



Review Paper

Exploration of Flower Based Natural Dyes - A Review

Singh R. and Srivastava S.

Department of Home Science, University of Allahabad, U.P. INDIA

Available online at: www.isca.in, www.isca.me

Received 4th April 2015, revised 11th May 2015, accepted 23rd May 2015

Abstract

Nowadays, demand for natural dyes has been growing rapidly due to increased awareness on hazardous, toxic and allergic reactions associated with synthetic dyes. Natural dyes are obtained from natural sources such as plants, insects and minerals. Among all the plant based dye sources i.e. bark, flowers, seeds etc. floral dye sources are more important for textile dyeing as it provides both dye as well as fragrance. This paper reviews the available floral dye sources, application and extraction of colourant from flowers and effect of different mordant.

Keywords: Natural dye, colourant, mordant and floral dyes.

Introduction

These days environmental protection has become a challenge for the textile industry because it utilizes a lot of chemicals for colouration of textile materials. These chemicals are harmful for both human as well as environment. Synthetic dyes suffer from several draw-backs. Some of the synthetic dyes which are even carcinogenic and mutagenic have been banned. In this era of green minded consumer, interest in natural dyes has grown mainly because natural dyes have been shown to possess health-promoting and eco-friendly properties.

There is found a wide range of natural products in India as it is one of the 17 mega-diverse countries. Two such natural products are flower and colour. India is the well known country of colours as it harbours a wealth of beautiful floral resources.

Floral dye sources are more important for dyeing of textile materials as it provides both dye as well as fragrance. Dye pigments of flower provide colour to the textile while fragrance of the floral dye will help in retaining freshness of the textile material by keeping body odor away from the garment for a long period of time. In the present review article, an attempt has been made to provide valuable information on floral dye extracted from natural resources.

Natural dyes

Natural dyes are obtained from various sources. These dyes can be classified as: i. Natural dyes obtained from plants - Berry, flower, bark, leaf, seed etc (e.g. catechu, Indigofera, myrobalan, pomegranate). ii. Natural dyes obtained from

insects – Cochineal and lac. iii. Natural dyes obtained from animal – Mollusk, murex snail, cuttlefish and shellfish. iv. Natural dyes obtained from mineral – Clay, ochre and malachite.

A vast array of natural colourant exists in the above sources. These colours are exhibited by various coloured pigments. Colour of the pigment is due to chromophores present in dye yielding plants to display the hue of the colour.



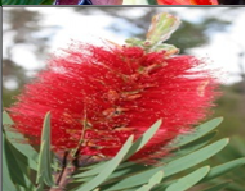





Mordants





Natural dyes require an element to create a bonding between fabric and the dye particle. The mordant is known as the element which can facilitate the chemical reaction taking place between the textile fibre and the dye or pigment; as a result, the dye is absorbed into the textile material. A mordant is utilized to fix the dye to the fabric and to increase the colour fastness.

Mordants can be classified as: i. Metallic mordants- Metal salts of chromium, iron, aluminium, copper and tin. ii. Oil mordants- Turkey red oil. iii. Natural mordants- tea leaves, myrobalan, vinegar.

Floral sources of natural dyes: Many natural dyestuff and stains were obtained mainly from plants and dominated as sources of natural dyes, producing different colours like red, yellow, blue, black, brown and a combination of these. Almost all parts of the plants like root, bark, leaf, fruit, wood, seed, flowers, etc. produce dyes¹. Some important dye yielding floral plants habitats are given in the table 1.

Table-1
Floral sources of dyes and mordants

S. No.	Plant	Appearance	Botanical name	Colour obtained	Textile material	Mordants
1	African marigold ²		Tagetes erecta L.	Yellow	Cotton and silk fabrics	Alum, Copper sulphate, Stannous chloride and Ferrous sulphate.
2	African tulip ³		Spathodea campanulata	Red	Silk and cotton fabrics	Alum, Copper sulphate, Ferrous sulphate, Myrobolan, Stannous chloride, Potassium dichromate
3	Bottle brush ⁴		Callistemon citrinus	Purple	Cotton cloth	Copper sulphate and Ferrous sulphate
4	Pink Hollyhock		Alcea Rosea	Green	Cotton, silk and wool	Alum, Stannic chloride, Stannous chloride, Copper sulphate, Potassium dichromate and Ferrous sulphate
5	Saffron ⁵		Crocus Sativus Linn	Dark yellow	Pashmina wool	Aluminum sulphate, Stannous chloride and Ferrous sulphate
6	Night-flowering jasmine ⁶		Nyctanthes arbor-tristis	Brown	Cotton and wool fabric	Alum, Copper sulphate, Vinegar and Ammonia
7	Aparajita ⁶		Clitoria ternatea	Blue	Cotton and wool fabric	Alum, Copper sulphate, Vinegar and Ammonia
8	Flame of the Forest ⁷		Butea monosperma	Yellow	Cotton, silk and wool	Alum, Chrome, Copper sulphate and Ferrous sulphate

9	Yellow flax ⁸		Rein wardtia	Yellow	Silk	Stannous chloride, Ferrous sulphate, Indian gooseberry and Babool
10	Fire Flame Bush ⁹		Woodfordia fruticosa	Yellowish brown	Yarn - Silk, wool, cotton fabrics - cotton, cotton synthetic blend, cotton jute blend	Myrobalan, Ferrous sulphate, Stannous chloride and Potassium dichromate
11	Scarlet Cordia ¹⁰		Cordia Sebestena	Brown	Silk	Myrobolan, Nickel sulphate, Aluminium sulphate, Potassium dichromate, Ferrous sulphate, Stannous chloride
12	Cosmos orange ¹¹		Cosmos sulphureus Cav.	Yellow, orange, brown	Wool yarns	Alum, Copper Sulphate, Ferrous Sulphate

Conclusion

Due to increasing awareness among people about the harmful effects of synthetic dyes, products made from natural materials are gaining popularity. As natural dye shows non-toxic, non-allergic effects and results in less pollution as well as less side effects, it become a thrust area in the field of textile dyeing research. In spite of being gifted with treasure of diverse flora and fauna, only a little has been exploited to fulfill the need of textile coloration. The study on review collected on natural dyes is an important step towards documenting these treasures of indigenous knowledge on the utilization of resources of natural dyes. Such review is collection, documentation and analysis of data on valuable floral resources available for natural dyeing. It focuses on forming strategy for conservation of floral dye resources.

Reference

1. Chandramouli K.V., Sources of natural dyes in India – A compendium with regional name, PPST Foundation, Chennai (1995)
2. Jothi D., Extraction of natural dyes from African marigold flower (*Tagetes erecta* L.) for textile coloration, *AUTEX Research Journal*, **8(2)**, 49-53 (2008)
3. Lokesh P. and Swamy M.K., Extraction of natural dyes from *Spathodea campanulata* and its application on silk fabrics and cotton, *Pelagia Research Library Der Chemica Sinica*, **4(1)**, 111-115 (2013)
4. Baishya D., Talukdar J. and Sandhya S., Cotton Dyeing with Natural Dye Extracted from Flower of Bottlebrush (*Callistemon Citrinus*), *Universal Journal of Environmental Research and Technology*, **5(2)**, 377-382 (2012)
5. Raja A.S.M. et al. Extraction of Natural Dye from Saffron Flower Waste and its Application on Pashmina fabric. *Advances in Applied Science Research*, **3 (1)**, 156-161 (2012)
6. Deka B. et al. Exploration of plant derived natural dyes in Assam, *Asian Journal of Home Science*, **9(1)**, 17-20 (2014)
7. Siva R., Status of natural dyes and dye yielding plants in India, *Current Science*, **92(7)**, 917-920 (2007)
8. Yadav S., Rose, N.M. and Singh, S.S.J. Effect of rein wardtia flowers dye on physical properties of silk fabric, *Asian Journal of Home Science*, **8(1)**, 250-253 (2013)
9. Grover N. and Patni V., Extraction and application of natural dye preparations from the floral part of *Woodfordia fruticosa* (Linn.) kurz, *Indian Journal of Natural Products and Resources*, **4(2)**, 403-408 (2011)
10. Kumaresan M., Palanisamy P.N. and Kumar P.E., Application of eco-friendly natural dye on silk using combination of mordants, *International Journal of Chemistry Research*, **2(1)**, 11-14 (2010)
11. Kale S., Naik, S. and Deodhar S., Utilization of *Cosmos sulphureus* Cav. Flower dye on wool using mordant combinations, *Natural Product Reliance*, **5(1)**, 19-24 (2005)
12. Vankar P.S. and Shanker R., Dyeing Silk, Wool and Cotton with *Alcea Rosea* Flower. Retrieved October 17, 20014 from <http://www.fibre2fashion.com/industry-article/pdffiles/dyeing-silk-wool-and-cotton-with-alcea-rosea-flower.pdf> (2015)