</td>
<td>9.38</td>
</tr>
<tr>
<td>After Hot Mercerization</td>
<td>9.31</td>
<td>10.80</td>
</tr>
</tbody>
</table>
| % increase after Mercerization | 9.65 %                     | 15.13 %                     

Graph 8.7- Comparison of k/s value of Ring yarn Fabric & Compact yarn fabric before and after Hot Mercerization
Table- 8.5 and Graph–8.7 show comparison of K/S Value for Ring yarn Fabric & Compact yarn fabric before and after Mercerization. The K/S Value before mercerization of ring yarn fabric was 8.49 and after mercerization the K/S Value increases to 9.31. It shows that K/S Value increases by 9.65 % after mercerization. While the K/S Value before mercerization of compact yarn fabric was 9.38 and after mercerization the K/S Value increases to 10.80. It shows that K/S Value of compact yarn fabric increases by 15.13 % after mercerization. Maximum K/S Value is observed with compact yarn fabric after mercerization. However both fabrics have shown significant increase in K/S Value by 9.65 % and 15.13 % for ring yarn fabric and compact yarn fabric respectively. It can be observed that laboratory trials as well as bulk trials show similar results.
Table 8.6

Comparison of Fastness Properties Ring yarn Fabric and Compact yarn Fabric before & after Hot Mercerization

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Before Hot Mercerization Ring yarn</th>
<th>After Hot Mercerization Ring yarn</th>
<th>Before Hot Mercerization Compact yarn</th>
<th>After Hot Mercerization Compact yarn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Rubbing Fastness</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Wet Rubbing Fastness</td>
<td>3 - 4</td>
<td>3 - 4</td>
<td>3 – 4</td>
<td>3-4</td>
</tr>
</tbody>
</table>

Table 8.6 shows the comparison of Fastness Properties for Ring yarn Fabric & Compact yarn fabric before and after Mercerization. The Dry Rubbing Fastness for unmercerized and mercerized sample of ring yarn fabric and compact yarn fabric is found as 4. It shows that Dry Rubbing Fastness does not change with mercerization. Similarly ring yarn fabric and compact yarn fabric do not show any significant difference before and after mercerization.

The Wet Rubbing Fastness for unmercerized and mercerized sample of ring yarn fabric and compact yarn fabric is found as 3- 4. It shows that Wet Rubbing Fastness does not change with mercerization. Similarly ring yarn fabric and compact yarn fabric do not show any significant difference before and after mercerization. It can be observed that laboratory trials as well as bulk trials show similar results.
CONCLUSION –

1) Mercerization Bulk trial on ring yarn fabric and compact yarn fabric at optimum conditions shows that tensile strength, Barium activity number and k/s value increases significantly.

2) However, ring yarn fabric and compact yarn fabric after mercerization show that dry and wet rubbing fastness remains same.