

## USE OF PLANT DYES IN TEXTILES INDUSTRIES

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### ABSTRACT

Dyes are a kind of magic, a delight to the eye & a joy to use. A dye is a colorant that penetrates the actual fiber & appears to become a part of it. Indigo, Pomegranate, Maddar, Kamala, Mayrabolan, Catechu, Himalayan Rubrub, Redwood, Logwood are some examples of natural plant dyes. These dyes are very advantageous to human beings & textile industry.

**KEYWORDS:** Dyes, Colouring Matters, Indigo, Colour Fastness, Fabrics

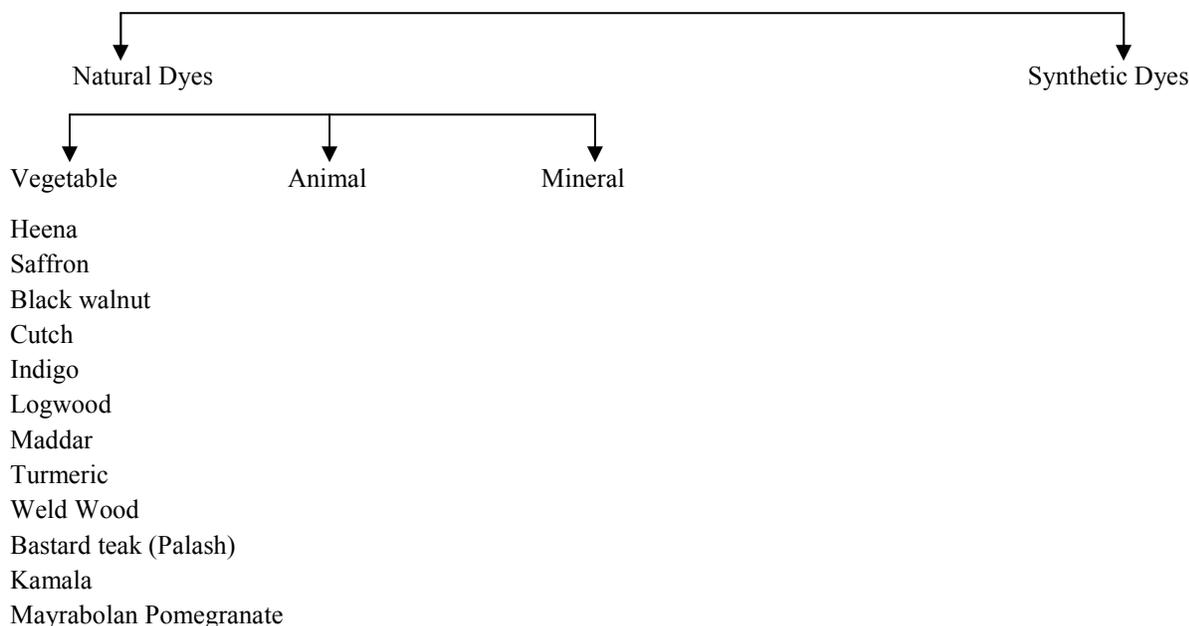
Dyes are a kind of magic, a delight to the eye & a joy to use. Even a brief inquiry into the early discoveries & uses of these colouring agents conveys a sense of mystery and glamour. Primitive people in many different parts of the world discovered that certain root, leaf or bark material could be treated to produce colour in a fluid form. Its application was both religious & functional the embellishment of body, clothing & utensils. A dye is a colorant that penetrates the actual fiber & appears to become a part of it. The best colour fastness is attributed to those dyes which must successfully colour the total fiber.

**Colouring Matters :** We obtain three different kinds of colouring matter-a) Vegetable Colours b) Mineral Colours c) Coal-tar Colours. Numerous plants have

been found to be sources of colorants. Knowledge of the preparation & usage of natural dyes evolved slowly over centuries of trial & error experimentation. The formulas & receipes were often carefully protected secrets, subject to cloak & dagger intrigues & trade conflicts among rival countries.

Mother nature has gifted us with more than 500 colour giving plants but we worked on most of them as have selected only those which are available in abundance, cost effective, yield good colour & ‘fastness properties. The majority of natural dyes are vegetable dyes from plant sources-roots, berries, bark leaves & wood & other organic sources such as fungi & litchis.

### TYPES OF DYES



### NATURAL INDIGO:



**Common Name** : Natural Indigo, Indigo, Indian Indigo.

**Botanical Name** : Blue dye-stuff for textile

This is one of the most ancient Natural Dye by man in Textiles. Indigo is about 2-3 feet long plant cultivated on thousands of acres of land in India. The whole plant is used for extraction of dye and the extract form of dye is supplied in powder form. This gives deep blue colour on wool, silk, cotton etc. It exhibits good fastness to washing, crocking and light. This is the only natural dye, which falls under vat category of dyes. We are among the largest exporter of Natural Indigo from India.

### POMEGRANATE:



**Common Name** : Pomegranate, Annar

**Botanical Name** : Punica Granatum

**Natural Dye** : Yellow dyestuff for textiles

The dye is extracted from its fruit rind. The colour obtained exhibit good fastness to washing rubbing of light.

### MADDER



**Common Name** : Madder, Manjistha

**Botanical Name** : Rubia Cardifolia

**Natural Dye** : Red, Pink & orange dyestuff

The cultivation of madder needs sub topical climates & prefers monist soil. It is cultivated in the foots of Himalayas in huge quantity.

### KAMALA



**Common Name** : Kamala

**Botanical Name** : Mallotus Philippines

**Natural Dye** : Orange, Yellow or Golden Yellow dyestuff

Kamala is taken from fruit of the plant mallotus. This is an evergreen tree growing upto 25 meter high. It imparts beautiful colour as wool & silk.

### MAYRABOLAN



**Common Name** : Hard, Harda

**Botanical Name** : Terminlia Chebula

**Natural Dye** : Greenish Yellow Dyestuff

Mayrabolan is fruit of tree, Terminalia chebula. This is used as greenish yellow dyestuff.

### CATECHU



**Common Name** : Cutch, Catechu, Kala Kaththa

**Botanical Name** : Accacia Catechu

**Natural Dye** : Brown Dyestuff

Catechu is purified extract of wood Accacia Catechu. The plant of Accacia catechu is about 15 meter high. Catechu is among cheap extract form of Natural Dyes.

### HIMALAYAN RUBRUB



**Common Name** : Doly, Himalayan Rubrub

**Botanical Name** : Rhum Emodin

**Natural Dye** : yellow

Doly is about 1.5 to 3 meter high stout herb. It is grown at an altitude of about 3000 to 5000 meters high. The colour is extracted from its wood. It dyes wool in range of colour mainly in yellow & exhibit good fastness ratings.

### RED ONION DYES



Red onion skins create a earthy range of colours. Protein fibers such as wool & silk dye a pale to medium mutmeg brown with a mix of rosewood, russet and rosy browns. Cellulose fibers such as cotton hemp and bamboo dye a range of seashell pinks, with a mix of champagne, pale and silver pink.

### YELLOW ONION DYES



Yellow onion skins create a golden range of earthy colours, with a concentrated dye bath and enough time for the fibbers to soak, the colours achieved are a combination of red and yellow, usually resting in the middle as an orange. Protein fibers such as wool & silk, dye deep to medium shades of ochre, creating pigments in the calcium orange families.

**Vegetable Colours** : Logwood is derived by fermentation from the heartwood of the tree known botanically as Hamatoxylon campechianum. By oxidation the product of the ferment is converted into haematein, which is the coloring principle. Though commonly considered a red, logwood gives a variety of colours when combined with different metallic oxides. With chromic oxide it produces black.

**Redwood** is a soluble colouring matter derived from trees and shrubs of the genus Caesalpinia. In all these woods the colouring matter is found in the form of a glucoside, which, when decomposed, produces a sugar and a colouring matter called brazilin. Soluble redwood dyes are seldom used alone, but in combination for the production of compound shades.



**Santalin** is the red colouring matter yielded by the small tree, pterocarpus santalinus, a native of India. This colour is seldom used for printing, though sometimes put into the dye-baths for special purposes.

**Quercitron Bark**-one of the most useful of vegetables dyes, quercitron is extracted from the bark of species of oak, the Quercus tinctoria, growing abundantly in North America, particularly in the State of Pennsylvania. The colour is bought in the form of a syrup liquid, mainly yellow, but employed largely in the production of browns, light olives and other complex colours.

**Flavine**-when quercitron bark extract has been purified, it is sold as flavine. For quick effects it is

much better than common quercitron and makes stronger and purer shades.

**Persian Yellow**-A fine yellow is taken from the fruit of two trees of the Rhamnus genus, the one R. infectoria.

**Old Fustic**-Another yellow is known as old fustic, derived from the weed of the Morus tinctoria, growing in the West Indies and South America. The colouring matter in the extract consists of moritannic acid and morin, which are of some service in black dyeing with logwood.

**Saffron**-The colour known as saffron is made of the flowers of the crocus bearing purple flowers. The stigmas are dried and caked. Saffronin is the yellow colouring principle, sometimes called polychroite.

**Turmeric**-To dye 10 lb. silk use 4 lb turmeric in a plain bath at 150°F. for orange shades add tin salts.



**Blues**-Indigo is the only natural colouring matter used in silk dyeing to obtain blues. The only other colouring matter available, till the advent of coal-tar colours, was Prussian blue, which is seldom used now.

1. **Indigo**-When used the indigo vat for silks is made up and utilized in the same manner as that for cottons; but the vat is seldom or never employed by silk dyers.
2. **Indigo Extract**-The method commonly practiced is the application of indigo extract. For pale blue, make a large bath with 2 percent indigo extract, with 1% sulphuric acid, and raise to a temperature of 150°F for deeper shades use larger proportions of the dyestuff. The indigo usually considered a fast colour, is fleeting in the extract form.

## ADVANTAGES

India is being one of the country which possesses the natural wealth in the form of plantation

in plenty. This has provided relatively better opportunity for the development of this industry in the country.

1. The raw material for production of vegetable dyes are plentiful available.
2. Vegetable dyes don't cause any harm to human skin and no hazards are anticipated in their manufacturing, rather some of the dyes act as health cure.
3. The chemical reaction is almost absent in the manufacture of vegetable dyes & no pollution problem.
4. All these dyes are harmonized with nature.

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