

“Application of natural dyes with biomordants for coloration of cotton”

Sanjeeda Iqbal, Arif Patel

Department of Botany, Govt. Holkar Science College, Indore, Madhya Pradesh- 452017 India.

Abstract

The present study focus on dyeing of cotton fabric with the natural dye obtained from two different plant as Turmeric (*Curcuma longa*) and Eucalyptus (*Eucalyptus sp.*). Biomordants were applied on scoured cotton fabric in premordanting process of dyeing. Three different biomordant pomegranate rind, myrobalan, and alum were used. The use of selected biomordant not only improved the colour fastness but also gave a variety of shades. The shade of fabric depends on specific mordant. These findings reveal that the all mordants are good in combination of two natural dyes. But myrobalan has given the excellent washing fastness with both the dyes resulted in different colour appearance.

Key words: Natural Dye, Biomordant, Cotton, Premordanting

Introduction

Today the protection of environment has become a challenge for the chemical industries worldwide among which textile industries uses a fairly large number of chemicals for dyeing and printing. Natural dyes are colorant derived from plants, invertebrates or minerals. The majority of natural dyes are obtained from bark, leaves and wood of plants and other biological sources such as fungi, lichen etc. Dyeing is the process of imparting colours to a textile material. Dyes extracted from plant parts are used to colour the fabrics on different temperature and time. Natural dyes are the eco friendly which do not harm the human body as compare to synthetic dyes. The widely and commercially used synthetic dyes impart strong colour but cause cancer in human beings and inhibition of photosynthesis of aquatic plants. Mordants are metal salt which produce affinity between dye and fabric (Vanker *et al.*, 2009). Chrom, Stannous chloride, copper sulphate, ferrous sulphate etc. are commonly used chemical mordants (Samanta and Agrawal, 2009). Mostly, natural dyes are used to develop colour on fabric with the help of synthetic mordants. However, in present work natural dyes extracted from Eucalyptus leaves and Turmeric rhizome were applied with three biomordants Alum, Pomegranate rind and Myrobalan.

Material and method

Preparation of Raw Material: The samples were collected and washed thoroughly with water to remove any impurities. After drying at room temperature, the samples were ground into powder with the help of grinder (Win and Swe, 2008).

Extraction of Crude Dyestuff: 100g of sample taken in beaker and aqueous solution of dye was prepared in water bath at 60 °C for 60 minutes. The solution was filtered to obtain crude dye stuff. Same processes were followed for preparation of mordant solution.

Scouring of Fabric: scouring of cotton cloth was done by washing in sodium carbonate and detergent solution at 90 °C for 60 minutes. the scoured fabric was thoroughly washed with tap water and dried at room temperature.

Dyeing: Scoured cotton was treated with both dye extract and biomordant simultaneously, at 60 °C for 60 minutes with material to liquor ratio of 1:40.

Table 1: Condition for Dyeing

Dye	Mordant	M:L	Temperature	Time
20% owf	20% owf	1:40	60 °C	60 minutes

Owf: Oven weight of Fabric

Evaluation of Colour fastness: The dyed material was tested for washing fastness. The colour fastness is usually rated either by loss of depth of colour in original sample or is expressed by staining scale (Samanta and Agarwal 2009, Adeel et al 2009).

Results & Discussion

The above process of dyeing done with the combination of natural dyes and biomordants. Two types of dye

extract were taken in dyeing process as Eucalyptus leaves and Turmeric rhizome with three biomordants as Alum, Myrobalan and pomegranate rind. Results shown the six shades of colour obtained on cotton fabric, after dyeing with different mordants viz. Alum, Pomegranate rind and Myrobalan. Turmeric with Alum showed dark yellow coloration while turmeric with myrobalan & turmeric with pomegranate rind both samples showed light yellow coloration. Eucalyptus with alum developed light khaki colour whereas, eucalyptus with myrobalan and eucalyptus with pomegranate rind developed khaki colour. The evaluation of colour fastness to washing of dyed samples were tested by standard method. The sample treated with myrobalan showed excellent washing fastness. Alum treated samples exhibit good to excellent fastness whereas, washing fastness grades of pomegranate rind ranged between moderately good to excellent.

Table 2: Fastness Properties of dyed fabric

S.No.	Fabric	Dye Extracted Material	Mordant	Colour obtained	Washing fastness
1	Cotton	Turmeric (Dry Rhizome)	Alum	Dark yellow	4-5
2			Myrobalan	Light yellow	5
3			Pomegranate rind	Light yellow	3-4
4	Eucalyptus (Dry Leaves)		Alum	Light khaki	4
5			Myrobalan	khaki	5
6			Pomegranate rind	khaki	3-4

Fastness Grades: 1-Very Poor, 2- Poor, 3- Moderately Good, 4- Good, 5- Excellent

Conclusion

It was found from the study that isolated dye from the Eucalyptus leaves and Turmeric rhizome can be used for dyeing of cotton to obtained wide range of soft and light colours by using combination of biomordants . The process of extraction and dyeing is environmental friendly and cause minimum atmospheric pollution. With regards to colour fastness samples exhibited moderately to excellent results. They also revealed that natural dye can be used with biomordant successfully on cotton fabric. Although all types of natural dyes as well as natural mordants are good for health and nature as compare to any chemical agent. But in above

investigations the studies also highlighted the good to excellent performance of dyes and mordants which occurs naturally. Here it is also important to know the excellent property of any dye for its hues and fastness as well as their significant harmless contribution to textile industries.

Acknowledgement

The authors are thankful to Principal Govt. Holkar Science College Indore. We are also thankful Dr.Sandeep Tubhrikar, Head of Bunker Seva Kendra Indore, for his encouragement during work. This work is Financially supported by Madhya Pradesh Council of Science & Technology , Bhopal.

References

Banerjee D . Substantivity and Extraction of Eco - friendly Floral Dyes: Better Waste Management, Research Journal of Textile and Apparel. 2013; 17(1): 87-93

Goodarzian, H and Ekrami E .Wool Dyeing with Extracted Dye from Pomegranate (*Punica Granatum*) Peel, World Appl. Sc. Journal. 2010; 8 (11): 1387-1389.

Samanta A K and Agarwal P . Application of natural dyes on textiles. Indian J Fibre Textile Res. 2009; 34: 384-399.

Vanker P S, Shankar R, Dixit S, and Mahanta D Sonicator dyeing of cotton, wool and silk with leaves extract, J. Textile Apparel, Technol. Manag. 2009; 6(1): 296-305.

Win Z M , Swe M M. Purification of the Natural Dyestuff Extracted from Mango Bark for the Application on Protein Fibres. World Academy of Science, Engineering and Technology . 2008; 46:536-540.

