

DYE THE FABRICS USING NATURAL DYESTUFF

Neetu Singh, Dr. Ritu Pandey, Dr. Archana Singh and Tara Rana

Received 25 Oct, 2016, accepted on 23 June. 2017

ABSTRACT

Natural dyes are **dyes** or colorants derived from plants, invertebrates, or minerals. The majority of **natural dyes** are vegetable **dyes** from plant sources—roots, berries, bark, leaves, and wood—and other biological sources such as fungi and lichens.

Natural Dyes are usually used with a mordant to make them "stick" to the fabric and generally give more muted tones on plant fibers like cotton and rayon, but are brilliant on wools and silks.

Natural dyestuff such as Madder (*Rubia tinctorium*) 25g considered as queen of natural dye stuff used along with alum mordant 5g in 5 liter water, was boiled at 100 degree Celsius to produce red color and madder dye 25g with alum 3g or cream of tartar 2g total mordant (5g) in 5 liter water (82-99 degree Celsius), to obtain orange color. Whereas Indigo (*Indigofera tinctoria*) 25g king of natural dye stuff with alum mordant 5g in 5 liter water to obtain blue hue was used and simultaneous method of mordanting was done. It has properties to save time, energy and water. Least toxic mordant alum was mostly used, being eco-friendly and found good washing and light fastness it was used to prepare ethnic garments range for women.

Key Words: Natural Dye, Bandhani, *Rubia tinctorium* (Madder), and *Indigofera tinctoria*.

INTRODUCTION

Bandhani is a type of tie & dye style for decorating textile primarily by holding the cloth with fingernails or metal rings and tying into many tiny bindings that form a figurative design.

1. **Neetu Singh**, Department of Textiles and Clothing, CSA University of Agriculture & Technology, Kanpur, UP
2. **Dr. Ritu Pandey**, Department of Textiles and Clothing, CSA University of Agriculture & Technology, Kanpur, UP
3. **Dr. Archana Singh**, Department of Textiles and Clothing, CSA University of Agriculture & Technology, Kanpur, UP
4. **Tara Rana**, Design Department (CAD), Indian Institute of Carpet Technology, Bhadhoi, UP
Corresponding author: csapradeep8@gmail.com

Ranganaar, is the specific word which denotes the dyer of bandhani. Traditionally natural resources of dye are used in bandhani. Mordants have affinity for both textile fibers and dyes and thus they act as a link between the fiber and dyestuff. Natural dyes are considered to be eco-friendly as these are obtained from renewable resources as compared to synthetic dyes which are derived from non renewable petroleum resources.

METHODOLOGY

Preparation of dye source

(a) Natural dye source

All natural dye sources were collected in standardized powder dye form, and were used directly for dyeing.

(b) Preparation of mordants

All mordants that were used (alum and tartaric acid) were available in ready to use form.

Process of dyeing

Chemical required – Alum

Dye used –Madder dye (dried root powder)

Trade name- Rubia tinctorium

Dyeing condition- The material should be in ready for dyeing (RFD) state.

Dyeing process (madder/madar dye)

The raw material was dyed with madder dye. Dye was powdered and mixed into $\frac{1}{4}$ cup of hot water and stirred continuously until dissolved. Dissolved madder was added into a large amount of water (material to liquor ratio 1:20). The alum mordant was dissolved in a separate jar with warm water. Alum solution was added into the madder (5gm in 5litre solution) and stirred well. The solution was heated upto 100 degree Celsius temperature and hold there for 60 minutes, the liquid appeared red, cotton fabric was added and solution was continuously stirred. The pre washed fabric was added into the dye bath and stirred gently. Firstly only fabric was immersed for 5 to 10 minutes to absorb the maximum color and the fabric was removed from the dye pot. The indigo dye was "oxidizing" again, and become once more insoluble in water, a desired depth

of shade was obtained and the fabric was washed in hot water to remove the chemicals and excess dye. This was very important process, or the dye will “crock” or rub off

RESULT AND DISCUSSION

Description of natural dye stuff (Eco-friendly dye)

For dyeing it was decided that only standardized dye sources were used. Two dyes named indigo and madder was used with various mordants and temperature.

Natural dye stuff no.1.

Madder dye: The madder dye (*Rubia tinctorium*) powder was purchased from Gujarat (from a dyer’s home)

Obtained color.1. Red

2. Orange

(a) Dyeing method.1: For obtaining red color from madder dye, water was boiled 100 degree Celsius temperature and 25 gram madder dye was added to 5 liter boiling water along with mordant(5gram), plate 1.

Used mordant: Alum

(b) Dyeing method.2: For obtaining orange color from madder dye, simmering method was used. Water was simmered at 82 to 99 degree Celsius temperature and 25 gram madder dye was added to 5 liter water along with mordant (5gram),plate 2.

Used mordant: Alum 3g or tartaric acid 2g

(c)Dyeing method.3

Indigo dye: To obtain blue color indigo dye stuff (*Indigofera tinctoria*) was used. It was available in dry powder form. Simmering method was used and 10 gram indigo powder was added to “5 liter” simmered water along with mordant (5gram), plate 3.

Used mordant: Alum

Method used for mordanting process:

Meta mordanting / simultaneous mordanting

The advantage of simultaneous mordanting are time saving, water saving and energy saving.



Plate:1



Plate: 2

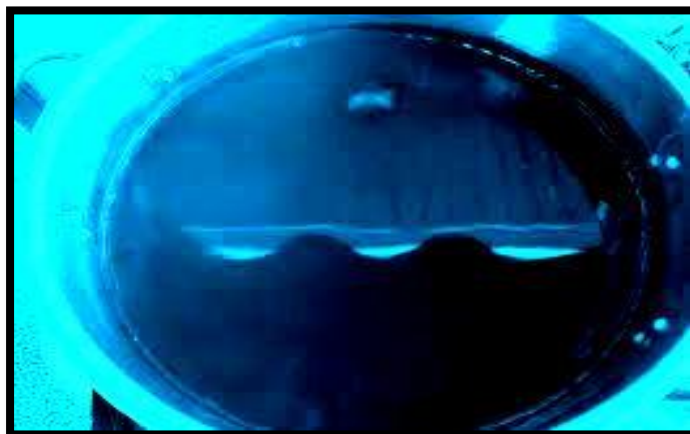


Plate: 3

BRIEF DISCRIPTION

Mordant	Method of Mordanting	Temp.	Dye source	Raw material	Color obtained	Color quality	Color fastness
Alum	Simultaneous Method	82 to 99 degree Celsius	Indigo	Mulberry silk	Blue	Excellent	very good
Alum	Simultaneous Method	Up to 100 degree	Madder	Chino Cotton	Red	Very good	Very good
Alum, tartaric acid	Simultaneous Method	82 to 99 degree Celsius	Madder	Gauze Cotton	Orange	Excellent	Excellent

SUMMARY AND CONCLUSION

The dyed fabrics were prepared by simmering and boiling method because it was found that sample that was simmered and boiled, acquired darker and even shades of color than soaked.

As the chemicals used as mordants are not safe to the environment and human life, so Alum (non- toxic) and cream of tartar least toxic were used for mordanting.

Prepared dye solution from natural dyes shows very good to excellent hues, and prepared range of ethnic wear is also very good to excellent.

Only one method of mordanting (Simultaneous mordanting) was tried due to advantages such as time, energy and water saving.

Women's ethnic textiles range in including skirt along its upper garment plate:1, and 2 saree was prepared employing the tying and dyeing process using natural dye by cotton and silk fabric plat1:2 and 3.

Prepared dye solution from natural dyes shows very good to excellent hues and prepared range of ethnic wear is also good to excellent.



Plate:1

Plate:2



Plate:3

Reference

- Kulloli S. D., Naik S. D. (2014) Designing** eco friendly fabrics from naturally colour lited cotton. 9(1):157-161.
- Mongkholrattanasit R., Saiwan, C., Rungruangkitkrai, N., Punrattanasin, N., Sriharuks K., Klaichoi., Nakpatho, C. M. (2016) Eco dyeing of silk fabric with Garcinia dulcis (Roxb.) Kurz bark as a source of natural dye by using the padding technique.** 13(1):65-76.
- Naik S.R (2006) Dyeing and printing of natural and synthetic fibre/fabrics by vegetable dyes.** 1(5)11-60.
- Pisitsak P., Hutakamol J., Thongcharoen R., Phokaew P., Kanjanawa K., Sakseng N.** Improving the dye ability of cotton with tannin rich natural dye through pretreatment with whey Protein isolate. 7(9):47-56.
- Saravanan P., Chandramohan G., Saivaraj S., Deepa, D. (2013) Extraction and application of eco friendly natural dye obtained from barks of Odina wodier L. on cotton fabric.** 3(2):80-85.
- Saxena S., A. S. M. Raja (2014) Natural Dyes: Sources, Chemistry, Application and Sustainability.** 978-981
- Subhashini, S.; Rajalakshmi, R.; Keertheeswari, N. V. (2009) A systematic and scientific approach to the extraction and dyeing with a natural dye on silk annatto seeds dye.** 25(1):77-87