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TRADITIONAL TEXTILE OF INDIA AND VALUE ADDITION

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Abstract: *VALUE ADDITION is the process where we enhance the salability of the product by adding some incentives to it. . A great deal of emphasis is given to the details of the designs and many new colours are introduced in the production of traditional textiles viz., dress materials and shirting's incorporating traditional motifs like- kantha, kasuti ,worli etc during weaving by Jacquard and dobby mechanism. Thus this study is taken up to revive the traditional textiles. Polycot union woven sareese attained excellent Structural and physical properties viz dimensional stability, better cloth count, cloth stiffness, crease recovery, cloth weight, cloth thickness properties respectively. Polycot union sample had better Abraision Resistance and fabric strength and elongation.* Overall respondents opined that pallu designs with compactly woven traditional motifs can also be used to produce toppers, dupatta, stoles and other madeups.*The total cost of poly cot pattern sarees was relatively less because of Jacquard shedding mechanism adopted for producing these patterns not only assisted in creating new designs but also saved time, money and labour*
Keywords: *kantha, kasuti , worli, Jacquard and dobby mechanism,GC Kala – 2008 and wilcom softwares*

1.INTRODUCTION

Gone are the days when quality product was the only criterion to eye a product by a consumer. Earlier were the times when sheer competitiveness in the domestic market was very confined. But, during some past years with the emergence of globalization, competitive atmosphere and quality consciousness, has reached a new mark. With the steady improvement in technology & application standards, a gradual rise was observed in consumer demands .And to reach up to that mark, manufacturers have to add something to their products to get some added value for their product. A product must be able to encompass something more with it & therefore this has taken todays market to a platform where it seems very difficult for a manufacturer to market his product until he satiates consumer with something new which not only rewards him for his novel concept but also lures him with considerable increase in profit. This urge to come up with something novel to earn increased profit, have larger market share, satiate the fad could probably be termed as value addition to textiles. Value Addition is the process where we enhance the salability of the product by adding some incentives to it.

The world market place is continuously changing and so is demand of people changing .Every person desires for some change .i.e. something new & unique. The successful effective implementation of change has to be done to in the market.

Past are the days of traditional and conventional fabrics, which are the super fed by fabrics with multi-functional weaving. Indeed, days are now of research and development of a huge spectrum of various advancements in fabric construction in order to project world class fabric in the world class market at the most competitive rates. A range of new fabrics need to be developed and manufactured which will give an innovative edge to the textile sector in various applications. In addition more emphasis should be laid on the derivation of various textile materials with numerous features and characteristics which should be merged for multifold applications to create variety of textiles. Today there is such an increasing demand for *traditional textiles* that despite of the thousands of workers involved in spinning and producing *traditional* fabric, the demand of the market does not get fulfilled. A great deal of

emphasis is given to the details of the designs and many new colours are introduced in the production of traditional textiles viz., dress materials and sarees incorporating traditional motifs of different states like kantha of Bengal, kasuti of Karnataka, worli of Maharashtra during weaving by Jacquard and dobby mechanism. Thus this study is taken up to revive the traditional textiles.

Objectives:

1. To develop variegated traditional textiles
2. To assess the physical characteristics of the traditional textiles and
3. To calculate the cost of production of these products

2.MATERIALS AND METHODS

Selection of raw material -

Raw materials – Cotton and Polyester yarns were procured from Hubli, Uppina betegeri, Khadhi Handloom Development Center, Gadag, Belgaum and local market

Pre-loom process

This section involved the Scouring and bleaching, Sizing, bobbin winding, warping and pirn winding and were carried out in the Department of Textile and Apparel Designing, College of Community Science ,University of Agricultural Sciences, Dharwad, Karnataka ,India

a. Scouring and bleaching

Scouring leaves the material in a more absorbent condition than the gray cloth. Scouring was done using sodium hydroxide (NaOH) which is a strong alkali. Cotton yarns were subjected for scouring where the hanks were boiled in alkaline media of sodium hydroxide for three hours to remove all the impurities and additives present in it. The hanks were squeezed, rinsed thoroughly once in hot water and twice in cold water to ensure the complete removal of chemical deposited superficially (IS: 1383-1977).

MLR ratio - 1:20
Sodium hydroxide - 1 per cent
Turkey red oil - 0.5 per cent
Time - 3 hours

Bleaching is whitening of the raw cotton material by removing the coloring matter.. The scoured yarn hanks were further subjected to bleaching. The scoured yarn hanks were boiled in a solution of hydrogen peroxide, sodium silicate and turkey red oil for 2 hours. Further bleached yarn hanks were thoroughly rinsed once with hot water and twice in cold water (IS: 10590-1983).

Water - 1:20
Hydrogen peroxide - 1.5 per cent
Sodium silicate - 0.5 per cent
Time - 2 hours

b. Sizing

cotton yarns were sized using maida starch wherein water was kept for heating and as the temperature raised to boiling maida was added with continuous stirring with a stirrer until a thin consistency was obtained. Thus once the required consistency of maida was obtained, it was applied to the warp yarns prior to warping (IS: 179-2009).

c. Warping

Polyester yarns were used as warp where required number of threads was laid in parallel form under uniform tension to make the required width of cloth.

d. Beaming

The process of winding the previously prepared warp yarns in the form of a sheet, on to a weavers beam is known as beaming. The beam is usually provided with discs on both the ends of the beam in order to maintain required width of warp to keep the selvedge ends in

control. While winding the warp on the beam the individual threads are laid parallel to each other and are kept under uniform tension.

e. Pirn winding

Pirns winding is the process of transferring the weft yarn from cone onto the pirn. Cotton yarns were wound on pirns with the help of hand driven charkha.

Sl, No	Woven Saree	Embroidered Saree
1	Warp-cotton 2/100	Warp-cotton 2/100
2	Weft-polyester 110 denier	Weft-polyester 110 denier
3	Coloured poly thread cone for border and motifs 2/64	Coloured poly thread cone for border, buttas and motifs 2/64
4	-	Coloured fancy thread spools for border, buttas and motifs

Table 1. Details of sarees woven and embroidered with motifs

Multifilament polyester of 110 d as warp and two ply(Table 1) mercerized cotton of 100s as weft and was selected to weave the ground cloth. The extra weft figuering was produced by using four folds of the ground polyester multi-filament yarn. The border warp constituted of two ply mercerize of 64s and extra warp figuring was produced with two ply rayon of 80d.Handloom with jacquard shedding mechanism (Figure 1a) of 172 needle capacity was employed to produce weft design patterns on polycot union saree with reed count 68. The extra warp figuring in the border on either sides of the saree was produced by dobby shedding mechanism.The *patterns* were woven in sarees by means of small swivel shuttles. These shuttles were inserted through a separate Jacquard shed operated manually.
After the insertion of extra weft, the shed was closed and the ground weft was beaten to the fell of the cloth. In the sequential order of processing, the pattern was completed. The woven traditional textile material were fabricated into sarees

Post loom process and Design development

i. Cutting and doffing

After weaving a known length of fabric, extra one inch approximately was woven and separated from the cloth beam with the help of a knife which helped to prevent the slippage of yarns through dents. Further the fabrics were folded and pressed neatly.

a. Woven pattern motifs

A total of conventional motifs used in different states namely, traditional Kasuti of Karnataka, Kantha of Bengal and Worli of Maharashtra embroidery were selected. Motifs were grouped into three categories *viz.*, main motifs, buttas and borders. The selected motifs were sealed according to the simulations and digitized using the software GC Kala – 2008. The output of digitized motifs was taken on point paper and accordingly punch cards were prepared and the pattern chain was developed.

b. Embroidery motifs

Embroidery pattern designe were developed on woven sarees using Wilcom embroidery software at Vadgaon digitized embroidery centre,belguam, karnataka

Laboratory Assessment

Structural and physical properties viz., cloth count, thickness, stiffness, weight, dimensional stability, abrasion and drapability. The following tests were carried out in the testing laboratory to assess the physical parameters of the woven fabrics

A Structural properties

1 Dimensional stability

Cloth dimensional stability is measured in terms of shrinkage percentage. The fabric sample of 25 cm × 25 cm was taken and initial length of 20 cm was marked both in warp and weft direction. The test samples were soaked in the soap solution of 2gpl at room temperature for one hour rinsed thoroughly in cold water and dried under shade. The dried samples were pressed gently without stretching. The final distance was measured and change in dimensional stability was calculated using the below formula.

$$\text{Shrinkage} = \left[\frac{L_o - L_a}{L_o}\right] \times 100$$

Where,

L_o = Initial length
L_a = Final length

2 Cloth count

Cloth count in woven textile material is the number of ends and picks per unit area while the fabric is free from wrinkles and is affected by the yarn count and compactness of the weave. The number of warp and weft yarns in one square inch of the fabric is counted at five random selected places across the width and along the length of the test specimens. The region near the selvedge should be avoided because the spacing of thread is often a little different than in the body of the cloth (Booth, 1996). Further, mean values of ends and picks per inch were calculated.

Number of specimen tested: 5 each warp and weft
Method: Direct counting of threads per unit area, 1 inch
Instrument: Magnifying counting device (Pick glass)

3 Cloth weight

Fabric weight is expressed as mass per unit area in g/sq.mt. A sample of 5 × 5 cm was cut and weighed on an electronic weighing balance to determine the weight per sq.mt (g) (Booth, 1996). Further, warp and weft threads were separated and weighed to calculate respective percentages. The per cent composition of warp and weft was calculated as follows.

Weight of 5 × 5 sample : a (g)
Weight of warp yarns : b (g)
Weight of weft yarns : c (g)
% of warp : b/a ×100
% of weft : c/a × 100

4 Cloth thickness

Thickness is the distance between the upper and lower surface of the material measured under a specified pressure, expressed in mm. The specimens were tested as directed in BS test method 2544:1954 (Booth, 1996). The specimen chosen were free from folds, crushing or distortion, wrinkles, specimen were placed on the anvil of test apparatus and bring the pressure foot into the contact with the opposite side of the material and record the thickness in mm, the shape of the anvil and pressure foot was round. The thickness gauge instrument was used for measuring thickness. Five readings were recorded and mean was calculated.

5 Cloth Stiffness

Fabric stiffness is the resistance of the fabric to bending. Bending length is the length of the fabric that bends under its own weight to a definite extent. It equals half the length of rectangular stripe of fabric that bends under its own weight to an angle of 41.5°. The test samples were tested as directed in BS test method: 3356-1961. A rectangular strip of fabric, 6 inch × 1 inch was mounted on a horizontal platform in such a way that it hangs like a cantilever and bends downwards. Test specimen was cut with help of template and then both template and test specimen was placed on the platform with the fabric underneath. Both were pushed forward slowly. The strip of fabric was started to a droop over the edge of the platform and the movement of the templates and the fabric was continued until the tip of the specimen viewed in the mirror cuts both index lines. The bending length was read off from

the scale mark opposite a zero line engraved on the side of the platform.Readings were recorded by using Shirley's stiffness tester (Booth, 1996).

6 Cloth crease recovery

Crease recovery is nothing but allowance of the fabric to recover from the crease. The test samples were tested as directed in IS method: 4681-1968 by using Shirley's crease recovery tester. Samples were cut both warp and weft way from the fabric with a template, 2 inch long by 1 inch wide. It was creased by folding into half and placed under a weight of 2 kg for 5 minutes. The weight was removed and the specimen was transferred to the fabric clamp on the instrument using forceps and was allowed to recover from the crease for 5 minutes. As it recovered the dial of the instrument was rotated to keep the free edges of the specimen in line with the knife edge. At the end of the time period as it was allowed for recovery, usually 1 minute the recovery angle in degrees was read on the engraved scale. Readings were recorded for both warp and weft separately. (Booth, 1996)

B. Performance properties

1 Cloth Drape coefficient

Drape is the ability of the fabric to assume a graceful appearance in us. Fabric drape may be explained as the extent to which a fabric deforms when it is allowed to hung under its own weight. A circular specimen about 10 inch diameter was supported on a circular disc about 5 inch diameter and upper supported area drapes over the edge. On switching the lamp of the drape meter, it gave the shadow of the draped area, which was taken on a paper and was weighed. Similarly draped shadow area of the template and supporting disc was also taken. Drape coefficient is the ratio of the projected area of the draped specimen to its undraped area after deduction of the area of the supporting disc. Thus, drape coefficient was calculated using the formula.

$$F = \frac{\left(\frac{w}{w - a}\right)}{A - a} \times 100$$

Where;
F - Cloth drape coefficient
W – Weight of the draped pattern
w – weight/unit area of the print paper
a – Area of the specimen disk
A - Area of the specimen template

C. Durable properties

1 Cloth Tensile strength and elongation

Tensile strength is the ability of the material to resist or rupture induced by eternal force. It is expressed as force per unit cross sectional area of the specimen at the time of maximum load. The specimens were tested as directed in ASTM test method: 12616-1989. The method employed to determine the breaking load and elongation of the material by using the 'raveled strip test' in Unistretch 250 tensile tester. The specimen was gripped between two clamps of the tensile testing machine in such a manner that the same fabric was gripped by both the clamps and a continuous increasing load was applied longitudinally to the specimen by moving one of the clamps until the specimen ruptured. Values of breaking load of the test specimen were recorded from the indicator of the machine.

Elongation is the increase in length of the specimen from its initial length expressed in units of length. The distance that material will extend under a given force is proportional to its original length. Hence elongation is coated as percentage was assessed for the fabrics.

Size of the specimen	: 20 cm × 5 cm
Numbers of specimen tested	: 5
Test method	: Raveled strip test
Load range	: 250 kgf
Speed	: 300 mm/min

Abrasion is the rubbing away of component fibres and yarns of the fabric (Booth, 1996). Abrasion resistance was carried out using the instrument 'Martindale abrasion tester'. Fabric

specimens were cut according to the size of template. The specimens were abraded until a hole was formed and number of cycles to create a hole and readings are recorded.

Size of the specimen : 13.5 cm
Number of specimen tested : 5
Type of abradent : Zero emery paper
Type of abrasion : Multidirectional
Determination of end point : Formation of hole
Name of the instrument : Martindale's abrasion tester
Test method : IS 12673-1989

Visual evaluation of the polyester and cotton union sarees

Visual assessment of the developed fabric samples was carried out by a panel of 30 textile experts comprising of faculty members and PG students of Department of Textile and Apparel Designing, University of Agricultural Sciences, Dharwad. Fabric structure, fabric handle, fabric texture, overall acceptability of the developed fabrics based on their end uses were expressed in terms of frequency, percentages and weighted average ranking (WAR) was done in order to study the preference of developed union fabrics based on rakings (5- Excellent, 4- Very good, 3-Good, 2- Fair and 1-Poor).

Cost of production of developed sarees

The cost of the yarns and developed bamboo and tencel union fabrics per meter were calculated for comparison of polyester × cotton union sarees

3.RESULTS AND DISCUSSION

It is seen from Table 2 that, Polycot union sample attained excellent dimensional stability (warp and weft-20), better cloth count (warp-44 weft-55), cloth stiffness (warp -2.19 cms and weft-1.89cms), crease recovery (warp – 80^0 weft-87.50^0), cloth weight (114.9 gsm) cloth thickness (0.35 mm) properties respectively. Polycot union sample had better Abraision Resistance (112cycles) and fabric strength of warp-73 and Weft-57 (Kgf) with elongatin (warp 25.46% and weft 16.19%).

Table 2. Structural and Physical properties of Polycot union fabric sample

Sample	Mean values	
	Polyester- Warp	Cotton – Weft
Dimensional stability	20	20
Cloth count	44	55
Cloth stiffness	2.19	1.89
Crease recovery (degrees)	80	87.5
Tensile strength (Kgf)	73	57
Elongation (%)	25.46	16.19
Cloth thickness (mm)	0.35	
Cloth weight (gsm)	114.9	
Abraision Resistance (cycles)	112	
Drapability (%)	110.06	

Drapability is an important property regarding aesthetic and drape ability of textile materials. This may also be attributed to the larger diameter of polyester fiber which increases diameter of the yarn and decreases the cloth stiffness of polyester rich fabric.

a) b)

Figure 1. Sarees woven with pattern designs

Visual analysis of woven sarees:

Table 3: Visual analysis of woven sarees with respect to tradional motifs n=30

Motifs	Clarity	Colour combination	Texture	Alignment	Overall appearance	Preference WMS
Parrot	18.0	18.0	18.0	**9.6**	**9.6**	**9.6**
Leaf	**27.6**	**27.6**	**27.6**	20.4	20.4	**27.6**
Flower	24.0	15.6	24.0	20.4	20.4	20.4
Mango	24.0	24.0	**27.6**	24.0	24.0	**28.8**

From Table 3 and Figure 1b it is revealed that, among the different woven motifs and mango motif (28.8) secured the highest scores with respect to overall preference, followed by leaf (27.6) with respect to clarity, colour combination, texture and preference. While, the least score was obtained for parrot (9.6) motif with respect to alignment, overall appearance and preference.

Table 4: Visual analysis of embroidered sarees with respect to traditional motifs n=30

Sarees	Clarity	Colour combination	Texture	Alignment	Overall appearance	Preference WMS
White Worli	27.6	26.4	28.8	27.6	27.6	26.4
White Kasuti	30.0	30.0	28.8	22.8	30.0	28.8
Coloured Worli	27.6	27.6	27.6	27.6	27.6	27.6
Coloured Kasuti	28.8	26.4	28.8	27.6	27.6	28.8

From Table 4 and Figure 2 it is concluded that, based on the ranks given to motifs of embroidered sarees percent score was given to white coloured embroidered sarees (30.0) with respect to its clarity, colour combination and overall appearance when compared to white coloured Worli embroidered sarees. Comparing white coloured Worli and kasuti embroidered sarees highest score was given to white colour Kasuti embroidered saree (28.8) with respect to it clarity, texture and overall preference. While among all the four sarees lowest score (22.8) was given to white coloured kasuti saree with respect to alignment.

Table 5 explains about the preference of borders with different motif combinations with respect to their clarity of motifs, their colour combinations and overall appearance, therefore the resultsindicated that among the five motifs highest preference was given for Elephant & flower Motif 3 (5.0) with respect to its colour combination followed by motif 3 (4.1) with respect to motif clarity and colour combination. Whereas, among the five motifs the least preference was given to Kantha parrot & leaf Motif 5 (3.0) with respect to the clarity of motifs followed by motif 1 & 4 with respect to its overall appearance. Overall respondents opined that pallu designs with compactly woven traditional motifs can also be used to produce toppers, dupatta, stoles and other madeups.

Table 5. Preference of border with motif combination n=30

Sl.No	Motifs	Parameters		
		Motif clarity	Colour combination	Overall appearance
1	Temple & kasuti	3.5	3.8	3.7
2	Khairi & leaf	3.8	3.7	3.7
3	Elephant & flower	4.1	5.0	4.0
4	Temple & worli	3.5	3.2	3.0
5	Kantha parrot & leaf	3.0	4. 1	3.5

Various factors like fixed cost (depreciation) and variable costs (repairs and maintenance, cost of yarns, preparatory processes, punch cards, embroidery thread; wages for weaving and embroidering) were taken into account while determining the cost of production. It is clear from Similarly, the cost of raw materials and preparatory processes also remained same. The variation existed mainly with the wages paid towards embroidering and weaving, resulting into difference in the cost of production.

Figure 2. Woven Sarees with digitized embroidery designs

Looking into the total cost of the hand embroidered saree that accounted to Rs. 705.79 where greater amount paid was towards wages for embroidering (Rs. 300.00), since hand embroidery is very elaborate, time consuming, intricate and not only labour intensive but also expresses skill and creativity of an individual. Further, the embroidery threads were also relatively expensive that added to the production cost. On the other hand, the total cost of woven pattern sarees was relatively lower than that of embroidered saree.Actual cost of woven saree with traditional motif was Rs 775/saree and woven and embroidered with traditional motif was Rs 1075/saree. Though the amount spent on fixed and variable costs of these sarees were same, a slight variation was observed with respect to the amount spent on punch cards. Further, it is assumed that the weavers earned 25 per cent of net profit per saree on total production cost

4.CONCLUSION

As a natural fiber, 100% cotton garments also tend to be a bit more expensive than the synthetic counterparts. A fabric made from a poly cotton combines the strengths of the two fibers*. Poly cotton sarees* are breathable, tear-resistant, and durable and can be fashioned into abrasion-resistant fabrics, like canvas. While not as inexpensive as pure polyester, poly cotton blends do tend to cost less than comparable garments made of 100% cotton and they provide much more comfort.
The total cost of poly cot pattern sarees was relatively less because of Jacquard shedding mechanism adopted for producing these patterns not only assisted in creating new designs but also saved time, money and labour. Thus, the handloom weavers can take up the production of these sarees, madeups, dupattas, stoles and toppers to earn better wages and in turn improve their livelihood. The weavers can even design and produce exquisite home textiles.

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