

INNOVATIVE METHODS OF DYEING OF TUSSAR SILK YARN AND FABRIC FOR RURAL UPLIFTMENT

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Introduction:

Even though there is a traditional demand of Tussar fabrics in its natural colour, Tussar silk weavers are producing limited number of fabrics in terms of different design and fabric variety. New generation demands 100 % Tussar fabric in diversified products in different design and colour combination therefore it become necessary to dye the Tussar yarn and fabric in different colour. This new concept has been started few years back therefore to fulfil the new generation consumer demand of diversified products in different colour combination for Tussar fabric is growing up day by day.

Only few Tussar fabric manufacturers / weavers are in a position to produce such type of diversified fabric but they have not standardized the procedure for bleaching and dyeing of Tussar yarn and fabric. Therefore, the quality of the product is not of better standard. If same trend will continue for few more years, demand of new diversified coloured Tussar fabric will decrease. Currently, there is no sufficient light focusing standard procedure is available in the literature, journal, books for bleaching and dyeing of Tussar yarn and fabric for achieving better fastness property.

At this juncture of time, it is highly requirement of the Tussar industry to standardize the procedure for bleaching and dyeing of Tussar yarn and fabric.

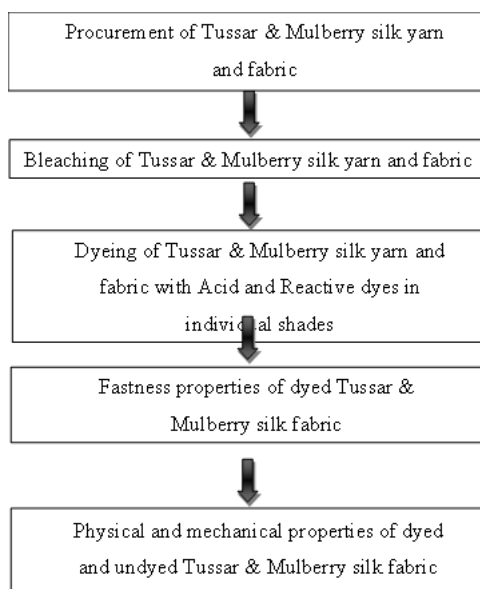
Objectives:

1. To develop the standard recipe for bleaching and dyeing of Tussar silk yarn and fabric with Acid and Reactive dyes in individual shades.
2. To study the fastness properties of dyed Tussar silk yarn and fabric.

3. To study the physical and mechanical properties of dyed and undyed Tussar silk yarn and fabric.
4. To compare the dyeing properties of Tussar with Mulberry silk.

Methodology:

Flowchart



Materials:

Tussar silk yarn & fabric, Mulberry silk fabric, Hydrogen peroxide, Acid dye, Reactive dye, Sodium Carbonate, Acetic Acid, Glauber’s salt, Wetting agent & Spectrophotometer.

Bleaching Method:

Sl. No.	Fabric Type	Time of Bleaching	Temperature	Chemicals Used
1.	Tussar silk	60 minutes	80 C	Hydrogen Peroxide & Wetting Agent
2.	Mulberry silk	60 minutes	80	

Dyeing Method:

Sl. No.	Fabric Type	% Shade	Time of Dyeing	Temperature
1.	Tussar silk	2 & 3	90 minutes	85 - 90 C
2.	Mulberry silk	2 & 3	90 minutes	85 - 90 C

Testing Methods:

Fastness Properties

Sl. No.	Parameter	Instrument
1.	Fastness to Light	Paramount Digi Light nx TM
2.	Fastness to Washing	Paramount Launderometer
3.	Fastness to Rubbing	Paramount Crock meter

Colour Strength

Sl. No.	Parameter	Instrument
1.	K/S Value	Minolta Absorption Spectrophotometer

Geometrical Parameters

Sl. No.	Parameters	Tussar Silk		Mulberry Silk	
		Warp	Weft	Warp	Weft
1.	Threads/Inch	96	100	100	76
2.	Denier	37	85	22	130
3.	Thickness of the Fabric	0.257		0.251	
4.	Weight of the Fabric	0.44		0.60	

Physical & Mechanical Properties of Fabric

Sl. No.	Parameter	Instrument
1.	Tensile Strength	Instron Tensile Strength Tester
2.	Crease Recovery	Eureka Crease Recovery Angle Tester

Results and Conclusion:

Fastness Property:

Light Fastness:

Acid Dyed Fabric:

Sl. No.	% Shade	Tussar Silk	Mulberry Silk
1.	2%	5	5
2.	3%	5	5

Reactive Dyed Fabric:

Sl. No.	% Shade	Tussar Silk	Mulberry Silk
1.	2%	5	5
2.	3%	5	5

Wash Fastness:

Acid Dyed Fabric:

Sl. No.	% Shade	Tussar Silk	Mulberry Silk
1.	2%	5	5
2.	3%	4	4

Reactive Dyed Fabric:

Sl. No.	% Shade	Tussar Silk	Mulberry Silk
1.	2%	5	5
2.	3%	3	3

Rubbing Fastness:

Acid Dyed Fabric:

Sl. No.	% Shade	Tussar Silk		Mulberry Silk	
		Dry	Wet	Dry	Wet
1.	2%	4	3	3	3
2.	3%	5	4	4	3

Reactive Dyed Fabric:

Sl. No.	% Shade	Tussar Silk		Mulberry Silk	
		Dry	Wet	Dry	Wet
1.	2%	4	3	4	4
2.	3%	5	4	4	3

K/S Value Property:

Acid Dyed Fabric:

Sl. No.	Fabric Sample	% Shade	Standard Value	Sample Value
1.	Tussar Silk	2%	6.078	8.218
2.	Mulberry Silk	2%	8.390	9.270
3.	Tussar Silk	3%	7.709	9.376
4.	Mulberry Silk	3%	9.376	9.376

Reactive Dyed Fabric:

Sl. No.	Fabric Sample	% Shade	Standard Value	Sample Value
1.	Tussar Silk	2%	3.063	9.270
2.	Mulberry Silk	2%	5.244	9.270
3.	Tussar Silk	3%	2.232	9.270
4.	Mulberry Silk	3%	5.549	9.270

Tensile Property:

Warp Way:

Sl. No.	Fabric Sample	Tensile Strength Before Dyeing	Tensile Strength After Dyeing
1.	Tussar Silk	15.70	16.65
2.	Mulberry Silk	28.36	29.42

Crease Recovery Angle:

Sl. No.	Fabric Sample	Crease Recovery Before Dyeing (Kgs)		Crease Recovery After Dyeing (Kgs)	
		Dry	Wet	Dry	Wet
1.	Tussar Silk	143	120	140	118
2.	Mulberry Silk	89	75	89	75

Conclusion:

From the experiments conducted and the results obtained, it can be concluded that tussar silk can be efficiently dyed using acid and reactive dyes using the similar procedure followed for mulberry silk and it was also observed that there will not be any major changes in performance and comfort properties of tussar silk fabrics after dyeing with acid and reactive dyes. When compared with results obtained for mulberry silk dyeing behavior of tussar silk is similar to dyeing behavior of mulberry silk.

Scope For Future Work:

1. Dyeing behavior can be studied after finishing the fabric with crease resistant finishes.
2. Kinetics of dyeing can be studied.