A Comparative Study on Depth of Color (for Self Shade and Combine Shade) Among Different Brand of Reactive Dyes

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Abstract: This paper aimed at to analyze the fixation% or absorption among different brand of reactive dyes. As we know now a day’s reactive dyes are mostly used for coloration of cellulosic fiber. In this research work the authors have tried to find out which brand of reactive dye is best. For this study three brand of reactive dyes like as novacron reactive dyes, remazol reactive dyes, bezactive reactive dyes and bezactive S matrix reactive dyes were used. Amount of reactive dyes that present in the dyed fabric was determined with the help of Spectrophotometer.

Keyword: Fixation, Reactive dyes, novacron, remazol, bezective, Absorption.

1. INTRODUCTION

The utilization of knitted fabric has been rapidly increasing in world wide. Both men & women feel comfortable wearing knitted fabric for their shape fitting properties, softer handle, bulkier nature and high extension at low tension compared to woven fabric [1]. Saturation level of dye also influenced positively in most cases i.e more intensive in higher dye concentration and fabric GSM.

Cotton today is the most used textile fiber in the world. Its current market share is 56% for all fibers used for apparel and home furnishings and sold in the U.S. Another contribution is attributed to nonwoven textiles and personal care items. It is generally recognized that most consumers prefer cotton personal care items to those containing synthetic fibers. Current estimates for world productions are about 25 million tones or 110 million bales annually, accounting for 2.5% of the world's arable land. China is the world's largest producer of cotton, but most of this is used domestically. The United States has been the largest exporter for many years [2].

In recent years, reactive dyes have been most commonly used the reactive dyes are the best for cotton for its wide range of application and better fastness properties [3]. Therefore 50% of cellulosic fibers are dyed with reactive dyes. Share of reactive dyes among all textile dyes is 29%. Due to their strong interaction with many surfaces of synthetic and natural fabrics, reactive dyes are used for dyeing wool, cotton, nylon, silk, and modified acrylics [4].

In Bangladesh wet processing industries, reactive dyes are extremely used. The reactive site of the dyes reacts with functional group on fiber under influence of heat and alkali [6]. Fiber reactive dyes react with the cellulosic fiber in the presence of alkali to form a strong covalent chemical bond between a carbon atom of the dye molecule and an oxygen atom of the hydroxyl group in the cellulose.

In this research Work we use cotton weft knitted plain single jersey fabric & reactive dyes. All of the samples were dyed by reactive dyes with different amount of shade%. After completing dyeing and finishing how much dye present in the dyed fabric were observed by spectrophotometer. Finally analyze the self shade and combine shade that were dyed with total four shade with the help of three brand of reactive dyes.

2. MATERIAL AND METHOD

2.1. Instruments: following are the instruments that were used during research work:

- Electric Balance
- Scissor
- Beaker
- Sample dyeing Machine
- Hot wash Machine
- Pipette
- Squeezer Machine
- Dryer
- Spectrophotometer with colour I match software etc.

2.2. Dye Stuff and Chemicals:

The chemicals and dye stuff were collected from Norban comtex ltd, Sarabo, Gazipur. Reactive Dye Remazol (Red, Blue, Yellow), Novacron (Yellow S-3R, Red FNR, Blue FNR), Bezective (Yellow S3R, Red S-Matrix, Blue S-Matrix), Bezective (Red S-Matrix, Yellow S-Matrix, Blue S-Matrix) Electrolyte (Gluber salt Na2SO4. 10 H2O), Alkali: (Soda ash-Na2CO3 and caustic soda NaOH), Soaping agent ( SW CONE), Acetic Acid
(100%), Wetting agent and Sequestering agent etc were used.

2.3. Sample preparation:
In this research work I have used plain single jersey 100% weft knitted cotton fabric that were prepared from Norban comtex ltd, Sarabo, Gazipur. 1% stock solution was prepared For Novacron, Remazol, Bezactive and Bezactive s-matrix dyes.

2.4. Analytical Procedure:
At First 16pieces (4*4) fabric were taken. Then calculate the dyes and chemicals according to the following shade%.

Table 1: Different shade% applied on single jersey fabric

<table>
<thead>
<tr>
<th>Dyes</th>
<th>light</th>
<th>Medium</th>
<th>Dark</th>
<th>Extra dark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novacron</td>
<td>0.5%</td>
<td>1.2%</td>
<td>2.4%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Remazol</td>
<td>0.5%</td>
<td>1.2%</td>
<td>2.4%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Bezactive</td>
<td>0.5%</td>
<td>1.2%</td>
<td>2.4%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Bezactive-s matrix</td>
<td>0.5%</td>
<td>1.2%</td>
<td>2.4%</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

Then the fabric were dyed by batch process with the help of lab dyeing machine keeping material to liquor ratio 1:10 for the above mentioned shade percentage. During dyeing standard method were followed as per prescribes by the manufacturers. Then marked 16(4*4) dyeing pot for the 4 dyes and 4 shade. The pH of the dye bath was adjusted by soda ash. Set the bath with substrate at room temperature 40°c and add sample, dyes, soda ash, Sequestering Agent, Wetting Agent, Anti Creasing Agent, Leveling Agent and salt. Then raise the temperature at 60°c to room temperature. After this dropped the samples from bath and rinsed and then carried on after treatment process. After dyeing the samples were washed by hot water, detergent & finally rinsed. Then the samples washed with cold water & neutralized by 1g/l acetic acid (100%) for 10 minutes. Dry the sample by incubator (dryer). After completing finishing process then take the spectrophotometer reading and check how much dye fixed with the fibre for self shade and combine shade.

“3. RESULTS AND DISCUSSION”
Analyses of depth of color (for self shade and combine shade) for different brand are shown below:

3.1. Graphical representation of combine shade is as follows:

“Figure 1. Effect of light shade for combine (0.50%)”

“Figure 2. Effect of medium shade (1.2 %)”

“Figure 3. Effect of dark shade (2.4 %)”
“Figure 4. Effect of extra dark shade (4.8 %)"

The effects of combine shade for different brand of reactive dyes have been showed at figure no 1 to 4. For light shade novacron dye showed the better absorption capacity in compare to other dyes. Then bezective and bezective s matrix showed the better fixation. If we consider the medium shade novacron dye also showed the better absorption capacity in compare to other dyes and remaining dyes showed the average absorption. In case of dark shade novacron dye also showed the better absorption capacity in compare to other dyes and remazol dyes is better in compare to other two dyes. But bezective S matrix showed the better fixation in compare to other three dyes when we consider extra deep shade. So it is clear from the above graph novacron dye is best when shade% goes to 0.5 to 2.5 but above this bezective S matrix dye is better.

3.2. Graphical representation of self shade is as follows:

“Figure 5. Effect of light shade (0.50%) for self shade”

“Figure 6. Effect of medium shade (1.2 %) for self shade”

“Figure 7. Effect of dark shade (2.4 %) for self shade”

“Figure 8. Effect of extra dark shade (4.8 %) for self shade”

The effects of self shade for different brand of reactive dyes have been showed at figure no 5 to 8. In case of light shade novacron red, novacron yellow and bezective blue shows the better fixation. If we consider the medium shade novacron red and yellow good but in case of blue both novacron and bezective are same. For dark shade bezective red, novacron yellow and remazol blue better. In case of extra dark shade bezective s matrix, bezective yellow and remazol blue shows the maximum absorption.

“4. CONCLUSION”

In this research work, it was observed that, depth of color varies between the self shade and combine shade. In case of combine shade it was found that novacron dyes is better but up to certain shade% i.e 3% and above this shade% bezective dyes shows the maximum dye uptake. On the other hand different dye absorption have been found for different brand when we observed the self shade. For self shade novacron red and yellow dyes are better and in case of blue sometimes remazol and sometimes bezective dyes shows the better absorption.
For dark shade bezective red, novacron yellow and remazol blue better. In case of extra dark shade bezective s matrix, bezective yellow and remazol blue shows the maximum absorption.

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“6. AUTHOR CONTRIBUTION”

Md Shamim Alam and Md Muzahidur Rahman Chowdury carried out the study and drafted the manuscript. Both authors read and approved the final manuscript.

“7. CONFLICTS OF INTEREST”

The authors declare no conflict of interest.

“8. REFERENCES”