

To Study the Mordanting Method of Myrobalan with Dyeing of Hibiscus Rosa on Cotton Fabric

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Abstract

Natural dyes are derived from renewable resources, and the use of these dyes contributes to the maintenance of nature. A dye can usually be described as a colored substance that has a connection to the molecule used. The dye is generally applied in an aqueous solution, and may require a mordant to improve the fastness of the dye on the fiber. In this research Hibiscus Rosa flower used to dye the cotton fabric with myrobalan mordant in three leveling of pre, simultaneous, post mordant method and optimized color strength of the dyed fabric.

Key Words: *Cotton, Natural Dye, Hibiscus Rosa, Mordant, Myrobalan, Colour Strength, Colour Fastness.*

1. Introduction:

For the thousands of years human being have used natural color for a lot of purpose. Today reveals the late old age due to the global emerging interest in protecting environmental pollution (Siva,R.2007). Production of synthetic dyes involves many violent chemical reactions and the emerging supplements should be encouraged in water or in the atmosphere. The uninterrupted use of synthetic dye and detergents of waste water in the waste water has led to brutal results and a terrible load in the environment Synthetic dyes are the two products of petroleum and some of

the toxic / cancerous aminos are skin-allergic and hazardous to human health (ML GulRajani and Deepti Gupta,1992).

They are free of soil pollution and have been placed in the world in the age of environmental and environmental consciousness due to soil pollution. Environmental pollution is gaining prominence as one of the most challenging issues facing the human race at present. Textile industry, delayed, bombarded with accusations of its products being cancerous, allergic and miscarriages. (Warren W.1997) .In this study, attempts are made to identify such sources of natural dye, which are derived from the flower of a rose hibiscus dye to cotton cloth. It is the most widespread flower in the world, especially in India, where it gives a reddish hue to a plant flower red and oval shaped leaves. (Glower Brian 1998). That dye had low fastness so, that only mordant used for observing and fixing agent. Mukherjee A.2005). The myrobalan available all over the world and it have very good tannin content. In this research the dried myrobalan fruit peel used as a mordant in dyeing of Hibiscus Rosa on cotton fabric.

2. Material and Methods:

2.1. Material

2.1.1. Fabric:

Scoured cotton woven fabric with Ends/Inch of 72, Picks/inch of 66 and Grams /m² of 90 was used for dyeing.

2.1.2. Dye and mordant:

Hibiscus Rosa, Myrobalan, Ash water, Anatto Seed

2.2Methods

2.2.1Pilot study:

The researcher did the pilot study for optimize the process parameters of material liquor ratio, temperature, ph, mordant concentration for dyeing, mordanting, extraction process. As per the pilot study the process variable was optimized.

2.2.2Extraction of Mordant:

The dried myrobalan powder of 20 gram was taken in dye bath with material liquor ratio of 1:30 at 8 ph in temperature of 60c for 30 min. the solution was filtered and stored in container

2.2.3Extraction of Dye:

To take 20% of dried Hibiscus Rosa flower powder in a dye bath keeping material liquor ratio of 1:30 at 8 ph temperature of 60⁰c for 30 min. Then the liquid to be filtered.

2.2.4 Mordanting:

The calculated amount of myrobalan powder was taken in dye bath at 20% of concentration for 30 minutes at 80°C, MLR of 1:30 after thirty minutes the mordanted fabric was taken out and washed with tap water

2.2.5 Dyeing:

Dyeing was carried out in an open bath beaker dyeing machine equipped with programmable control of temperature and time. The wetted cotton fabric was entered into the dye bath containing 20% dye solution at 80°C in material liquor ratio of 1:40 and dye was continued for 60 minutes at the end of dyeing the dyed samples were rinsed, soaped with natural soap and water (annatto seed), squeezed

2.2.6 Determination of Colour Strength:

The colour of the sample was evaluated with a Gretag Macbeth color eye 7000a spectrophotometer with illuminant D₆₅ 10° observer in terms of reflectance values given for the wavelength of maximum value and CIE L*a*b* C_h data. The reproducibility of the results was also checked. The colour strength of the dyed samples expressed in terms of K/s (Kubelka-Munk function) is given by:

$$K/s = \frac{(1-R)^2}{2R}$$

where, “K” is absorption coefficient; “S” is the reflectance at complete opacity

2.2.7 Colour Fastness Determination:

Colour fastness to washing was assessed as per AATCC Test Method 61-1996 Test No. 2A. Evaluation of colour fastness to crocking was accomplished by AATCC test method 8-1996 using a Crockmeter. Colour fastness to perspiration was determined using AATCC test method 15-1997 using a perspirometer. Colour fastness to light was accomplished by AATCC Test Method 16-2004 (20afu)

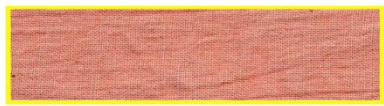
3. Result and Discussion

3.1 Effect of Mordant on Colour Strength:

To optimize mordant method of pre, post, and simultaneous mordanted fabric were dyed in Hibiscus Rosa flower on cotton fabric with constant process condition. The pre mordanted dyed fabric achieved maximum colour strength the value presented in Table 1. Among the mordanted dyed sample pre mordanted sample recorded maximum K/s value 91.42 for 30% of dye shade, material liquor ratio of 1:30 and temperature of 80°C time one hour. However the pre mordant dyed sample uptake more dye during dyeing compared to other post and simultaneous

method. It observed that all the dyeing have their colour coordinates positive with regard to a^* (red-green) and b^* (yellow-blue) and therefore all of them lie in the yellow-red quadrant of the colour space diagram. The value of coordinate a^* were found to be much lower than b^* with the values of mordanted samples ranging from 4.638 (pre mordanted) to 7.528(simultaneous mordant) the value of b^* for pre mordanted sample have 10.54 to 7.528 of simultaneous mordant. L value of pre mordant have low because of premordant have dark shade compare to simultaneous and postmordant method

Table1. The k/s values and colour co-ordinates of samples pre, post, simultaneous and dyed with flower extract of Hibiscus Rosa

s.no	Mordant method		K/S	L^*	a^*	b^*	Sample Picture
1	Pre mordant		91.4226	84.807	4.638	10.524	
2	Post mordant		75.6832	83.619	7.479	6.656	
3	Simultaneous Mordant		82.73215	85.046	7.528	11.535	

K/S= colour strength, L^* =light and dark, a^* =(red-green), b^* =(yellow-blue)

3.2 Colour Fastness of dyed sample

The colour fastness of the dyed samples with respect to washing, crocking, perspiration and light are presented in table value (table2). the pre mordanted dyed sample have good washing, light, perspiration ,rubbing compare to post and simultaneous method however the use of mordants improved the light fastness considerably. The maximum recorded with ferrous sulfate.

Table2.Colour fastness properties of dyed cotton sample with pre, post, simultaneous mordanting method

s.no	Method of mordant	WASHING		RUBBING		LIGHT	PERSPIRATION			
		CC	SC	Dry	Wet		Alkali		Acidic	
							CC	SC	CC	SC
1	Pre mordant	5	4/5	5	4	6/7	5	4/5	5	4/5
2	Post mordant	4	4	4	¾	5/6	4/5	4	4	4

3	Simultaneous mordant	4/5	4	4/5	4	6	4/5	4	4/5	4
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Conclusion:

In this research to optimized the mordant method on cotton fabric used with Hibiscus Rosa flower extract. and colour fastness also studied. the pre mordanted dyed fabric recorded maximum k/s value of 91.4226 it observed that all the dyeing have their colour coordinates positive with regard to a^* (red-green) and b^* (yellow-blue) and therefore all of them lie in the yellow-red quadrant of the colour space diagram. The colour fastness of pre mordant dyed sample had good washing, light, rubbing, perspiration fastness among simultaneous and post method

Reference:

1. Warren W.1997 *Tropical Plant for home and Garden and Hudson new York* 240pp
2. Mukherjee, maulik s.r., choudhary, p.k. and mitra, A.2005. *Application of Textile Trends* 48:37-45.
3. Siva, R.2007 *Status of Natural Dyes Dye Yielding plants in India* correct scig 92(7)916-925
4. *ISI hand book of Textile Testing* 1982 new Delhi. Indian Standards Institution 538-539, 550-551
5. *Natural Dyes and Their Application to Textile*, edited by ML GulRajani and Deepti Gupta (IIT Delhi)1992.
6. Glower Brian ,j.soc Dyers colour, 114(1998)4.