



## Natural yellow colour from Corolla of *Nyctanthes arbortristis* Linn. for dyeing and painting on cotton and silk for value addition

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### ABSTRACT

The present study was undertaken to use corolla of *Nyctanthes arbortristis* L. as a natural colour for dyeing and painting of cotton and silk with Kalamkari technique using bamboo stick. From the present work it can be concluded that cotton and silk painted and dyed with Corolla of *Nyctanthes arbortristis* Linn exhibited fair to excellent wash and sunlight fastness. Further four different dresses were designed and evaluated for fabric elements and colour which rated very good to excellent by the panel judges. Therefore the study suggest the use of *Nyctanthes arbortristis* Linn corolla extract as very good option for yellow, and yellow orange colour as a value addition to fashion fabric and ultimately in eco-friendly clothing.

### INTRODUCTION

The world over, people are turning away from dangerous chemical dyes. The harmless, naturally dyed fabrics are used for Kalamkari paintings. The artists believe in using natural dyes, extracted from bark, flower and root. One would be stunned to know that the colour red is obtained by using the Indian madder root, yellow from the pomegranate seed or even mango bark, and black from myrobalam fruit. No chemical dyes are used in producing kalamkari. The present work focuses on monochromatic tones and shades of yellow colour obtained from corolla of *Nyctanthes arbor-tristis* Linn.

(Parijat). Colour obtained were applied on cotton and silk with traditional method of kalamkari painting. Deshmukh and Ganeshani (2013) explored, analyzed and evaluated distinct herbal dye sources such as *Bunchanania cohinchinensis* (lour)

*Syzygium cumini*(L), *skeels*, *Nyctanthes arbor - tristis* Linn, *Lagerstomia reginae* Roxb .in Colour palette of the conventional Almeida,. *Tecomella undullata* (Sm) *Seem*, dye sources. Painted kalamkari samples were subjected to wash, rub and sunlight fastness and were assessed in terms of colour change. Moderate to very good fastness was found. Rani and et.al (2012) reported that the review of secondary data that flowers contain modified *diterpenoid nycanthin*, *flavonoids*, *anthocyanins*, and essential oil which is similar to that of jasmine 4-Hydroxy hexahydrobenzofuran -7-one has been isolated from the chloroform extract of the flowers. The orange tubular calyx of the flower contains carotenoids. Radhika Rajamani (2003) in her article mentioned a 'facelift' by Soumya, a graduating students of the National Institute of

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fashion technology new theme "The art of Regeneration at the design Paradigm 2003". Soumya worked on the Kalamkari motives on the clothes were hand painted. Bansal et.al, (2001) 'Isolated and identified of flavonoid from in vitro and natural grown *Nyctanthes arbor-tristis* L. (Harsingar). Udayini and Jacob (1988) introduced colour for Kalamkari painting on Indian textiles. Orange, blue, garnet, and lavender were used on desized, bleached, and cleaned grey cotton materials. Washing, sunlight, perspiration, and pressing were employed in order to test for colourfastness. Blue was rated the most efficient colour. P. Saravanan, et.al. (2012) studied on the barks of *Ficus religiosa*. L can be used as dye for colouring textiles. D. Jothi (2008) focused more towards the utilization of the vast diversity of natural resources of color pigments for their use in textiles, in place of their synthetic counterparts. This trend is aimed at safeguarding human health as well as protecting and prolonging life on earth.

## MATERIALS AND METHOD

100% Gray cotton and silk were used. Silk and Cotton being protein and cellulosic fibers are biodegradable in nature. Corolla of *Nyctanthes arbor-tristis* Linn (Parijat) extract was used as a source of natural dye. Two natural mordants Harda Fruit (*Terminalia chebula* Linn) and Babool bark Alum (Aluminium potassium sulphate), Tin (Stannous chloride) and Iron (Ferrous sulphate) were used as mordants.

### Experimental Methods:

Cotton and Silk fabrics were prepared prior to dyeing by scouring and degumming.

#### Preparation of Colour for Painting:

**Black colour:** Black is prepared by traditional method of fermentation using jiggery and iron fillings.

#### Yellow colour:

Yellow colour was obtained from corolla of *Nyctanthes arbor-tristis* Linn. Different tones and

shades were prepared by adding different mordants in extract. Corolla extract + alum, Corolla extract + alum + black, Corolla Extract + alum + tin.

#### **Kalamkari painting on Cotton and Silk.**

Tannin 20% harda (owf) treatment was given to cotton and silk. Selected designs were outlined with black and filled with different shades of yellow colours and shade dried. Steaming of painted cotton and silk was carried out for colour fixation. Painted samples were washed thoroughly and shade dried.

#### **Dyeing of Cotton and Silk:**

Aqueous extract of *Nyctanthes arbor-tristis* Linn was prepared using 50% corolla of parijat (owf) M:L ratio was 1:50. Extraction was carried out at 80°C for 30 minutes. Liquor ratio was maintained throughout the extraction. Extract was filtered and used as a dye.

#### **Mordanting of Cotton and Silk.**

Mordanting was carried out with 10% mordant concentration (owf). Alum+iron, alum + tin & alum + babool bark with 7:3 mordant proportions were used to obtain desired colour tones and shades of yellow. Mordanting was carried out at 90°C for 45 minutes. M: L ratio of the mordanting bath was kept as 1:50.

#### **Dyeing of Cotton and Silk:**

Dyeing of cotton and silk fabric was carried out in previously prepared dye bath with extract of *Nyctanthes arbor-tristis* Linn corolla. The initial temperature of the dye bath was 40°C and slowly it was raised up to 90°C. Dyeing was carried out for 60 minutes. M:L ratio was kept as 1:50 with constant handling of fabric in the dye bath. Dyed fabrics were washed and shade dried.

#### **Assessment of fastness properties:**

Painted and dyed cotton and silk fabrics were assessed towards. Wash fastness using ISO Test 2 Sunlight fastness was assessed using (IS: 686-1985). On paramount Launder- O – meter (IS: 3361-1979).

#### **Designing Ecolabelled Dresses:**

4 different apparels were designed and

constructed using selected painted and dyed silk and cotton fabrics.

**Evaluation of the Dresses:**

Evaluation was done by a panel of 5 judges towards suitability of Cotton and Silk fabric for kalamkari painting with colour obtained from corolla of *Nyctanthes arbortristis* Linn. Dresses were also evaluated towards elements of dyed and painted fabric.

**RESULTS AND DISCUSSION**

Table-1 reveals the wash fastness of *Nyctanthes arbortristis* dyed cotton sample.

**Table-1. Wash Fastness of Dyed and Painted Cotton and Silk**

No. of sample Random	Mordant/ Mordant Proportion	Dyed Cotton	
		CC.	CS.
1	A+T	2	4
2	7:3	2	4
3		2	4
n=3	SD	$\sum X_1=6$	$\sum(X_1 - \bar{X})^2 = 0$

  

No. of sample Random	Mordant/ Mordant Proportion	Painted Cotton	
		CC.	CS.
1	A+BL	3.5	5
2	9:1	3.5	5
3		3.5	5
n=3	SD	$\sum X_1=10.5$	$\sum(X_1 - \bar{X})^2 = 0$

n=Number of Random Sample; CC=Colour Change; CS= Colour Staining; SD=Standard Deviation, B=Babool bark, BL=Black.

Alum + tin mordant with 7:3 mordant combination and proportion poor fastness was noted which rated 2 for accuracy and precision

of the values three samples were tested randomly for wash fastness and standard deviation was calculated with average rating towards fastness, value of Standard deviation is 0, hence from the results it can be said that the wash fastness of alum+ tin mordanted sample has not deviated which confirm the accuracy of the wash fastness rating. Tables also represent the fastness rating towards Alum + iron mordants combination with 7:3 proportion dyed with *Nyctanthes arbortristis*. Mean value of fastness was found 4 and value of standard deviation has noted 0.

**Table.2. Wash Fastness of Dyed and Painted Cotton and Silk**

No. of sample Random	Mordant/ Mordant Proportion	Dyed Silk	
		CC.	CS.
1	A+T 7:3	5	5
2		5	5
3		5	5
n=3	SD	$\sum X_1=15$	$\sum(X_1 - \bar{X})^2 = 0$

  

No. of sample Random	Mordant/ Mordant Proportion	Painted Silk	
		CC.	CS.
1	A+B 7:3	5	5
2		5	5
3		5	5
n=3	SD	$\sum X_1=15$	$\sum(X_1 - \bar{X})^2 = 0$

Wash fastness of *Nyctanthes arbor-tristis* Linn painted cotton with alum + black solution (9:1) mordant combination and proportion exhibited fairly good fastness which rated 3.5 for change in colour and 5 for colour staining with absolutely no staining of adjacent un dyed fabric.

Value of Standard deviation was found 0 with more accuracy and precision in fastness.

and colour staining where n=3 and SD was noted 0.



**Plate 1. *Nyctanthes arbor-tistis* Linn Dyed and Painted Cotton**



**Plate 3. *Nyctanthes arbor-tistis* Linn Dyed and Painted Silk**



**Plate 2. *Nyctanthes arbor-tistis* Linn Dyed and Painted Cotton**



**Plate 4. *Nyctanthes arbor-tistis* Linn Dyed and Painted Cotton**

Table-2 represents Wash fastness of *arbortristis* dyed silk. (Alum+Tin) mordant combination with (7:3) mordant proportion exhibited excellent colour fastness. Value of standard deviation was found 0 where n=3 with more accuracy and precision in fastness. Alum + babool bark (7:3) mordant combination and proportion when used excellent fastness was noted which rated 5 for change in colour and 5 for colour staining with absolutely no staining on adjacent dyed fabric. Value of Standard deviation is found 0 with more accuracy and precision in fastness. Painted silk also imparted excellent colour fastness towards colour change

### CONCLUSION

From the present work it can be concluded that *Nyctanthes arbor-tristis* Linn as a natural source of dye imparted poor to excellent wash and sunlight fastness towards dyed and painted cotton and silk depending upon the mordant combination and proportion. Dresses designed using dyed and painted cotton and silk were for suitability and elements were evaluated for fabric elements which rated very good to excellent by the panel of judges. Therefore the study suggests the use of *Nyctanthes arbor-tristis* Linn as very good option for range of yellow, and yellow orange colour as a value



addition to fashion fabric and ultimately in eco friendly clothing.

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