

# **NATURAL**

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# **DYES**

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## **Natural Dyes**

### **From the Roads of History**

Nature, unlike any other source, has a wonderful visual device for sensing the seven shades of the colour spectrum. Hence, it is considered as the most abundant source of colours. Since the early dawn of civilization and through the history of the human race, colours have played a significant role in man's individual, family and social life. Archeological findings have shown that natural colours were being used in dyeing, printing, painting and preparing cosmetics among primitive communities throughout the world.

In the ancient civilization of Greece, Egypt and in the far east, colours had an important place in life. The earliest written record of the use of natural dye was found in China dated 2600 B.C. The Roman graves in the second & third century (A.D) were found with madder and indigo dyed textiles. In 1321, Brazil wood was first mentioned as a dye source from East Indies and India. Historical evidence reveals the fact that in the 15<sup>th</sup> century, eleven Mayan cities paid a yearly tribute of 40 bags of cochineal (insect dye) to the conqueror the Aztecs. In the early sixteenth century France, Holland and Germany began to cultivate dye plants as an industry

The latter part of the 20th century threw open a startling revelation that chemical colours maybe be harmful to the human skin.

### **The genesis of Sir Natural's Dyes**

Since our origin, our mission has been to deliver truly world-class natural & ecofriendly products. High quality natural solutions for healthy lifestyles. Natural products that leverage a scientific

approach. Vegetable dyes & natural solutions that enhance every environ. A small step in our endeavor to contribute to a future environ that is cleaner, healthier & purer.

From colour fast natural dyes for textiles to wool & jute. Consistently reproducible natural dyes for wood to paper & wax products. From new & natural eco-friendly sources of natural pigments to the common & the traditional. From intrinsically colour to light fastness dyes. Dyes that are simpler & better in recipe and method of application. Products that enhance a sense of ecology living. That add value to everyday lives.

## **The Sir Naturals Product Edge**

- ❖ Process of extraction of dyes based purely on an aqueous medium which makes the extracts highly water soluble.
- ❖ Natural dyes obtained with a scientific approach from renewable resources or waste products.
- ❖ A new & unique manufacturing technique of impregnating the fiber with the dye.
- ❖ The colours obtained have a harmony, resonance and depth that chemical dyes lack along with having an aesthetic appeal.
- ❖ Environment friendly, as it involves the total elimination of effluent disposal problems.
- ❖ Non-toxic, non-allergic, non- hazardous compared to chemical dyes & have therapeutically active properties
- ❖ The depth in the portfolio of natural dye shades we have to offer from a variety of vegetable & natural dye sources.
- ❖ None or negligible chemical reactions involved in their manufacturing.
- ❖ Easy-to-handle, process & execute at the end-product level.
- ❖ Reproducibility and Repeatability of hues & shades
- ❖ Natural Dyes for textiles obtained from various plant parts are produced in fine powder form
- ❖ Multi-sized packs to cater to specific quantity needs.
- ❖ The constant exploration of virgin vegetable sources that yield dyes that are novel & brighter in shades with optimum fastness properties.

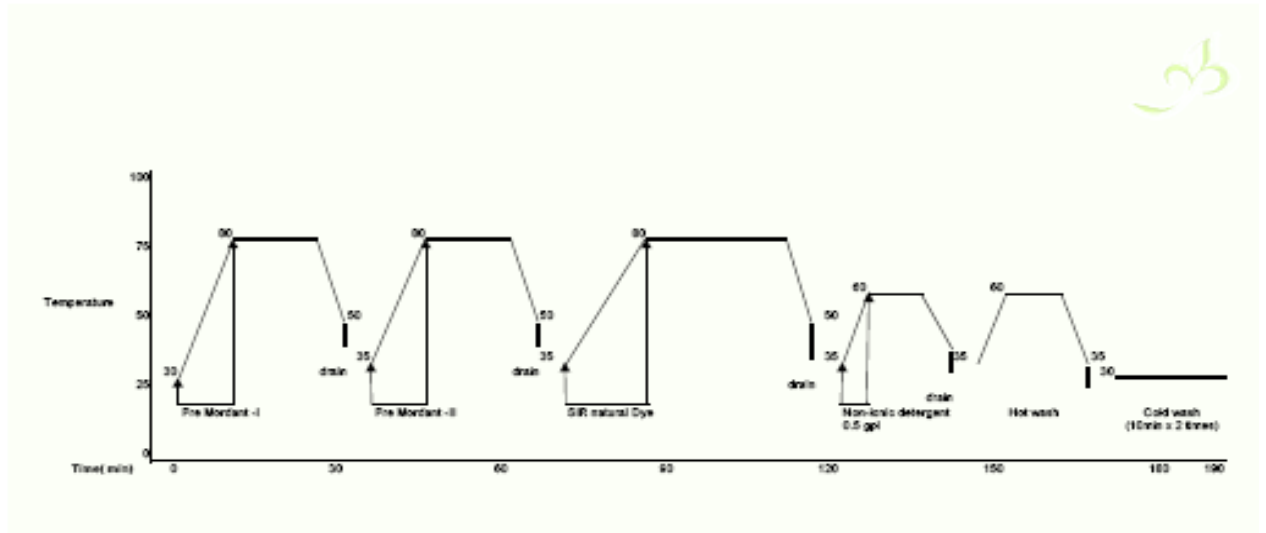
# The Sir Naturals Process Advantage

- ❖ Domain Specialists that include topographic experts, botanical Identifiers, taxonomists, phytochemists, microbiologists & mechanical engineers
- ❖ Micro level analysis of every operation in the production phase.
- ❖ Continuous R &D in evolving detailed & precision-led parameters for every input and output
- ❖ Computerized plant and processes to control the various parameters.
- ❖ The constant development in new systems of evaluation & and currently developing machines required for the same.
- ❖ The extension of our R&D to the plant and seed development stage.
- ❖ Plant Capacity of 150 TPA & further scalable to ensure smooth availability for bulk requirements
- ❖ Customized conversion of cotton, wool and silk yarn to specific shade requirements with reasonable fastness
- ❖ The cultivation of dye yielding plants under controlled conditions with skilled supervision to ensure standardization,quality,reasonable reproducibility & supplies
- ❖ Regular & intensive training of all our operators and innovative techniques of packaging

# The Sir Naturals Commitment








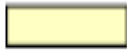































- ❖ Innovative products with consistent quality standards
- ❖ Customized R&D for specific client needs & solutions
- ❖ Assured & reliable time frame for delivery of standardized dyes
- ❖ User-friendly methods & processes of scientific dyeing
- ❖ Technical know-how, process flows & on-site assistance for dyeing of textiles
- ❖ Quality analysis & support services to all our clients

# Dyeing Time Temperature Graph












## The Natural Dyes Portfolio


















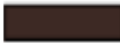

















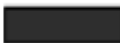



## For Cotton Material

Common Name	Botanical Name	Trade Name	With Alum	With Copper Sulphate	With Ferrous Sulphate
Anar chhilka	<i>Punica granatum</i>	Arctic			
Indigo	<i>Indigofera tinctoria</i>	Blue Ocean*			
Teak	<i>Tectona grandis</i>	Earth			
Harda	<i>Terminalia chebula</i>	Ganga			
Galls nut	<i>Quercus infectoria</i>	Himalaya			
Cutch	<i>Acacia catechu</i>	Kaveri			
Arjun	<i>Terminalia arjuna</i>	Mercury-A			
Arjun	<i>Terminalia arjuna</i>	Mercury-B			
Malabar nut	<i>Adhatoda vasika</i>	Narmada			
Babool	<i>Acacia nilotica</i>	Neptune			
Annatto	<i>Bixa orellana</i>	Mars**			
Lac	<i>Karria lacca</i>	Red Desert			
Himalayan rubhada	<i>Rheum Emodi</i>	Vindhya			

# The Natural Dyes Portfolio For Silk Material

Common Name	Botanical Name	Trade Name	With Alum	With Copper Sulphate	With Ferrous Sulphate
Anar chhilka	<i>Punica granatum</i>	Arctic			
Indigo	<i>Indigofera tinctoria</i>	Blue Ocean*			
Teak	<i>Tectona grandis</i>	Earth			
Harda	<i>Terminalia chebula</i>	Ganga			
Galls nut	<i>Quercus infectoria</i>	Himalaya			
Cutch	<i>Acacia catechu</i>	Kaveri			
Arjun	<i>Terminalia arjuna</i>	Mercury-A			
Arjun	<i>Terminalia arjuna</i>	Mercury-B			
Malabar nut	<i>Adhatoda vasika</i>	Narmada			
Babool	<i>Acacia nilotica</i>	Neptune			
Annatto	<i>Bixa orellana</i>	Mars**			
Lac	<i>Karria lacca</i>	Red Desert			
Himalayan rubhada	<i>Rheum Emodi</i>	Vindhya			

# The Natural Dyes Portfolio For Wool Material

Common Name	Botanical Name	Trade Name	With Alum	With Copper Sulphate	With Ferrous Sulphate
Anar chhilka	Punica granatum	Arctic			
Indigo	Indigofera tinctoria	Blue Ocean*			
Teak	Tectona grandis	Earth			
Harda	Terminalia chebula	Ganga			
Galls nut	Quercus infectoria	Himalaya			
Cutch	Acacia catechu	Kaveri			
Arjun	Terminalia arjuna	Mercury-A			
Arjun	Terminalia arjuna	Mercury-B			
Malabar nut	Adhatoda vasika	Narmada			
Babool	Acacia nilotica	Neptune			
Annatto	Bixa orellana	Mars**			
Lac	Karria lacca	Red Desert			
Himalayan rubhada	Rheum Emodi	Vindhya			

\* Blue Ocean is a vat dye, so it will not require mordents.

\*\* Mars will not require mordents.

Note:- This is an E-catalogue and shades may vary on material to material. The actual shades on material may vary from the above shades due to method of application.



## Common Name

Anar

## Botanical Name

Punica Granatum

## Trade Name

Arctic

## Properties

- Punica granatum rind is used as a raw material in manufacturing this natural dye.
- Rind is also used as a tannin material due to rich content of tannins.
- The main colouring compound in the dye is Flavogallol and having reasonable good light, wash and rub fastness.
- To get different shades, apply the dye on textile material already pretreated with mordants (like Potash alum for yellow or ferrous sulphate for grey shades).

## The Dye Specification

**BOTANICAL NAME**

Punica granatum

**COMMON NAME**

Anar

**PART USED**

Fruit rind

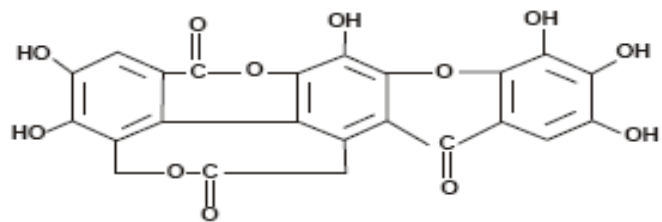
**MAIN COLOURING COMPONENT**

Flavogallol

**CHEMICAL FORMULA**

$C_{21}H_{12}O_{12}$

**STRUCTURE**



**TYPE OF DYE**

Mordant

**C.I. NUMBER**

C I Natural Yellow 7

**DESCRIPTION**

It is spray dried colour extract from pomegranate rind.

**APPEARANCE**

Brown Fine Powder

**SOLUBILITY IN WATER**

$95.0 \pm 3.0 \%$

**PH OF 1% SOLUTION**

$4.3 \pm 0.2$

**MOISTURE CONTENT**

$6.0 \pm 2.0\%$

**TOTAL ASH CONTENT**

$11.0 \pm 2.0 \%$

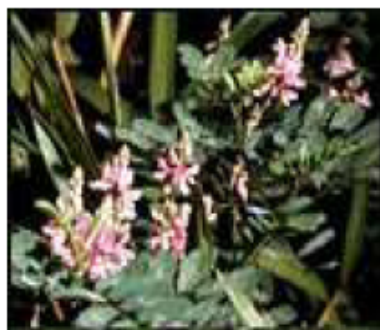
**ACID INSOLUBLE ASH**

$1.0 \pm 0.2 \%$

**BULK DENSITY (gm/cc)**

0.55 to 0.70





## Common Name

Indigo Blue

## Botanical Name

Indigofera Tinctoria

## Trade Name

Blue Ocean

## Properties

- The leaves of Indigofera tinctoria plant are fermented in fermentation pits. The dye is precipitated by oxidation or by passing the air. The precipitated blue natural dye at bottom is dried in the air to make the cake.
- This is a vat dye and is used after converted into liquid Leucoform form with sodium hydrosulphite and caustic soda in soft water. The dyeing is carried out in the reduced liquid form at about 25°C to 30°C or room temp. By oxidation, the dyed fabric slowly changes into blue colour form green.
- The process of dyeing of cotton, wool and silk is almost same.
- The appearance of dye is blue and main colouring compound is Indigotin.

## The Dye Specification

BOTANICAL NAME	Indigofera tinctoria
COMMON NAME	Indigo Blue
PART USED	Leaves
MAIN COLOURING COMPONENT	Indigotin
CHEMICAL FORMULA	C <sub>16</sub> H <sub>10</sub> O <sub>2</sub>
STRUCTURE	
TYPE OF DYE	Vat Dye
C.I. NUMBER	C I Vat Blue 1
DESCRIPTION	It is prepared from leaves of plant Indigofera Tinctoria by natural fermentation process.
APPEARANCE	Blue Powder
SOLUBILITY IN WATER	4.0 ± 2.0 %
PH OF 1% SOLUTION	5 ± 1
MOISTURE CONTENT	5.0 ± 1.0%
TOTAL ASH CONTENT	63.0 ± 7.0 %
ACID INSOLUBLE ASH	35.0 ± 2.0 %
BULK DENSITY (gm/cc)	0.80 to 0.90



## Common Name

Teak

## Botanical Name

Tectona Grandis

## Trade Name

Earth

## Properties

- The dye produced from dried leaves of Tectona grandis (Teak) tree.
- The green leaves also used for preparing fermented soyabean.
- The main colouring compound in the dye is Tectoleafquinone.
- Cotton can be dyed after pre mordanting with tannic acid and Alum.

## The Dye Specification

**BOTANICAL NAME**

Tectona grandis

**COMMON NAME**

Teak

**PART USED**

leaves

**MAIN COLOURING COMPONENT**

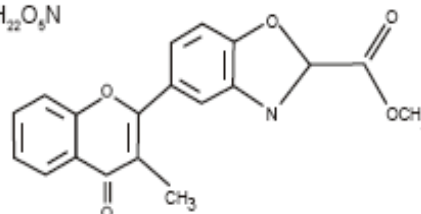
Tectoleafquinone, 1,4,5,8-tetrahydroxy - 2 iso-penta dienyl

Anthraquinone

**CHEMICAL FORMULA**

$C_{19}H_{22}O_5N$

**STRUCTURE**



**TYPE OF DYE**

Mordant

**C.I. NUMBER**

N. A.

**DESCRIPTION**

It is spray dried colour extract from teak leaves.

**APPEARANCE**

Orangish Brown Powder

**SOLUBILITY IN WATER**

$95.0 \pm 3.0 \%$

**PH OF 1% SOLUTION**

$7.3 \pm 0.2$

**MOISTURE CONTENT**

$6.0 \pm 2.0\%$

**TOTAL ASH CONTENT**

$20.0 \pm 2.0 \%$

**ACID INSOLUBLE ASH**

$2.0 \pm 0.7 \%$

**BULK DENSITY (gm/cc)**

0.55 to 0.70

# NATURAL DYES



## Common Name

Harada

## Botanical Name

Terminalia Chebula

## Trade Name

Ganga

## Properties

- The dried fruits of Terminalia chebula (Myrobalan) is used to produced the dye.
- A natural yellow and grey dye with good light and wash fastness.
- The appearance of dye powder is brown and the main colouring component is Chebulinic Acid.
- Myrobalan is used in Ayurvedic preparations and has therapeutical value.

## The Dye Specification

**BOTANICAL NAME**

Terminalia chebula

**COMMON NAME**

Harada

**PART USED**

Fruit

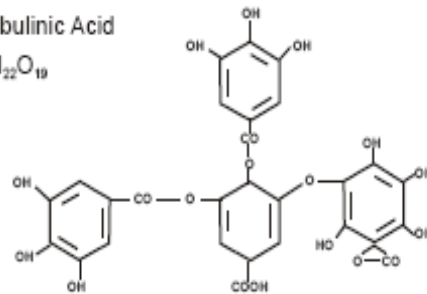
**MAIN COLOURING COMPONENT**

Chebulinic Acid

**CHEMICAL FORMULA**

$C_{28}H_{22}O_{19}$

**STRUCTURE**



**TYPE OF DYE**

Mordant

**C.I. NUMBER**

Natural Brown 6

**DESCRIPTION**

Spray dried water extract

**APPEARANCE**

Brown Powder

**SOLUBILITY IN WATER**

$95.0 \pm 3.0 \%$

**PH OF 1% SOLUTION**

$4.5 \pm 0.5$

**MOISTURE CONTENT**

$6.0 \pm 2.0\%$

**TOTAL ASH CONTENT**

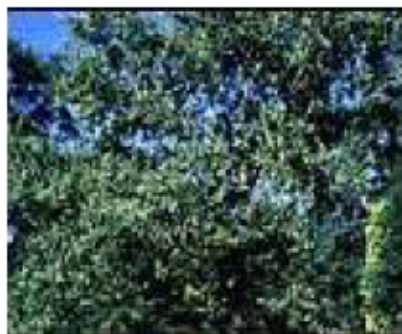
$12.0 \pm 2.0 \%$

**ACID INSOLUBLE ASH**

$1.5 \pm 0.7 \%$

**BULK DENSITY (gm/cc)**

0.65 to 0.80



## Common Name

Galls Nut

## Botanical Name

Quercus Infectoria

## Trade Name

Himalaya

## Properties

- The Gallnuts of Quercus Infectoria are pulverized to required partical size and extracted in aqueous media. The extract is filtered and spry in vacuum dryer to obtain the dye.
- Quercus infectoria is dried secretion of an insect living on the tree.
- The main Colouring component is Gallotannic Acids and appearance of dye powder is Brownish yellow.
- It also may be used as a mordant in dyeing, sizing paper and silk etc.

## The Dye Specification

**BOTANICAL NAME**

Quercus Infectoria

**COMMON NAME**

Majuphal

**PART USED**

Gall Nut

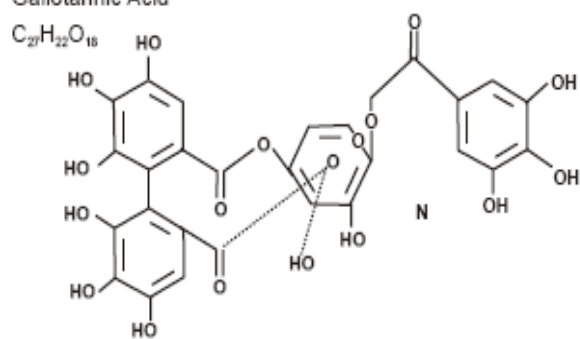
**MAIN COLOURING COMPONENT**

Gallotannic Acid

**CHEMICAL FORMULA**

$C_{27}H_{22}O_{16}$

**STRUCTURE**



**TYPE OF DYE**

Mordant

**C I NUMBER**

N.A.

**DESCRIPTION**

Spray dried water extract

**APPEARANCE**

Brownish Yellow

**SOLUBILITY IN WATER**

$96.0 \pm 2.0 \%$

**PH OF 1% SOLUTION**

$4.0 \pm 0.2$

**MOISTURE CONTENT**

$5.0 \pm 1.0\%$

**TOTAL ASH CONTENT**

$6.0 \pm 1.0 \%$

**ACID INSOLUBLE ASH**

$0.9 \pm 0.4 \%$

**BULK DENSITY (gm/cc)**

0.50 to 0.60



## Common Name

Cutch

## Botanical Name

Acacia Catechu

## Trade Name

Kavari

## Properties

- The cutch is used as raw material for manufacturing the dye. Which is obtained from the left over of kattha produced from Acacia catechu.
- Kattha is used as an edible paste in pan preparations.
- The main colouring component is Catechin / Flavonoid and soluble in soft warm water.
- The dye gives different shades by treatment with different metal salts such as Copper Sulphate, Aluminium Sulphate or Ferrous Sulphate.

## The Dye Specification

**BOTANICAL NAME**

Acacia catechu

**COMMON NAME**

Cutch / Kattha

**PART USED**

Residue of Kattha / left over of kattha

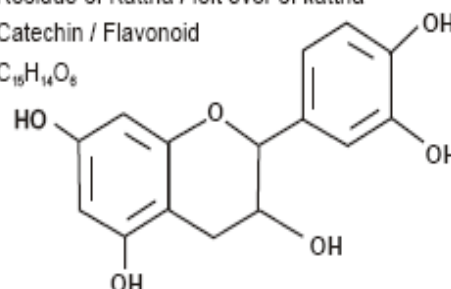
**MAIN COLOURING COMPONENT**

Catechin / Flavonoid

**CHEMICAL FORMULA**

$C_{15}H_{14}O_6$

**STRUCTURE**



**TYPE OF DYE**

Mordant / Direct

**C.I. NUMBER**

Natural Brown 3

**DESCRIPTION**

It is water extract of left over of kattha.

**APPEARANCE**

Brown Powder

**SOLUBILITY IN WATER**

$95.0 \pm 2.0 \%$

**PH OF 1% SOLUTION**

$6.0 \pm 0.5$

**MOISTURE CONTENT**

$6.0 \pm 1.0 \%$

**TOTAL ASH CONTENT**

$7.0 \pm 2.0 \%$

**ACID INSOLUBLE ASH**

$1.6 \pm 0.7 \%$

**BULK DENSITY (gm/cc)**

0.25 to 0.45



## Common Name

Arjun

## Botanical Name

Terminalia Arjuna

## Trade Name

Mercury - A

## Properties

- The bark of Terminalia arjuna is used for manufacturing the dye.
- The dry bark from the stem contains 15 - 24 % tannin and used in tanneries.
- The main colouring compound is Arjunic acid(MI- 15).
- The process of dyeing of textile material is done with mordants to improve the fastness.

## The Dye Specification

BOTANICAL NAME

Terminalia arjuna

COMMON NAME

Arjun

PART USED

Bark

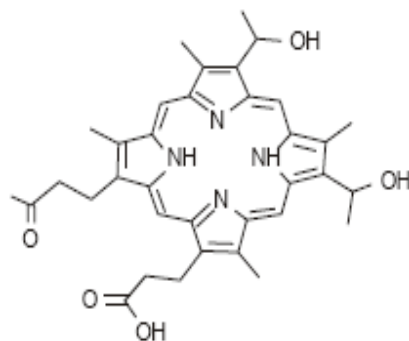
MAIN COLOURING COMPONENT

Arjunic acid

CHEMICAL FORMULA

$C_{30}H_{48}O_5$

STRUCTURE



TYPE OF DYE

Mordant

DESCRIPTION

It is extract of Arjun bark.

APPEARANCE

Light Brown Powder

SOLUBILITY IN WATER

$96.0 \pm 2.0 \%$

PH OF 1% SOLUTION

$7.0 \pm 0.4$

MOISTURE CONTENT

$6.0 \pm 0.2 \%$

TOTAL ASH CONTENT

$12.0 \pm 2.0 \%$

ACID INSOLUBLE ASH

$1.0 \pm 0.7 \%$

BULK DENSITY (gm/cc)

0.45 to 0.65



## Common Name

Malabar Nut

## Botanical Name

Adhatoda Vasika

## Trade Name

Narmada

## Properties

- This is a natural yellow dye with reasonable good fastness and obtained from the leaves of Adhatoda vasika.
- The leaves also contained betaine and carotene.
- The main colouring component is adhatodic acid and appearance of dye powder is brown.
- The dye is dissolved in soft warm water and applied on pre treated fabric or yarns with tannic acid and metal salts such as Aluminium sulphate or Ferrous sulphate to get yellow or grey shades

## The Dye Specification

BOTANICAL NAME

Adhatoda vasika

COMMON NAME

Malabar nut

PART USED

Leaves

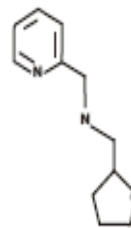
MAIN COLOURING COMPONENT

2-pyridylmethyl amine

CHEMICAL FORMULA

$C_{11}H_{12}N_2O$

STRUCTURE



TYPE OF DYE

Mordant

DESCRIPTION

It is water extract of leaves of malabar nut.

APPEARANCE

Brown Powder

SOLUBILITY IN WATER

$97.0 \pm 2.0 \%$

PH OF 1% SOLUTION

$7.0 \pm 0.4$

MOISTURE CONTENT

$5.0 \pm 0.2 \%$

TOTAL ASH CONTENT

$12.5 \pm 1.0 \%$

ACID INSOLUBLE ASH

$0.5 \pm 0.2 \%$

BULK DENSITY (gm/cc)

0.45 to 0.55



## Common Name

Babool

## Botanical Name

Acacia Niotica

## Trade Name

Neptune

## Properties

- The dye is obtained from the bark of *Acacia niotica* tree, which is collected as a by-product, when the trees are cut down for timber or fuel.
- It is also an important source of tannin for tanning industries.
- The dye gives different shades with different mordants and having good fastness.
- The appearance of dye powder is dark brown and main colouring component is Ellagitannin.

## The Dye Specification

BOTANICAL NAME

*Acacia niotica*

COMMON NAME

Babool

PART USED

Bark

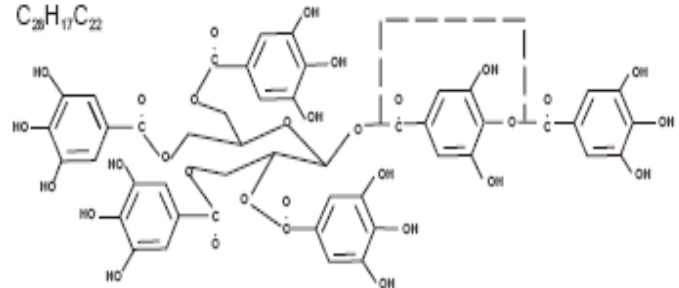
MAIN COLOURING COMPONENT

Ellagitannin

CHEMICAL FORMULA

$C_{26}H_{17}O_{22}$

STRUCTURE



TYPE OF DYE

Mordant

DESCRIPTION

Dye is extracted in alkaline medium from dry powdered bark

APPEARANCE

Brown Powder

SOLUBILITY IN WATER

$60.0 \pm 4.0 \%$

PH OF 1% SOLUTION

$7.5 \pm 1.0$

MOISTURE CONTENT

$4.5 \pm 1.2 \%$

TOTAL ASH CONTENT

$27.0 \pm 2.0 \%$

ACID INSOLUBLE ASH

$0.5 \pm 0.2 \%$

BULK DENSITY (gm/cc)

0.65 to 0.75





**Common Name**  
Annatto

**Botanical Name**  
*Bixa orellana*

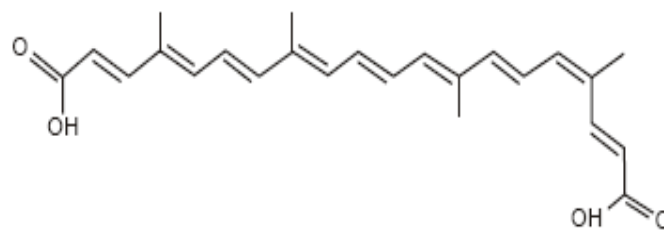
**Trade Name**  
Mars

**Properties**

- This is a obtained from seeds of *Bixa orellana* tree.
- It is also an important source of colouring of butter and cheese.
- The dye gives orange shade on cotton, silk and wool and having good fastness.
- The appearance of dye powder is reddish orange and main colouring Nor-Bixin.

**The Dye Specification**

BOTANICAL NAME	<i>Bixa orellana</i>
COMMON NAME	Annatto
PART USED	Seeds
MAIN COLOURING COMPONENT	Nor-Bixin
CHEMICAL FORMULA	$C_{26}H_{38}O_4$
STRUCTURE	



TYPE OF DYE	Natural
DESCRIPTION	Dye is extracted from seed in aqueous medium
APPEARANCE	Reddish orange
SOLUBILITY IN WATER	$80.0 \pm 5.0 \%$
PH OF 1% SOLUTION	$4.0 \pm 0.5$
MOISTURE CONTENT	$7.5 \pm 1.0 \%$
TOTAL ASH CONTENT	$5.0 \pm 3.0 \%$
ACID INSOLUBLE ASH	$2.5 \pm 0.8 \%$
BULK DENSITY (gm/cc)	0.65 to 0.75



## Common Name

Lac

## Botanical Name

Kerria Lacca

## Trade Name

Red Desert

## Properties

- This is a natural red dye and is obtained by washing the raw stick lac by water and then precipitating the filtered wash liquor with acid.
- The dye is obtained as a by product of the secretion of insect Kerria Lacca.
- The fastness will be improved by pre treating the material with SIRfix. The dye is dissolved in soft warm alkaline water and dyeing is carried out by treatment with metal salts, like aluminum sulphate for pink shade.
- The main colouring component is Laccaic acid.

## The Dye Specification

BOTANICAL NAME

Kerria lacca

COMMON NAME

Lac

PART USED

Excreta of Kerria lacca insect.

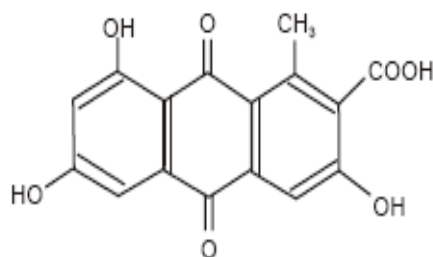
MAIN COLOURING COMPONENT

Laccaic Acid

CHEMICAL FORMULA

$C_{28}H_{18}O_{12}$

STRUCTURE



TYPE OF DYE

Mordant / Dispersal

C.I. NUMBER

C I Natural Red 25

DESCRIPTION

Dye is excreta of Kerria lacca insect.

APPEARANCE

Red powder

SOLUBILITY IN WATER

$62.0 \pm 6.0 \%$

PH OF 1% SOLUTION

$3.0 \pm 1.0$

MOISTURE CONTENT

$6.0 \pm 2.0 \%$

TOTAL ASH CONTENT

$5.0 \pm 3.0 \%$

ACID INSOLUBLE ASH

$1.0 \pm 0.5 \%$

BULK DENSITY (gm/cc)

0.50 to 0.70



## Common Name

Himalayan Rubhada

## Botanical Name

Rheum Emodi

## Trade Name

Vindhya

## Properties

- This dye is manufactured from the dried rhizome and roots of a Rheum Emodi.
- Dye is extracted in aqueous medium from dry powdered materials.
- The medicinal properties of the same are as purgative and astringent tonic.
- The dye is dissolved in soft water and gives golden yellow shade with the salt Alum and copper sulphate on wool and silk.

## The Dye Specification

BOTANICAL NAME

Rheum Emodi

COMMON NAME

Himalayan Rubhada

PART USED

Rhizome and Root

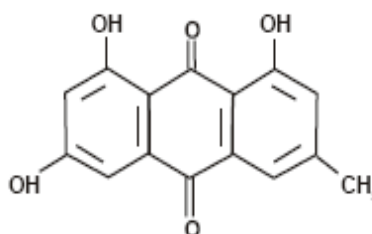
MAIN COLOURING COMPONENT

Rutin

CHEMICAL FORMULA

$C_{27}H_{30}O_{16}$

STRUCTURE



TYPE OF DYE

Mordant / Disperse

C.I. NUMBER

Natural Yellow 23

DESCRIPTION

Spray dried water extract

APPEARANCE

Brown Powder

SOLUBILITY IN WATER

$63.0 \pm 3.0 \%$

PH OF 1% SOLUTION

$5.92 \pm 0.5$

MOISTURE CONTENT

$6.53 \pm 1.0 \%$

TOTAL ASH CONTENT

$8.8 \pm 1.0 \%$

ACID INSOLUBLE ASH

$4.50 \pm 0.5 \%$

BULK DENSITY (gm/cc)

0.75 - 0.85