

# **Analysis of Garment Dyeing On Cotton Terry Fabric By Using Natural Dyes**

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## **ABSTRACT**

The worldwide demand for natural dyes is nowadays of great interest due to the increased awareness on therapeutic properties of natural dyes in public. Natural dyes are derived from naturally occurring sources such as plants, insects, animals, and minerals. Several synthetic colorants have been banned because they cause allergy-like symptoms or are carcinogens. Among the all natural dyes, plant-based pigment have wide range of medicinal value. Although known for a long time for dyeing as well as medicinal values. Although known for a long time for dyeing as well as medicinal properties, the structure and protective properties of natural dyes have been recognized only in the recent past. Many of the plant used for dye extraction are classified as medicinal and some of these have recently been shown to possess remarkable antimicrobial activity. The present review, describes the detail information about medicinal importance found in naturally occurring dye yielding plants, which are helpful to further development of pharmaceutical formulation.

**KEYWORDS:** Dyes, medicinal value, Dyes, Terry fabric

## **INTRODUCTION**

In ancient times, the natural dyes were only used for colouring the fabrics. Natural dyes were used in 2000 years ago and culture exhibits this. Ajantha and Ellora are the examples, which high lights the uses of natural dyes. Most of the natural dyes have great medicinal values too. The medicinal properties of natural dyes are well known in the Indian sub continent for thousands of years. After the innovation of synthetic dyes the natural dyes were replaced by synthetic dyes. Synthetic dyes produce brilliant colours and shades but the waste water and chemicals from the dyeing process ultimately polluted the water, soil and the air. So the use of natural dyes were again concentrated to save the Earth. Nowadays the consumers are aware about their product quality and they are ready to pay more for eco-friendly products. Leading global brands and private labels are increasing their emphasis on eco-friendly textiles.

So the study was planned with the following objective

1. To study the effect of Natural herbal dyeing on cotton terry fabric.
2. To study the wearability of Natural herbal dyed cotton terry fabric.

3. To study the quality of Natural herbal dyed cotton terry fabric colour fastness after 5 and 10 washes.

## **MATERIAL-HISTORICAL DEVELOPMENT**

Originally terry towels were produced on hand looms, but to produce loops, it was necessary to insert long wires in the same way that picks of weft are inserted. After a number of wires had been beaten up by the reed in Lon sequence with the weft, it was necessary to start withdrawing them by hand, to be reinserted thick wires were used to form long loops in the cloth and thinner wires were used for shorter (smaller) loops and ties determined the quality. The principal of terry weaving is thought to have originated in France in 1841, and was first used in the weaving of 'silk 'pile cloths. In 1841, John Bright of Rochdale used the terry principal in the weaving of worsted. Credit for the introduction of the terry towel construction as it is known today is often given to Henry Christ, second son of William Miller Christy while on the visit to the middle –East in the eighteen forties (1848), in Constantinople (Istanbul), he visited Topliapi place of the sultan. During his visit he saw ladies making towels, the texture of which he had not seen before, and obtained the sample of towels. He sent the sample to his brother Richard at his Hill gate mill in Stockport, who asked Samuel Holt, the manager of the silk plush weaving department at Hill Gate Mill to produce this structure. Holt obtained a patent Bp (13572, 1851) for, making terry without using wires, the structure and method for producing it were a heady known.

## **MEDICINAL IMPORTANCE OF HERBAL DYES**

The dye process attempts to keep medicinal properties alive on the textile. Dye fixation is accomplished using natural and harmless resource having high medicinal value. This process uses innovative way to standardize the quality and quantity of colour consistently in long running length. Herbal dyeing is applied to textile article like raw fiber, woven fabric, knitted fabric on wove fabric, stitched garment etc. Generally it takes 3-7 days to make the fabric depending upon the application and ailment.

## **INDIGO**

India is believed to be the oldest center of indigo dyeing in the Old World. It was a primary supplier of indigo dye, derived from the plant *Indigoferatinctoria*, to Europe as early as the Greco-Roman era. The association of India with indigo is reflected in the Greek word for the 'dye,' which was *indikon* (ινδικόν).

## **SCIENTIFIC CLASSIFICATION:**

### **Scientific Names**

- ❖ *Baptisiatinctoria* L.

- ❖ Indigoferatinctoria L.
- ❖ Leguminosae
- ❖ Pea family

#### **BINOMIAL NAME & COMMON NAME OF INDIGO:**

- ❖ Americanindigo
- ❖ Falseindigo
- ❖ Rattlebush
- ❖ Horseflybush
- ❖ Horseflyweed
- ❖ Indigobroom
- ❖ Lan-ts'ao(Chinesename)
- ❖ Mu-lan
- ❖ Wildindigo
- ❖ Yellowbroom
- ❖ Yellowindigo

#### **MEDICINAL PROPERTIES OF INDIGO**

Antiseptic, stimulant, purgative, emmenagogue, If the shoots are used after they acquire a green color they will cause dramatic purgation. A stem decoction used for pneumonia, tuberculosis, and influenza. The tips of Indigo combined and boiled with chopped twigs of Utah Juniper (*Juniperusosteosperma*) was used as a kidney medication. The tea was used in cases of smallpox, given internally in small doses and externally as a cleansing wash.Used in ulcerations of the skin and mucous colitis and amebic dysentery, follicular tonsillitis and quinsy, septic conditions of the blood, muscular soreness, rheumatic and arthritic pains, and constriction of the chest, whooping cough, dropsy, epilepsy, nervous disorders, chills, fever. Also good for mumps and, piles, worms. Externally, applications of leaf poultice or a paste of indigo and warm water is used for burns, scalds, wounds, insect bites, animal bites, boils

#### **MYROBALAN**

##### **SCIENTIFIC CLASSIFICATION**

Common Name : ChebulicMyrobalan  
 Hindi Name : Harad  
 Sanskrit Name : Haritaki, Abhaya

Latin Name	:	Terminaliachebula Retz
Habit and Habitat	:	Plant of Haritaki is found everywhere in India lower Himalayan region to Bengal to Assam and upto the height of 5000 feet. Fruits appear in winters.
Part Used	:	Small unripe fruits, moderately developed medium sized fruits and fully ripe and mature yellow coloured fruits, all are used in Ayurvedic formulations
Effect on Dosha	:	Pacifies Tridoshas especially Vata

### MEDICINAL PROPERTIES OF MYROBALAN:

**Medicinal properties in Ayurveda:** Fresh fruit is refrigerant, diuretic and laxative. Fruit is also carminative and stomachic. Dried fruit is sour and astringent. Rejuvenative, tonic, astringent, laxative, nervine, expectorant, anthelmintic, alterative. The fruit from this herb is among the “triphalā” (combination of three herbs) of Ayurveda. It is useful in asthma, sore throat, vomiting, eye diseases, heart diseases and hiccup. Prevents premature graying of hair and makes them strong and free from dandruff. Harad is a Rasayana herb which helps to improve immunity and protects heart, brain and other vital organs of body.

**Main classical uses:** Harad is one of the most widely used in various formulations in Ayurveda. Main formulations containing Harad are: Triphala, Abhayachuran, Abhayarishta, Brahma rasayana, Pathyadivati, Pathyadikwath, Vyaghriharitaki, Chitrakharitaki, Agastyaharitaki, Dantiharitaki, Pathyadichuran and Haritakikhanda.

### Pomegranate (peel)

A **pomegranate**, *Punicagranatum*, is a fruit-bearing deciduous shrub or small tree growing between five and eight meters tall. The pomegranate is native to the Caucasus, the Himalayas in north Pakistan and Northern India. It has been cultivated in the Caucasus since ancient times, and today, is widely cultivated throughout Iran, Azerbaijan, Afghanistan, India, Pakistan, Bangladesh, Iraq, Egypt, China, Burma, Saudi Arabia, Israel, Jordan, the drier parts of southeast Asia, the Mediterranean region of Southern Europe, and tropical Africa. Introduced into Latin America and California by Spanish settlers in 1769, pomegranate is now cultivated in parts of California and Arizona for juice production. In the Northern Hemisphere, the fruit is typically in season from September to February. In the Southern Hemisphere, it is in season from March to May. The pomegranate is a very ancient fruit, mentioned in the

Homeric Hymns and the Book of Exodus. It has, in recent years, reached mainstream prominence in the commercial markets of North America and the Western Hemisphere.

### **Pomegranate *Punicagranatum***

Fruit

#### **SCIENTIFIC CLASSIFICATION**

Kingdom : Plantae  
 Division : Angiosperms  
 Class : Magnoliopsida  
 Subclass : Rosids  
 Order : Myrtales  
 Family : Lythraceae  
 Genus : *Punica*  
 Species : *P. granatum*

#### **Binomial name**

*Punicagranatum* L.

#### **Synonyms**

*Punicamalus* Linnaeus, 1758

#### **MEDICINAL PROPERTY OF POMEGRANATE PEEL**

Anti-bacterial, Anti-viral, Astringent, Cardiac, Demulant, Emmenagogue, Refrigerant, Stomach-ache, Vommiting.

#### **ECLIPTA ALBA**

#### **SCIENTIFIC CLASSIFICATION**

Kingdom : Plantae  
 (unranked) : Angiosperms  
 (unranked) : Eudicots  
 (unranked) : Asterids  
 Order : Asterales  
 Family : Asteraceae  
 Genus : *Eclipta*  
 Species : *E. alba*

#### **Binomial name**

*Ecliptaalba* (L.) Hassk.

## Synonyms

*Eclipta erecta*

*Eclipta prostrate*

*Verbesina alba*

*Verbesina prostrate*

*Eclipta alba* (L.) Hassk. (syn. *Eclipta prostrate* L.), commonly known as False Daisy, yerba de tago, and bhringraj, is a plant belonging to the family Asteraceae. Root well developed, cylindrical, greyish. It is also named 'kehraj' in Assamese and karisalankanni in Tamil. Floral heads 6-8 mm in diameter, solitary, white, achene compressed and narrowly winged. It grows commonly in moist places as a weed all over the world. It is widely distributed throughout India, China, Thailand, and Brazil. In Ayurvedic medicine, the leaf extract is considered a powerful liver tonic, rejuvenative, and especially good for the hair. A black dye obtained from *Eclipta alba* is used for dyeing hair and tattooing. *Eclipta alba* also has traditional external uses, like athlete foot, eczema and dermatitis, on the scalp to address hair loss and the leaves have been used in the treatment of scorpion stings. It is used as anti-venom against snakebite in China and Brazil (Mors, 1991). It is reported to improve hair growth and colour (Kritikar and Basu 1975 and Chopra *et al.* 1955). At Pocharam lake Andhra Pradesh India in Goa, India the herb *Eclipta alba* contains mainly coumestans i.e. wedelolactone (I) and demethylwedelolactone (II), polypeptides, polyacetylenes, thiophene-derivatives, steroids, triterpenes and flavonoids. Coumestans are known to possess estrogenic activity (Bickoff *et al.* 1969). Wedelolactone possesses a wide range of biological activities and is used for the treatment of hepatitis and cirrhosis (Wagner *et al.* 1986), as an antibacterial, anti-hemorrhagic (Kosuge *et al.* 1985). And for direct inhibition of IKK complex resulting in suppression of LPS-induced caspase-11 expression (Kobori *et al.* 2004).

## MEDICINAL PROPERTY OF ECLIPTA

Plant is bitter, hot, sharp, dry in taste and is used in Ayurveda & "siddha" for the treatment of Kapha and Vata imbalances. In India, the plant is known as *bhangra*, "bhringaraj" or *bhringraja*. Another plant *Wideliacalendulacea* is also known by the same name, but *Eclipta* has white flowers so called white *bhangra* and *Widelia* has yellow flower so it is called yellow *Bhangra* (Puri 2003).

The expressed leaf juice, applied along with honey, is a popular remedy for catarrh in infants. A preparation obtained from the leaf juice boiled with sesame or coconut oil is used for anointing the head to render the hair black and luxuriant. An oil prepared with *amla*, *bhringraj* and sometimes with *brahmi* is well known in India as *Amla Bhringraj* oil, which is said to blacken the hair. Plant is rubbed on the gums in toothache and applied with a little oil for relieving headache and with sesame oil in elephantiasis. Roots of *Eclipta alba* are emetic and purgative.

In the Tamil tradition of Siddha medicine the plant is used for many diseases and according to Saint Vallalaar *Ecliptaalba* (majalkarisaalai in Tamil) is the number one herb according to hierarchy of herbs. The tonic Liv52 that is sold all over the world is based on Siddha formulation and are manufactured in Tamil Nadu.

In Ayurveda the plant is considered *arasayana* for longevity and rejuvenation. Recent studies have shown that it has a profound antihepatotoxic activity. A cardiodepressant activity was also observed in it when used for hepatic congestion. A complete symptomatic relief in epigastric pain, nausea and vomiting in ulcer patients has also been observed (Puri 2003). Also it is one among 10 flowers called as 'Dasapushpam' (Ten auspicious flowers) in Kerala, the southern state in India. In Taiwan, entire plant is used as a remedy for the treatment of bleeding, haemoptysis, haematuria and itching, hepatitis, diphtheria and diarrhoea; in China, as a cooling and restorative herb, which supports the mind, nerves, liver and eyes. The leaf extract is considered to be powerful liver tonic, rejuvenative, and especially good for the hair. A black dye obtained from *Ecliptaalba* is also for dyeing hair and tattooing. *Ecliptaalba* also has traditional external uses, like athlete foot, eczema and dermatitis, on the scalp to address hair loss and the leaves have been used in the treatment of scorpion stings. It is used as anti-venom against snakebite in China and Brazil (Mors, 1991).

### **BARBERRY STEM**

Medicinal use of barberry dates back more than 2,500 years, and it has been used in Indian folk medicine to treat diarrhea, reduce fever, improve appetite, relieve upset stomach, and promote vigor as well as a sense of well-being. Today, it is widely used for medicinal purposes in Iran, including for biliary disorders (such as gallbladder disease) and heartburn. Barberry and goldenseal (*Hydrastis canadensis*) are often used for similar medicinal purposes because both herbs contain the chemical berberine. Berberine has been shown to inhibit the growth of bacteria in test tubes, and also may help the immune system function better. The aqueous extract of barberry has beneficial effects on both the cardiovascular and neural system. As such, it may be useful in the treatment of hypertension, tachycardia (rapid heart beat), and some neuronal disorders, such as epilepsy and convulsions.

### **SCIENTIFIC CLASSIFICATION:**

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliophyta
Class	<u>Ranunculales</u>
Order	<u>Berberidaceae</u>
Genus	<i>Berberis</i>

**Species**

About 450-500; see text

**BINOMIAL NAME & COMMON NAME OF BARBERRY STEM:**

Common Names

Barberry root, Huang Lian, Chinese Goldthread, Pepperidge-bush, DaruHaridra

Botanical Name

*Berberis vulgaris* L.

Family

Berberidaceae Barberry Family

**MEDICINAL PROPERTIES OF BARBERRY STEM:****Infection and skin disorders**

Barberry is used to ease inflammation and infection of the urinary (bladder and urinary tract infections), gastrointestinal, and respiratory tracts (sore throat, nasal congestion, sinusitis, bronchitis) as well as candida (yeast) infections of the skin or vagina. Barberry extract may also improve symptoms of certain skin conditions including psoriasis, but more research is needed to confirm these findings. Some berberis species are known as Barberry and used for herbal medicine. Barberry contains the alkaloid berberine.

**Common Uses:** Cancer Conjunctivitis Gout Lupus Psoriasis Rheumatoid arthritis

**Properties:** Anti-inflammatory Antibacterial Cholagogue COX-2 Inhibitor

**Parts Used:** bark, root-bark

**Constituents:** alkaloids berberine, oxyacanthine, and columbamine

**SAPPAN**

*Caesalpinia sappan* is a species of flowering tree in the legume family, Fabaceae, that is native to Southeast Asia and the Malay archipelago. Common names include Sappanwood, Sapanwood, and Suou (Japanese). Sappanwood belongs to the same genus as Brazilwood (*C. echinata*), and was originally called “brezel wood” in Europe. This plant has many uses. It possesses medicinal abilities as an anti-bacterial and for its anti-coagulant properties. It also produces a valued type of reddish dye called brazilin, used for dyeing fabric as well as making red paints and inks. The wood is somewhat lighter in color than Brazilwood and its other allies, but the same tinctorial principle appears to be common to all.

The dye is used in colouring leather, silk, batik, calico printing, furniture, floors, feather, medicines and several handicrafts. Sappan wood or East Indian red wood is a multipurpose tree. It is botanically known as *Caesalpinia Sappan* L.

It is a natural dye yielding medicinal plant. In India it is cultivated in gardens and nurseries as a



live fence plant in parts of Tamil Nadu, Kerala, Karnataka, Andhra Pradesh and West Bengal and nowhere is it found in the wild.

#### SCIENTIFIC CLASSIFICATION:

Kingdom : Plantae  
 (unranked): : Angiosperms  
 (unranked): : Eudicots  
 (unranked): : Rosids  
 Order : Fabales  
 Family : Fabaceae  
 Genus : Caesalpinia  
 Species : *C. sappan*

#### BINOMIAL NAME & COMMON NAME OF SAPPAN:

*Caesalpiniasappan* & **Sappanwood, Sapanwood, and Suou**

#### MEDICINAL PROPERTIES OF SAPPAN:

Anti\_bacterial ,Anti\_coagulant, Skin disorders

#### KATHA (CATECHU)

Catechu also known as cachou, catch, cashoo, Terra Japonica, khoyer or Japan earth) is an extract of any of several species of *Acacia*—but especially *Acacia catechu*—produced by boiling the wood in water and evaporating the resulting brew. Catechu (called *katha* in Hindi, Kaath in (marathi) *khoyer* in Bangla, *kachu* in Malay, hence Latin *Acacia catechu* as the type species which provides the extract) is an astringent and has been used since ancient times in Ayurvedic medicine as well as in breath-freshening spice mixtures, for example in France and Italy it's used in some licorice pastilles. It is also an important ingredient in South Asian Paan mixtures as well as ready made *Paan Masala* and Gutka.

#### SCIENTIFIC CLASSIFICATION

Common name: are queira –

Scientific name: ARECA CATECHU

Common Name: Cateche

Scientific Name: *Acacia cateche*

Family: Leguminosae

#### MEDICINAL PROPERTIES OF CATECHU

CATECHU 1883: Scudder Catechu is astringent and tonic. It is often used as an alvine astringent in cases of chronic diarrhea and dysentery, unattended with inflammation. In those cases attended with a

relaxed state of the intestinal exhalants, catechu is an appropriate agent. In these cases it is often associated with prepared chalk, magnesia, opiates, and aromatics, with decided advantage. Its powerful astringent qualities adapt it to the relief of atonic hemorrhages. It is especially useful in immoderate menstruation, for which purpose it may be unite with aromatics and opium. 1909: Kings Dispensatory Catechu possesses strong astringent properties. It is used for arresting mucous discharges when excessive, for removing relation or congestion for mucous membranes, and for checking hemorrhages. In chronic diarrhea, chronic catarrh, colliquativediarhea, and chronic dysentery, it has proved beneficial especially when combined with opium. As a local application, it is a valuable agent for removing cynancetonsilaris, apthous ulcerations of the mouth, elongation of the uvula, and relaxation and congestion of the mucous membrane of the fuaces, especially of the kind to which public singers are subject; it is also useful in congestion, tenderness, and spongines of the gums, particularly when the result of mercurialptyalism. Dr.,E.Hopkins states that catechu is not incompatible with opium and quinine, as no presipatate ensues when their respective solutions are united. He recommends, in diarrhea, a compound of catechu ten grains, opium one grain, sulphate of quinine two grains, mix, and make into or two powders, according to the urgency of the case. Catechu pallidum has similar properties, but is less astringent “it seem to have an especial affinity for the uterus, exerting powerful tonic and alterative influence upon this organ, and has hence been found highly beneficial in many uterine derangements, as in amenorrhea, some forms of dysmenorrhea, menorrhagia, chronic congestion of the uterus, enfeebled uterine nervous system, etc. it is said that the squaws drink a decoction of this plant for several weeks previous to their confinement, for the purpose of rendering parturition safe and easy.

## RESULT AND DISCUSSION

The results of naturally died fabric has been tested with different laboratory test and statistical analayais has been analysed by using following test method.

### One-Sample T Test

The One-Sample T Test procedure tests whether the mean of a single variable differs from a specified constant. **Examples.** A researcher might want to test whether the average IQ score for a group of students differs from 100. Or a cereal manufacturer can take a sample of boxes from the production line and check whether the mean weight of the samples differs from 1.3 pounds at the 95% confidence level.

## CONCLUSION

From the study it can be concluded that natural and medicinal value of dyes like indigo, pomegranate peel, Eclipta, Berberry stem, Sappan, Katha can be used for colouring the fabric and the same can serve in ayurvasthra upto ten washes. So this study will be helpful for the creators of ayurvasthra.

## SELECTION OF NATURAL DYES WITH MEDICINAL PROPERTY

TABLE - III

S.NO	NATURAL DYES	PARTS USED	MEDICINAL PROPERTY
1	Indigo	Whole plant	Antiseptic, stimulant, purgative, Emmenagogue
2	Pomegranate	Peel	Anti-bacterial, Anti-viral, Astringent, Cardiac, Demulant, Emmenagogue, Refrigerant, Stomach ache, vomiting.
3	Eclipta	Leaf	Used in Ayurveda and Siddha, for treatment of Kapha, and vata imbalance, anti-hepatotoxic.
4	Berberry	Stem	Infection and skin disorders in vagina. Berberry extract may also improve the symptoms of certain skin conditions including Psoriasis, in herbal medicine, rich in vitamin C.
5	Sappan	Bark	Anti-bacterial, Anti-Coagulant, Skin disorders.
6	Katha	Bark	Astringent and Ayurvedic medicine. Used medicinally for sore throat and cough.
7	Myrobalan	Seed	It is useful in asthma, sore throat, vomiting, eye disease, Heart diseases and Ayurvedic medicine. (It is a natural mordant so it was used for fixing natural dye)

**INDIGO PLANT  
PLATE 1**



**MYROBALAN  
PLATE 2**



**POMEGRANTEE PEEL  
PLATE 3**



**ECLIPTA  
PLATE 4**



**BERBERRY STEM  
PLATE 5**



**SAPPAN  
PLATE 6**



IJERT

## KATHA (CATECHU)

### PLATE 7



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