

Effect of Detergents on the Colour Fastness of Cotton Fabrics

Abstract

Apparel can enhance or undermine appearance. As we say "face is the index of mind", similarly apparel of a person is the index of his status, nature gravity and character. The choice of cleaning agents is very difficult due to the over flooding of market by so many new varieties of detergent. To study the effect of detergents on the colourfastness of color fabrics were observed by computer rating as well as grey scale method. The fastness properties were studied and samples were evaluated on computer. Turquoise blue cotton cloth was selected for the study. After experiments color fastness observations was taken on soil fabric and washed with three detergents. Out of three detergents studied wheel shows good fastness property with regard to loss in colour value and tone variations as compared to 'Surf' and Nirma under the conditions surf showed higher loss of colour and variations in tone.

Keywords: Detergent, Colour Fastness, Fabrics, Turquoise

Neelam Agrawal

HOD

Deptt. of Fashion
Technology, Govt. Women's
Polytechnic Jabalpur,
Madhya Pradesh

Shibani Chatterjee

Rtd. Principal,

Govt. Science College,
Jabalpur, Madhya Pradesh



Maneesha Thakur 3

Research Scholar,
Jabalpur, Madhya Pradesh

Introduction

A man is known by his dress and address. As we say "Face is the index of mind", similarly apparel of a person is the index of his status, nature, gravity and character". An immaculately garbed person is appreciated by all. Well cared clothes reflect the dignity of the wearer. The choice of cleaning agents is very difficult due to the over flooding of market by so many new varieties of detergent.

Colour fastness of textile materials is of considerable importance to the consumer, dyestuff manufacturer and dyer or printer. A large number of methods have been published by the Bureau of Indian standards to assess the colours fastness of textile materials towards various agencies to which the textile material is subsequently exposed during use such as light, washing, dry cleaning, perspiration, rubbing, hot pressing, bleaching etc.

Whiteness and yellowness tests were performed on computer as well as visual rating method and subjective method, By this method the treated fabric after washing, were observed for their appearance.

Method and Materials

To study the effect of detergents on the colour fastness of cotton fabric firstly to select the common popular brands of detergent by doing survey of housewives. After analyzing the results of survey 3 brands were selected namely Surf, Wheel and Nirma.

The procedure has been divided into the following subsections.

1. Survey of the housewives
2. Preparation of soil and soil samples
3. Washing of soil samples by washing machine
4. Two commercially available fabric were used. These were cotton (Popline) White and colored (Turquoise).

Preparation of Test Samples

For the purpose of uniformity of the sample, white cotton fabric was purchased in bulk, which belonged to the same lot, thus avoiding any disparity in the sample material during the whole work affecting the comparability of the results.

Preparation Of Soil And Soiled Sample

According to Singh O.P. ingredients used for soil are:

- | | |
|-------------------------|--|
| 1. Floor sweep | - Main ingredient of soil |
| 2. Carbon Tetrachloride | - used as a solvent |
| 3. Kerosene Oil | - For emulsion soiling |
| 4. Ground Nut Oil | - Represents general oil contents |
| 5. Animal Charcoal | - Grey Colored pigment to indicate greyness. |

Standard soiling procedure has been developed, in the endeavour that is based on the soiling method used by Jothi Kumar.

Soil Mixture-

- (i) 10 gm floor sweep.

- (i) 10 ml. Carbon tetra chloride.
- (ii) 10 ml. Kerosene oil.
- (iii) 5 ml. ground nut oil.
- (iv) 2 gm animal charcoal.

Method

This mixture was taken in a jar and mixed with one liter of tap water. The mixture was stirred with glass rod to make an almost uniform suspension. The test specimen was put in a jar and shaken with a glass rod 75 times clockwise and 75 times anti clockwise.

The whole process was carried out at room temperature approximately 20⁰ C. The sample is immediately lifted up from the jar after soiling and then transferred to the washing procedure.

Washing of Soil Sample

A standard washing machine was used. The amount of detergent was 5 gm per litre of water each time 2mtr. Cloth sample was used. Three washings were accomplished consequently.

First Washing – 30 gm of detergent was taken with 6 litres of water in the washing machine and at the rate of 1400 rotations/min. The specimen was washed for a period of 5 min. and then rinsed for 2 minutes with tap water at room temperature and then dried in sunlight. To maintain uniformity in time for which the fabric is exposed to sunlight the fabric was dried each time in sunlight for one hour and then tested.

Second Washing – In the second washing procedure was kept the same but 20gm. detergent was used with 4 litres of water.

Third Washing – In the third washing again the procedure part was the same but the amount of detergent was minimized to 10gm/2 litres of water.

Determination of color fastness:

To study the effect of detergents on the color fastness of cotton fabric's observation were taken by computer rating as well as grey scale method. The fastness properties were studied and sample were evaluated on computer, as per method developed by Harshe *et al.* Survey of housewives were also performed to investigate the general ideas prevailing in the activity of laundering. Turquoise blue cotton cloth was selected for the study. The purpose for selecting of this particular color because this color runs of soon and material get fade.

The visual method of shade matching followed in industry is based on trial and error technique. The main drawback in this method is the large number of errors involved. The process becomes tedious and even though perfect shade matching is not obtained. The need was therefore felt for having a rational and scientific approach to the solutions of color matching problems.

A large number of methods have been published by Bureau of Indian Standards to assess the color fastness of textile materials towards various agencies to which the textile material is subsequently exposed during use such as light, washing, dry cleaning, perspiration, rubbing, hot pressing, bleaching etc. We use grey scales for carrying out the test or for assessing the colourfastness ratings.

Method used for assessment of colourfastness using greyscale are subjective,

depending upon the viewing conditions and do not give any quantitative idea of the changes after treatment.

Result and Discussion

After repeated washings and survey of housewives following outcomes has been founded.

Table 1.**Type of cleansing agents used by the housewives**

S.No.	Cleansing agent	% of respondent
1	Soap	32
2	Detergent	59
3	Detergent cake	05
4	Liquid soap	02
5	Soap chips of powder	02

Table 2.**Effect and reaction of detergent/soap on colored cotton fabrics.**

S.No	Effect	Detergent % of resp.	Soap % of resp.
1	Color runs	04	45
2	Color gets faded	64	35
3	No effect	34	20

Table 3:**Color Fastness (Blue Samples) by visual grey scale and computer**

S. N.	Detergent	Washing	Strength (PIS)	Color Difference	Redder Greener	Yellow Bluer	Total Observation By Computer	Visual Grey Scale rating	Computer Rating
1	Surf	1	74.7	3.68	-0.40	1.79	Greener	2-3	2-3
		2	65.6	5.27	-0.72	1.86	Yellower	2	2
		3	55.0	7.21	-0.48	1.97	-	1-2	1-2
2	Nirma	1	89.2	2.16	-0.77	1.32	-	3-4	3-4
		2	73.6	4.16	-0.89	1.36	-	2-3	2-3
		3	82.2	2.99	-0.86	0.72	-	3	3
3	Wheel	1	95.0	1.06	-0.41	0.36	-	3-4	4
		2	79.3	3.13	-0.63	0.79	-	3-4	3
		3	87.3	2.39	-0.92	0.47	-	3	3-4

Fastness rating was obtained from the above data by the method developed in their laboratory.

Table 1 indicates that most of the housewives use detergents for washing their clothes. Table 2 indicates more respondents (45%) are of the view that comparison to soap color of the fabric does not run. 64% feel that color fades on using detergents while 35% feel that the color fades when soap is used. After experiments colourfastness observations on soiled fabric and washed with three detergents after three repeated washings are as under-

Out of three detergents studied wheel shows good fastness property with regard to loss in colour value and tone variations as compared to 'surf' and nirma under the conditions surf showed higher loss of color and variations in tone. By computer The samples were evaluated for reflectance values on color scan 2, DEC350, professional computer, Milton ray company (U.S.A.) in the Hukumchand mills Ltd. R. and D. by the method and the strength and PIS (%)

DER and YB values against original (unwashed fabric) were obtained.

Conclusion

A cleansing agent may be a good restorer of whiteness of white fabric but it should also possess the property of retaining color of the colored fabric even after repeated washing.

A cleanser which causes the taking of color of garment will always be avoided by consumers. For this purpose studied were carried out on colored fabric.

While comparing the restoration of whiteness in white fabric with retention of color in colored it seems that the best restorer of whiteness in white fabric proves to be a poor retainer of color in colored fabrics. It may be attributed to the synthetic whitening agents included in the composition of detergents, which are harmful for the dye on the colored fabric, and thus causing the fading off color.

References

1. Cormany, E. and Ruth, E. 1950. Effect of certain detergent on the service qualities of cotton and spun rayon fabrics. *J. Home Eco.* 42(4):284.
2. Jacob, M., 1990. Care of fabric by consumers. *The Indian Textile Journal*,:150.
3. Kaur, R. et al . 1988. Laundry practices of working and non working women. *The Indian Textile Journal*,:250.
4. Shrivastava, M.L., 1989. Soil release finishes for durable press fabric. *The Indian Textile Journal*,157