



**ORIGINAL RESEARCH PAPER**

**Arts**

**EFFECT OF PRE-TREATMENT OF CHITOSAN ON COLOUR YIELD OF 50:50 COTS-WOOL FABRIC**

**KEY WORDS:** Chitosan, Cots wool Fabric, Colourfastness, K/S Value.

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**ABSTRACT**

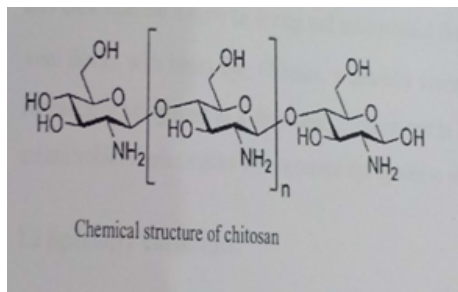
The effect of chitosan on colour yield of cots-wool blend fabric was explored. A cots-wool blend was first pre-treat with 0.25 % concentration of chitosan solution. And Printed samples tested as per standard procedure for their, ability to withstand light (light fastness), washing (washing fastness), Ironing (ironing fastness) and rubbing (rubbing fastness). In addition Speciality Chemicals Such as Benzyl alcohol ,cellulose and trypsin enzymes,monoethenol amine were used to modify the printability of cotton-wool blend then printed with printing paste of direct dye, reactive dye and acid dye.Improvement in colour depth was found without antagonistic effect on colour fastness.

**I. INTRODUCTION**

Blended textile of wool and cotton has many pleasing features like warmth, good moisture absorption, strength and soft handle. IN addition blending of wool with cotton make cots wool fabric cost effective. It is used for winter wear apparels. The aesthetic demand of consumers is satisfied by application of colouring agents on textile by dyeing and printing. Lots of work has been reported on dyeing of cotton wool blend, especially to solve problems in blend dyeing. Single stage and two stage dyeing process have been developed.

However very little work has been done in the area of printing of cotton wool blend. Wool is very hygroscopic and can absorb 20% of its weight of moisture.Thi is because of the presence of polar group and large amorphous regions in its polymer system. Due to the wide variety of functional group present in its molecular structure, it can be dyed with direct, acid, basic and reactive dyes. Cotton has good affinity for dye penetration due the presence of polar group (hydroxyl group). It can be dyed with direct and reactive dye. The difference in the physical, chemical and molecular structure of cotton/wool makes printing of cotton/wool blend difficult in order to attain a uniform shade.

Various chemical and auxiliaries are useful to bring about a modification in the physical structure or to help in swelling of fibres or dissolution of dyes or to increase affinity for dyes. Most classes of dyes are adoptable to one or more of the various types of printing.The choice depends on the purpose. Chitosan is a cationic natural biopolymer obtained by alkaline N-deacetylation of chitin, the most abundant natural polymer after cellulose. It comprises copolymers of glucosamine and N-acetyte glusomine and exhibits many unique properties such as non-toxicity, biocompatibility and biodegradability. It ideally consists of 2-amino-2deoxy-(1-4)-\_D- glucopyranose residues (D-glucosamine units) and may include a small number of N-acetyl-D-glucosamine units. Chitosan is a remarkable biomaterial because of its numerous biological and immunological activities .In particular, its non -toxic and biodegradable properties have attracted considerable attention for biomedical, textile and chemical industries application.



**II.Methodology**

**I. Material**

Fabric Commercially available cotton/wool blend of 50:50 ratios was used.

**I.I Chemicals**

**I.2 Dyes-** Three types of dyes belonging to different class were used:

- Direct dye (Direct Yellow 44)
- Reactive Dye (Reactive Dye 39)
- Acid Dye (Acid Yellow 114)

Others Chemicals- Citric acid, distilled water.

Chitosan	0.25 gm.
Distilled water	50 ml
Citric Acid	5 ml

**III.METHOD**

**Preparation of chitosan solution**The pre-treatment was given to cots wool fabric with chitosan solution. A stock solution of medium viscosity was prepared by dissolving 0.25 gm. chitosan in 50 ml of distilled water. 5 ml of citric acid of 20% concentration was used to assist in dissolution. It was left for 24 hours. Fabric was treated with 0.5%, 1.0%, 1.5% concentration of chitosan before printing

This solution was applied to the fabric with the help of padding mangle, dried in oven at 110 ° C temperature for 10 minutes. Fabric was printed with direct, reactive and acid dye individually.

**IV. Effect of pre-treatment of Chitosan on Cots-Wool Fabric**

As is evident, colour yield increased when cotton wool blend, pre-treated with chitosan was printed with direct dye and reactive dyes but reverse trend was observed with acid dye.

Evenness and sharpness of print of direct and reactive dyes were also highest when sample was pre-treated with chitosan but texture of untreated sample was found best

Chitosan	Dyes	Colour Depth (w.m.s.)	Evenness Of Print (w.m.s.)	Texture (w.m.s.)	Sharpness of outline (w.m.s.)
	Direct Dye				
Control		1.8	3.5	4.13*	2.75
Pre-treated		5*	5*	3.62	4.62*
	Reactive Dye				
Control		1.68	2.43	2.13	2.5
Pre-treated		4.5*	4.25*	3.12*	4.75*

	Acid Dye				
Control		2.53	3.00	4.48*	3.0*
Pre-treated		2.12	2.5	3.38	1.75

Table III. Shows the effect of chitosan pre-treatment on print quality i.e. depth of shade, evenness of print, and sharpness of outline as well as the texture of cots-wool blend fabric.

It can be concluded that print of good colour yield and superior sharpness, evenness as well as texture were obtained when fabric was printed with direct and reactive dyes after pre-treatment with chitosan.

**V. Determination of Colourfastness of printed samples**

The colourfastness of dye is very important from practical point of view for the manufacturer as well as consumer. It is essential to ensure that fastness of colour is sufficient to meet general and particular requirement. That is way in this study printed cots-wool blend was determined. Printed samples were subjected to testing as per standard procedure for their, ability to withstand light (light fastness), washing (washing fastness), Ironing (ironing fastness) and rubbing (rubbing fastness).

Treatment	Dye	Washing		Wet Ironing Light		Dry rubbing		Light
		CC	SC	CC	SC	CC	SC	
		Control	Direct	3	3	4	4	
Control	Reactive	3	3	4	4	4	3	4
Control	Acid	3/4	3	4/5	5	4	3/4	5
Pre-treatment With 1.5% Chitosan	Direct	4	4	5	5	5	5	5
Pre-treatment With 1.5% Chitosan	Reactive	4/5	4	5	5	5	5	5
Pre-treatment With 1.5% Chitosan	Acid	4/5	3/4	5	5	5	5	5

**VII. RESULT AND DISCUSSION**

The present study was conducted to find out the effect of pre-treatment with chitosan on colour yield of 50:50 cots wool .IN case of cots wool blend dyeing is well and printing is well established technique although it is not easy task considering the difference in dyeing characteristics of cotton and wool fibres.

Print of good colour yield and superior sharpness, evenness as well as texture were obtained when fabric was printed with direct and reactive dye after pre-treatment with chitosan.

Colourfastness improved after giving pre-treatment. Excellent to good fastness to washing, ironing and rubbing was seen with all the dyes printed on the cots-wool blend fabric.

**VIII. CONCLUSION**

It can be concluded that printing of cots wool blend after pre-treatment with 0.25% chitosan solution improve the colour yield. When the cots wool blend fabric printed with direct and reactive dye, gives excellent print quality as well as excellent colour fastness to washing, ironing and rubbing.

**REFERENCE**

[1] Mehra, R.H, R Anil Mehra, R Arun (1991), speciality chemicals for the processing of wool-1, Colourage, Vol.38  
 [2] Shukla. R and Gokhale, S.V. (1989). a useful tool for controlling viscosity of print paste on the shop floor, colourage, vol-36  
 [3] Shrivastava, H.C(1991) Rational for Delection of thickener for textile printing, colourage Vol-38.  
 [4] Teli, M.D et.al.(2003) Rhedogical study of Thickeners, Colourage, Vol- 50  
 [5] Corbman, B.P(1993)Textile Fiber to Fabric, Mc Graw-Hill Book Compony, New York, Th Ed.  
 [6] Booth J.E (1968)Principles of textile testing an dyeing, 3rd .Newness-Butler

worth:London.

[7] Marsh J.T.An Introduction to Textile finishing, BI.Publications, Mumbai.  
 [8] Shenai V.A..(1996), Chemicals, sevak publication Mumbai.  
 [9] Trotman E.R.(1975), Understanding Textile. Machmillon publication Co new york