

# Mordant Printed Cotton Fabric Dyed in Natural Dye

**Sunita Kale, Sangita Naik and Rashmi Gaikwad**

*Dept. of Clothing and Textiles College of Home Science, MAU, Parbhani - 431 402 (MS).*

**The traditional craft of block printing with natural dyes can be expanded to suit the present day market demand without changing the glory of the old technique of block printing with natural dyes. But there is no standardized procedure of block printing with mordant and subsequent dyeing with natural dyes. The range of dyes used by the artisan is very limited. The people involved in dyeing and printing with natural dyes have no idea about the fastness of the dyes and of the print obtained using these dyes. The present article involves standardizing the procedure of printing with natural dyes and their evaluation in terms of the colour fastness of the prints.**

## INTRODUCTION

Printing is an ancient art of decorating textiles. Block printing was one of the most commonly practiced methods of printing textiles used since long time. In some part of India particularly in Rajasthan and Gujarat the age-old art of block printing on cotton fabric with natural dyes using different mordants is still practiced. The technique of fixing colour to woven cloth to create pattern and compositions involves use of resist or mordant or combination of two applied with a brush or wooden block or through stencil. Mordant resist textile decoration technique involves the printing of dyestuff that will react with mordant prepared cloth or alternatively. The painting or printing of mordants on to cloth which when immersed in colour bath will cause the dye to react and be fixed by the pattern of applied mordant.

Natural dyes obtained from different parts of plant, animal residues and some of the minerals are non-toxic, non-allergic, biodegradable and eco-friendly. The traditional craft of block printing with natural dyes can be expanded to suit the present day market demand without changing the glory of the

old technique of block printing with natural dyes. But there is no standardized procedure of block printing with mordant and subsequent dyeing with natural dyes. The range of dyes used by the artisan is very limited. The people involved in dyeing and printing with natural dyes have no idea about the fastness of the dyes and of the print obtained using these dyes. Hence the research has been oriented towards standardizing the procedure of printing with natural dyes and testing the colour fastness of the prints.

## MATERIAL AND METHODS

**Scouring:** The fabric was scoured with 1% soap solution for one hour to remove impurities and finishing agents. The fabric was then washed in plain water three to four times with MLR 1:20

**Myrobalan treatment:** Myrobalan powder was soaked in water for twelve hours. The solution was filtered and fabric was introduced in the solution and soaked for three hours with material to liquor ratio as 1:20. Myrobalan powder was calculated on the basis of weight of the fabric (for 100 gram of



fabric – 20g myrobalan is 20%) The material was then dried under sun by spreading it on plain surface.

### Selection of mordants

Three mordants namely alum, stannous chloride and ferrous sulphate were selected for block printing cotton fabrics.

S. No.	Mordant	Percentages
1.	Alum	5,10,15,20
2.	Stannous chloride	2,3,4 and 5
3.	Ferrous sulphate	2,3,4 and 5

### Printing

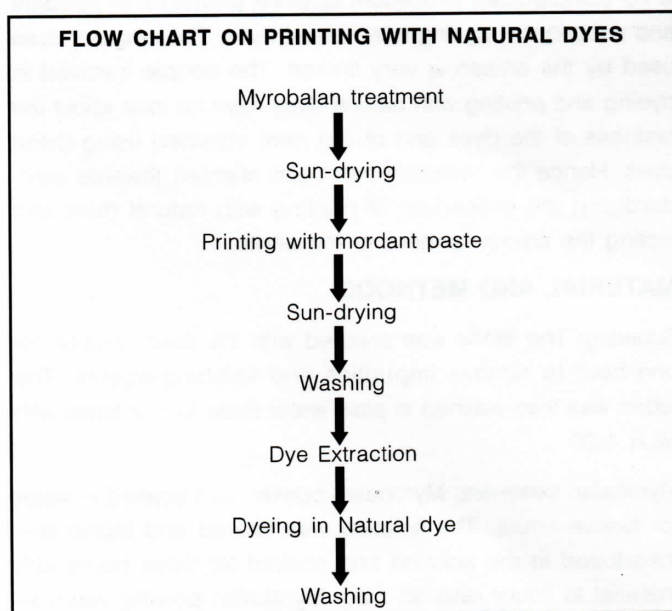
The proper concentration of the mordant was optimized with the help of subjective evaluation of the prints on the basis of clarity of design, sharpness of design and level of shade developed. Two best concentrations from each of the three mordants were selected and in total six best samples were selected. Myrobalan treated cotton fabric was block printed with mordant paste prepared by adding 3% starch. After printing samples were dried in sunlight for 30 minutes and were then aged for one day.

### Dyeing in Flame of Forest dye

The dye was extracted in aqueous medium using 6% concentration of dye material by boiling for 30 min. The extract was then strained and the fabric printed with mordant was then dyed in extracted Flame of Forest dye with MLR 1:20 (by weight) for 30 min. and then washed

### After-treatment given to printed samples:

After dyeing the samples were given after treatments in 5% concentration of Vinegar Common salt, Alum, Limejuice, Sodium carbonate solutions at room temperature for 30 minutes.



### Analysis of the printed samples:

#### Subjective evaluation

A panel of 10 judges (experts in the field) was constituted in order to conduct subjective evaluation of the design of samples. The judgment was done on a five-point scale. Subjective evaluation of the design was based on clarity and sharpness of design and on level of shade. Subjective evaluation was done for optimization of mordant concentration and also for the after treated samples for different mordants.

#### Objective evaluation

Colorfastness test were performed on the samples printed with different concentrations of mordants and also on after treated samples printed with selected concentrations of mordants for assessing the fastness to sunlight, washing and crocking both dry and wet by following the standard procedures laid by BIS.

## RESULTS AND DISCUSSION

### Subjective evaluation of samples for optimization of mordants

The optimized concentrations of alum for dyeing with Flame of Forest dye were 15% and 20%. The designs obtained using this mordant exhibited good clarity and sharpness of design and fairly good level of shade. Optimized concentrations of Stannous Chloride were 4% and 5%. Samples printed with Stannous Chloride mordant gave good clarity and sharpness of design and level of shade while samples printed with Ferrous Sulphate showed very good clarity, sharpness of design and level of shade and its optimized mordant concentrations were 4% and 5%.

### Subjective evaluation of mordant printed, dyed and after-treated samples

After-treated samples printed with Alum mordant and dyed with Flame of Forest dye showed fairly good clarity of design, sharpness of design and level of shade. Stannous Chloride mordant printed and after treated samples showed good to very good clarity of design, sharpness of design and level of shade and Ferrous Sulphate mordant printed after-treated samples exhibited very good clarity of design, sharpness of design and level of shade.

### Objective evaluation of mordant printed after-treated samples.

Table 1 indicates fastness grade of samples printed with alum dyed with Flame of forest dye. All the samples dyed showed excellent to outstanding sunlight fastness. Hue change was observed in the samples after treated with Vinegar, Alum and limejuice but no colour staining in washing. Slight colour change and noticeable colour staining was seen in wet rubbing and colourfastness to dry rubbing found to be excellent.



**Table 1.** Fastness grades of samples printed with alum dyed with Flame of forest dye

S. No	Treatments	Sun light	Fastness Properties					
			Washing		Wet Crocking		Dry Crocking	
			CC	CS	CC	CS	CC	CS
1	Vinegar	7/8	*	4/5	4	3	5	4/5
2	NaCl	7/8	5	5	4	3	5	5
3	Alum	7/8	*	5	3/4	3	5	4/5
4	Lime Juice	7/8	*	4/5	4/5	3	5	5
5	Na <sub>2</sub> CO <sub>3</sub>	7/8	4/5	4	4	3	5	5

CC- Change in color CS- Color Staining \* Hue Change

**Table 2.** Fastness grades of samples printed with Stannous Chloride dyed with Flame of forest dye

S. No	Treatments	Sun light	Fastness Properties					
			Washing		Wet Crocking		Dry Crocking	
			CC	CS	CC	CS	CC	CS
1	Vinegar	CI	5	5	*	4	5	5
2	NaCl	CI	5	5	*	4	5	5
3	Alum	CI	*	5	4/5	3/4	5	4/5
4	Lime Juice	CI	*	5	*	4	5	5
5	Na <sub>2</sub> CO <sub>3</sub>	CI	3	5	3/4	3	5	5

CC-Change in color CS-Color Staining CI-Color Increase \* Hue Change

**Table 3.** Fastness grades of samples printed with Ferrous Sulphate dyed with Flame of forest dye

S. No	Treatments	Sun light	Fastness Properties					
			Washing		Wet Crocking		Dry Crocking	
			CC	CS	CC	CS	CC	CS
1	Vinegar	7/8	*	5	5	3/4	5	5
2	NaCl	7/8	4	5	5	3/4	5	5
3	Alum	7/8	*	5	4	3/4	5	4/5
4	Lime Juice	7/8	*	5	4	3/4	5	5
5	Na <sub>2</sub> CO <sub>3</sub>	7/8	4/5	5	4	3/4	5	5

CC- Change in color CS- Color Staining \* Hue Change

Table 2 depicts fastness grades of samples printed with Stannous Chloride dyed with Flame of forest dye. Colour increase was observed in samples printed with Stannous

Chloride mordant when subjected to sunlight fastness test. Hue change was observed in the samples after treated with Alum and limejuice but no colour staining in washing. In wet crocking hue change was observed in the samples after treated with vinegar, Alum and limejuice and slight to noticeable colour staining. Colourfastness to dry crocking found to be excellent.

Fastness grade of samples printed with Ferrous Sulphate dyed with Flame of forest dye are shown in Table 3. Samples printed with Ferrous Sulphate mordant showed excellent to outstanding sunlight fastness. Hue change was observed in the samples after treated with Vinegar, Alum and limejuice but no colour staining in washing. In wet crocking slight colour change and considerable colour staining was observed. Colourfastness to dry crocking found to be excellent.

## CONCLUSION

Concentration of dye source optimized for dyeing with Flame of Forest dye was 6%. Concentrations of mordants optimized for printing and dyeing with Flame of Forest dye were Alum- 15 %and 20%, Stannous Chloride and Ferrous Sulphate – 4% and 5%. All the samples dyed with Flame of forest dye and printed with Alum showed good clarity of design, sharpness of design and level of shade while samples printed with Stannous Chloride mordant exhibited good to very good clarity of design, sharpness of design and Ferrous Sulphate mordanted samples showed very good clarity of design, sharpness of design and level of shade. All the samples dyed with Flame of forest dye and printed with different mordants exhibited excellent to outstanding sunlight fastness and samples printed with Stannous Chloride showed colour increase. Slight colour staining and hue change was observed in the samples

after treated with Vinegar, Alum and limejuice in washing and in wet crocking. Colourfastness to dry crocking found to be excellent.

## REFERENCES

- Desai (1992) Ecological and Toxical properties of dyestuffs, Colourage 39,12: 51-54.
- Gillow John and Barnard Nicholas (1991) 'Traditional Indian Textiles' Thames and Hudson Ltd. London 137.