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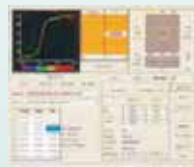
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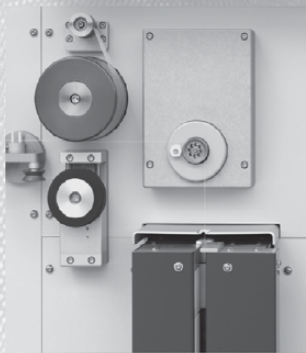
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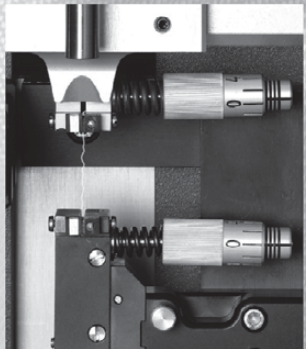
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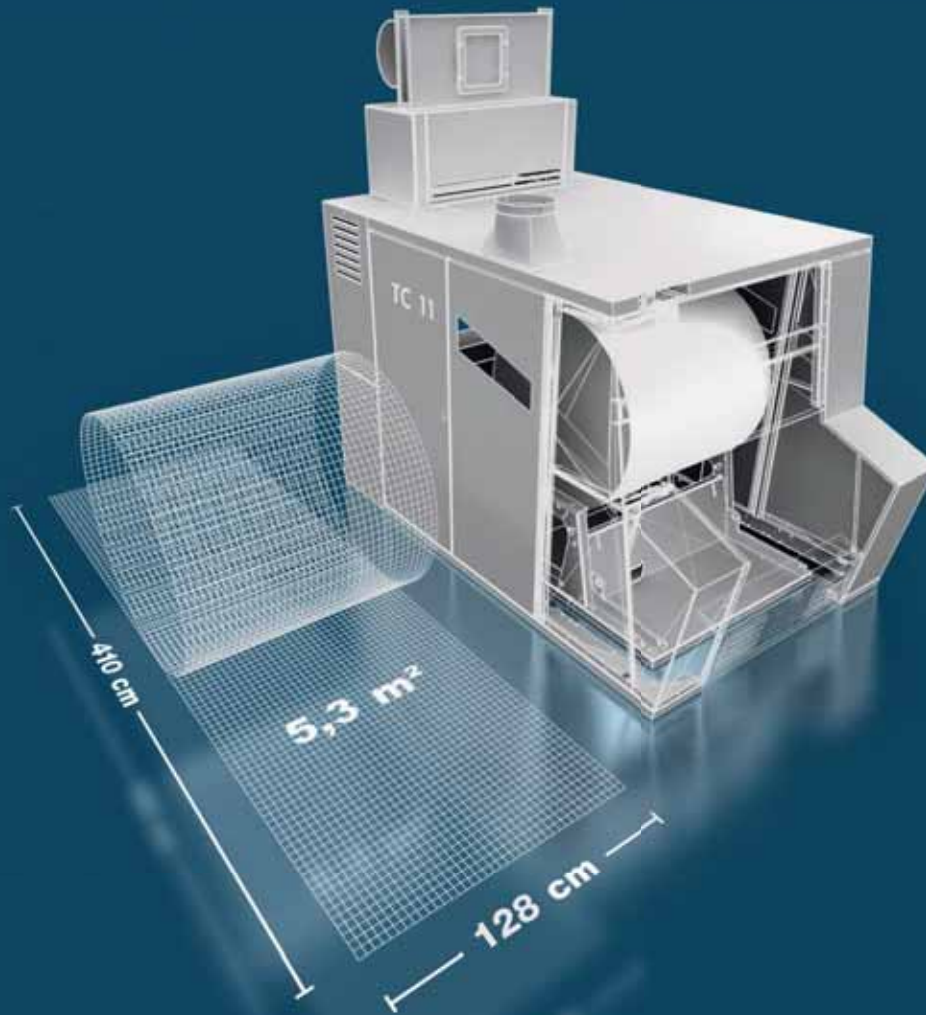
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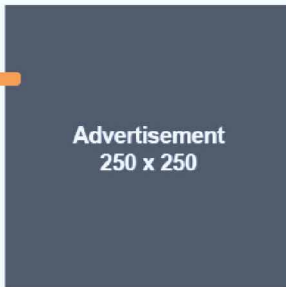
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<http://www.dmai.org>

Igmatex-Textile Home Furnishing and Garment Machinery Exhibition
Date: 01-03, February 2013
<http://www.igmatexfair.com>

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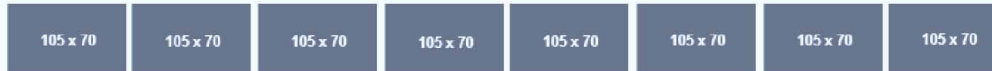
- Blow Room
- Carding
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- Draw Frame
- Fly Frame
- Ring Frames
- Doubling

Recent News

- Oswal Grp let down by Union Budget
Union Budget is finally been presented and textile industry does not seem to be satisfied with the Government's support.

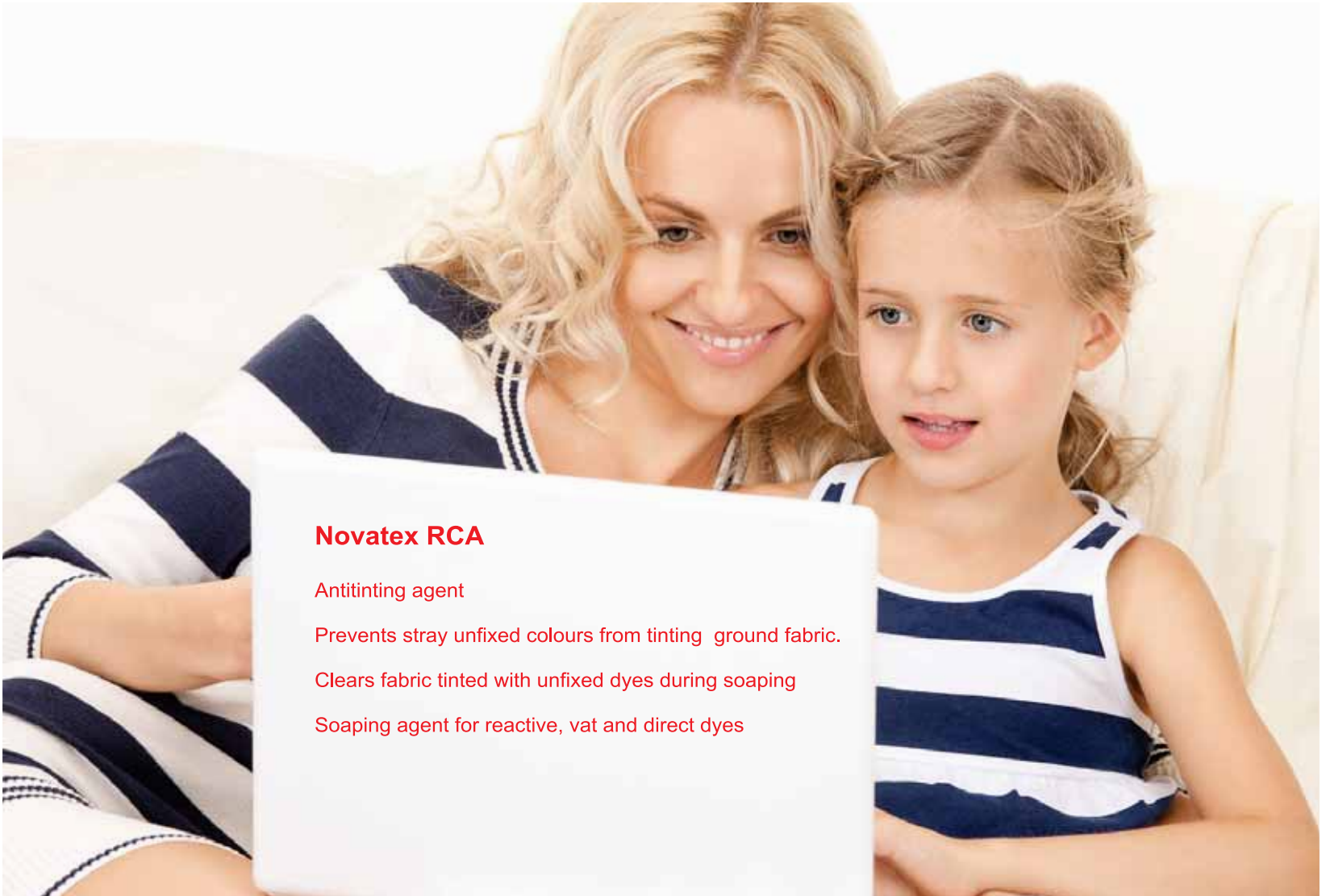
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Indian Textile Industry Handbook of Statistics 2012 also releasing soon

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A General Equation for Estimating Yarn Tenacity * ₹ 100; \$ 8



This research monograph is an excellent example of how good quantitative theory helps mills to reduce costs while achieving the desired tenacity in cotton yarns. Cotton spinning mills with sophisticated fibre testing instruments can save cotton costs up to 4% using this prediction equation.

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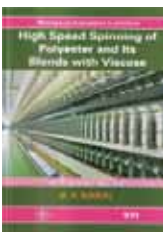
Every spinning mill on cotton and manmade fibres can assess its level of excellence in maintenance management and most will be able to improve it using Part 1. Parts 2 and 3 not only make available widely scattered use-worthy information, but also give several directives for ensuring that the work practices are right.

Fundamentals of Design for Textile and Other End Uses * ₹ 495; \$ 35



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Editorial

Warm welcome for the Budget 2013

To begin with, let me wish all our readers, “A very Happy and Prosperous New Year- 2013”. The year has certainly begun on a very encouraging note for all of us.

I would be happy to share some of the collaborations which we have initiated at ICT. Firstly, ICT is in process of collaborating with Unilever Industries Pvt. Ltd. for combined research work. Moreover, it has now signed an MoU with The Ethiopian Textile Industry Development Institute (TIDI), with the sole purpose of developing their Textile industry which is right now at its infant stage. Why I had to make mention of it? Just to highlight that this is the sign of shifting of textile related activities now from Asian continent to African continent.

On the other hand, the Indian textile industry, employing over 100 million people directly and indirectly has been looking for various schemes and assistance in the Union Budget 2013-14 to regain its global competitiveness which faced the worst ever crisis in its history during 2010-11 owing to an unprecedented volatility in the cotton prices and external factors. There have been signs of recovery in the past few months and further improvement is expected with the support of the positive features of the Budget. Main highlights of the budget of 2013-14 for the textile industry are restoring the optional excise regime for branded garments and made-ups which has been a long standing demand of the industry, continuation of Technology Upgradation Fund Scheme (TUFS) during the 12th Five Year Plan and allocation of Rs.2400 crores for 2013-14, reduction of customs duty from 7.5% to 5% for textile machinery which would also help to augment investments in the sector. A further allocation of Rs.50 crores for Apparel Parks and launching an Integrated Processing Development Scheme (IPDS) for 21 parks would also be an important growth factor where 42 parks are already developed. Also, reduction in the interest burden for working capital and term loans to a concessional rate of 6 per cent for the handloom sector will work as a major boon for the handloom sector. You can read analysis of Budget by our National President Mr. D. R. Mehta in this issue.

Apart from all these positive factors, reduction of the duty rates for man-made fibres and assistance to the industry to handle the precarious power situation are two major areas where the Budget has not addressed the issues of the textiles industry. However, we would like to thank the Finance Minister and extend a warm welcome to this budget which is a ray of hope for the growth of our industry.

Thus, we should say that, it is good to “Make hay while the sun shines” or act wisely while the opportunity is favourable.

Prof. (Dr.) R. V. Adivarekar,

JTA, Editor



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Green Dyeing with *Sesbania Aculeata* Plant

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Abstract

In India, there is a large base of plant resource and little has been exploited so far. The revival of natural dyes has prompted researchers to explore newer natural dye resources that are cheaply and abundantly available. In continuation of this research stream, a plant '*Sesbania aculeata*', commonly known as Dhaincha, was chosen for the present research. This plant belongs to the family of Fabaceae. Its usage in making natural dye does not result in any wastage of otherwise highly commercial product. In the present study, dyeing with ethanolic extract of *Sesbania aculeata* has been shown to give good dyeing results. The dyeing on silk and polyester blend fabrics were subjected for analysis in terms of K/S and CIE L*a*b* values as well as their performance properties.

Keywords

Ethanolic extraction, Natural dyeing, Polyester-cotton blend, *Sesbania aculeata*, Silk

1. Introduction

Today, natural colourants are emerging globally because of the growing consumer awareness about environmental conservation. Indian flora and fauna are rich in many untapped sources that have not been explored so far. In this regard, plant sources which have potential use in textile dyeing industries could be explored further for commercialization. Efforts are now being made to identify the raw materials from plant sources and to standardize the recipes for their use. In continuation of this research stream, a plant '*Sesbania aculeata*', commonly known as Dhaincha, was chosen for the present research.

Sesbania is a genus of flowering plants in the pea family, *Fabaceae*. *Fabaceae* or *Leguminosae* is an important and third largest family of flowering plants, which is commonly known as the legume family, pea family, bean family or pulse family. The plant *Sesbania aculeata* along with its various species like *Sesbania Sesban*, *Sesbania Grandiflora* has several uses as green manure (adding 150 kg nitrogen/hectare) and is used for erosion control, hedges, intercropping "mother

plants," nitrogen fixation, and windbreaks, for fodder and fuel wood [1]. It is used for manufacturing paper, particle boards, pipes, ropes and as sizing and thickening agent. Lately, the *Sesbania aculeata* plant is used as biomass and supplies 128 kW of electricity at 240 V. in Bihar. It also has several medicinal uses and is used in treatment of various eye, skin and inflammations [2].

Sesbania aculeata is an erect, low annual shrub and reaches up to height of one to two meters. It has fibrous, pithy stems with long leaves. It bears purple-spotted yellow flowers from September to November in Indian climatic conditions. It produces pods which contain light brown beans. Stems are fairly thick, glabrous, branched from the base but are soft and pithy. The leaves are pinnate, 1.2-2.5 cm long, 0.3 cm wide and are glabrous [3] (refer Figure No. 1). The plant is cultivated in India, Pakistan, China, Sri Lanka and Africa.



Figure 1: *Sesbania aculeata* Plant

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2. Materials and Methods

2.1 Materials

Sesbania aculeata plant was collected from the fields near Agra city (India). The leaves and the stems were washed well with tap water and dried under ambient conditions. The dried material was mashed and grounded well to form a fine powder.

A Soxhlet and a distillation assembly was used for ethanolic extraction of the dye. An open bath beaker dyeing machine equipped with programmable control of temperature was used to carry out all dyeing studies. Silk and Polyester/Cotton (67/33) blend fabrics were used.

All solvents, reagents, and chemical mordants such as alum, ferrous sulphate, copper sulphate, potassium dichromate and stannous chloride used were of laboratory grade.

The absorbance of dyeing solution was measured using a Shimadzu-UV visible spectrophotometer and K/S values and CIE L*a*b* values were measured on Premier Colour Scan Spectrophotometer.

2.2. Extraction of colourant and identification of colour component

The powdered dye material was extracted with ethanol for 8 hours using a Soxhlet extractor. The reason for this type of extraction is that aqueous extracts are not especially favorable for certain dye plants which contain flavonoids, anthraquinones and aglycones. These compounds are poorly soluble in water and therefore are extracted only partially [4].

Dried *Sesbania aculeata* plant material (100 gms) were crushed and dispersed in ethanol (400 ml) and heated to 60°C in a round bottom flask attached to the soxhlet. The extract was then filtered, and the filtrate was evaporated to near dryness using a distillation assembly at 50°C and the extract was obtained in purified form. The ethanol was recovered and reused in the process. Distilled water was added to this extract in the proportion of 1:4. The solution was stirred to a considerable extent to avoid formation of lumps in this solvent-aqueous dye extract.

The absorbances of the dye solutions were measured on the spectrophotometer in order to identify the compounds present.

2.3. Preparation of the fabrics for dyeing

For silk fabrics, degumming was carried out with solution containing 2 g/l of non-ionic detergent for 30 min. The scoured material was thoroughly washed with tap water and dried at room temperature. It was soaked in distilled water prior to dyeing or mordanting.

The polyester cotton blended fabrics were scoured with a solution containing 5 g/l mild detergent for 1 hour, washed, rinsed thoroughly and dried in air to remove all the impurities and starch present.

2.4. Mordanting

The scoured silk and polyester-cotton blended fabrics were mordanted by different metal mordants using pre-mordanting, simultaneous and post-mordanting methods in concentration of 1-2%.

To prepare mordant, it was first mixed with cream of tartar (potassium hydrogen tartrate) with little boiling water (50 ml) and volume was made up with remaining required water (150 ml). The mordant was dissolved in water to make the liquor ratio 1:50. The wetted sample was introduced into the mordant solution and then it was heated. Temperature of the dye bath was raised to 60°C over half an hour and left at that temperature for another 30 minutes. The mordanted material was then rinsed with water thoroughly, squeezed and dried.

2.5. Dyeing

A step wise dyeing of pre-treated, simultaneous-treated and post-mordanted fabrics (silk and polyester cotton blend) with five different mordants was carried out in a dye bath for three hours at a temperature between 60- 65°C, keeping the M: L ratio as 1:40. Dyed fabric was dried and then dipped in 2% sodium chloride solution (brine) at room temperature for 1 hour for fixing. The dyed material was washed thoroughly in cold water to get rid of extra dye.

2.6. Colour Measurement

Colorimetric data of the dyeing process were obtained using a spectrophotometer interfaced to a computer. The colour yield of both dyed and mordanted samples were evaluated by light reflectance measurements using Premier Colourscan Machine.

The colour strength (K/S value) was assessed using the Kubelka - Munk Equation: [5]

$$K/S = (1 - R)^2 / 2R$$

where R is the decimal fraction of the reflectance of dyed fabric.

The CIE L*a*b* values were ascertained for five mordants and three different mordanting conditions. Chroma (C) is a measure of intensity or saturation of colour and Hue angle (H) is derived from the two coordinates a* and b*.

3. Results and Discussions

3.1. Chemical composition of the Colourant

The ethanolic dye extract was dissolved in a suitable solvent system (water) and scanned through on Shimadzu UV Spectro, Spectrophotometer. Maximum wavelength of the dye was measured and the compounds present in the extracts were interpreted (refer Figures 3.1 and 3.2).

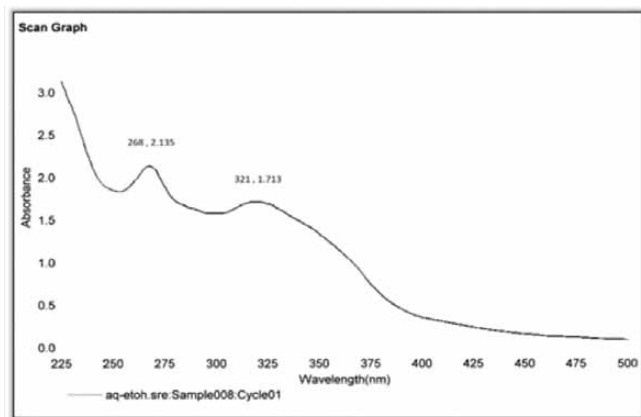


Figure 3.1: UV Spectra of ethanolic extract of Sesbania aculeata plant

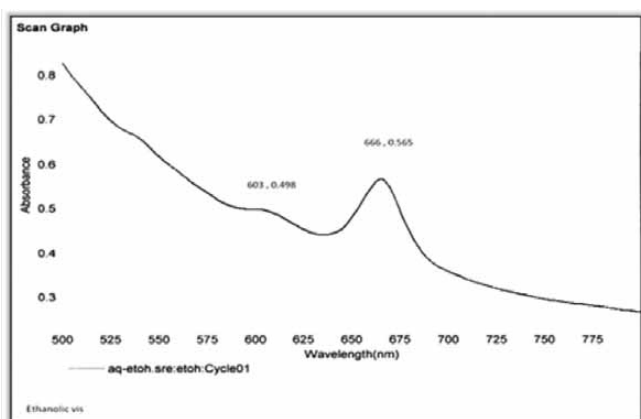


Figure 3.2: Visible spectra of ethanolic extract of Sesbania aculeata plant

From Figure 3.1, obtained on a spectrophotometer, the λ max of the ethanolic dye extract in the UV range

was found to be 268 nm., which falls in the spectral range of Flavonoids which is 200-500 nm. In the visible region the λ max was 666 nm., through which the presence of chlorophyll compound is confirmed. Therefore it may be interpreted that the ethanolic extract of the *Sesbania aculeata* plant contains flavonoids and chlorophyll compounds.

3.2. Colours obtained from dyeing with Sesbania aculeata

After the dyeing process was complete, different shades were obtained on silk and polyester-cotton blend through five mordants and three different mordanting conditions. Ethanolic extract rendered light to dark shades of green, sap green, khaki, yellowish green, leaf green, army green and bottle green on the dyed fabrics. Different shade cards prepared on Premier Colour Scan Spectrophotometer are shown as in Figure 3.3 for silk & 3.4 for polyester-cotton.

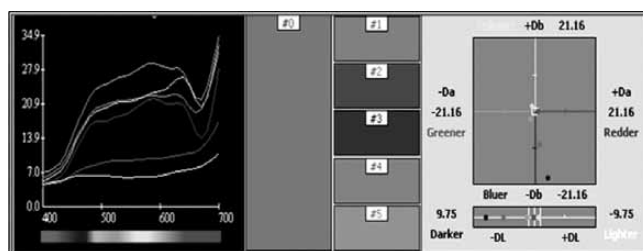


Figure 3.3: Pre mordanting shades on Silk fabric (0 - Control, 1 - Alum, 2 - CuSO₄, 3 - FeSO₄, 4 - K₂Cr₂O₇, 5 - SnCl₂)

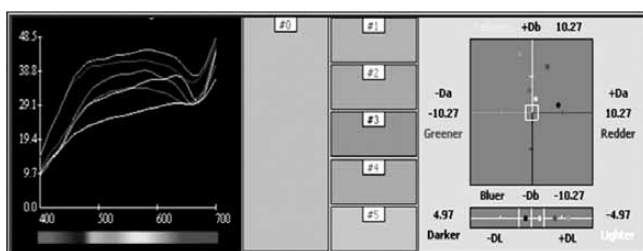


Figure 3.4: Pre mordanting shades on Polyester Cotton blend fabric (0 - Control, 1 - Alum, 2 - CuSO₄, 3 - FeSO₄, 4 - K₂Cr₂O₇, 5 - SnCl₂)

3.3. Evaluation on the basis of mordants and mordanting methods used

Five different mordants used in the dyeing process resulted in different range of shades and tints. Shades of green and grey and brown were obtained. It was observed that varied intensities of colour were obtained

by change of mordant on dyeing with ethanolic extract of *Sesbania aculeata*. Usually tans and dark shades were obtained through sulphates and chromes while chlorides and alum gave lightest of creams and their tints. Sulphates i.e. ferrous sulphate and copper sulphate when used gave the best dark range of browns and greens on silk fabric. Shades having less depth but more variation were obtained in case of Polyester-cotton blend. The rating of the mordants on the basis of shade achieved was as follows -

Fe → Cu → K → Sn → Al (refer Figure 3.5).

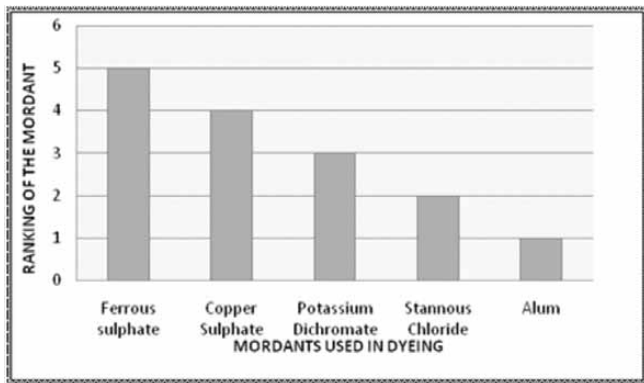


Figure 3.5: Ranking of mordants on the scale of 1-5 on the basis of depth of colour obtained

It was observed that the pre-mordanting technique with metal mordants gave the best results in terms of shades achieved. Since the pre-mordanting method forms an insoluble complex between dye molecule and metal mordant, higher affinity is acquired. Simultaneous-mordanting and post-mordanting method gave average dyeing results in terms of brightness of shades achieved as the mordant does not have enough chance to act upon the fabric (refer Figure 3.6).

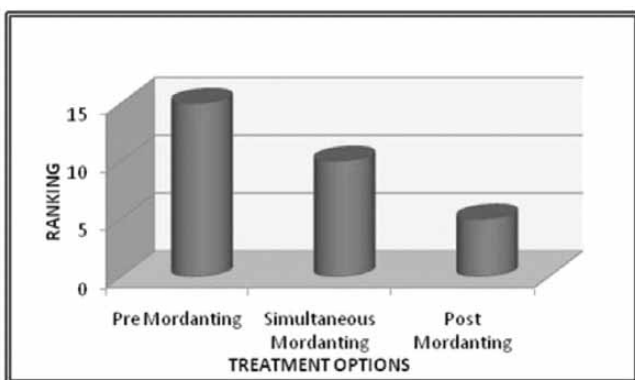


Figure 3.6: Ranking of best mordanting technique

3.4. Optimization of mordants with K/S and colour hue changes

Different mordants were used in 1-2% concentration keeping in mind the toxicity factor of some mordants, particularly copper and chromium. Varied hues were obtained from pre-mordanted, simultaneous and post-mordanted silk and polyester cotton fabrics with alum, CuSO_4 , FeSO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$ and SnCl_2 when dyed with aqueous extract of *Sesbania aculeata*. As shown in Tables 3.1 and 3.2, the different mordants not only cause difference in hue colour and in L^* values and brightness index values but also shows significant changes in K/S values.

Table 3.1: L^* a^* b^* C^* H^* values for pre-mordanted, simultaneous & post-mordanted silk fabric dyed with ethanolic extract of *Sesbania aculeata*

Pre-mordanting

	L^*	a^*	b^*	C^*	H^*
Control (Silk)	50.833	-3.322	20.791	21.055	99.111
Alum	49.734	-4.490	18.580	19.226	104.919
Copper sulphate	45.969	-1.615	11.049	11.166	98.349
Ferrous sulphate	43.138	1.181	1.627	2.010	54.003
Pot. dichromate	50.767	-2.323	20.818	20.947	96.401
Stannous chloride	51.519	-4.486	22.242	22.690	101.435

Simultaneous Mordanting

	L^*	a^*	b^*	C^*	H^*
Control (Silk)	51.440	-3.404	20.878	21.154	99.293
Alum	50.137	-3.405	18.097	18.415	100.688
Copper sulphate	49.145	-8.251	15.900	17.913	117.451
Ferrous sulphate	46.493	-3.307	9.948	10.483	108.417
Pot. dichromate	49.715	-4.319	16.869	17.413	104.391
Stannous chloride	52.921	-4.345	23.958	24.349	100.311

Post Mordanting

	L^*	a^*	b^*	C^*	H^*
Control (Silk)	49.917	-3.532	20.817	21.115	99.662
Alum	48.748	-5.425	18.025	18.286	106.778
Copper sulphate	47.951	-10.588	15.838	19.051	123.786
Ferrous sulphate	46.049	-3.086	13.049	13.409	103.336
Pot. dichromate	46.606	-6.337	18.445	19.503	108.989
Stannous chloride	49.369	-5.558	19.364	20.154	106.127

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Prospective husband: Do you have a book called 'Man, The Master of Women'?

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Table 3.2: L* a* b* C* H* values for pre-mordanted, simultaneous & post-mordanted polyester-cotton fabric dyed with ethanolic extract of Sesbania aculeata

Pre-mordanting

	L*	a*	b*	C*	H*
Control (Poly+Cot)	69.886	-5.246	10.353	11.606	116.897
Alum	72.860	-7.292	18.619	19.996	111.415
Copper sulphate	70.656	-5.538	13.568	14.655	112.231
Ferrous sulphate	69.428	-0.721	11.379	11.402	93.660
Pot. dichromate	71.814	-2.652	16.901	17.108	98.950
Stannous chloride	70.546	-4.468	12.271	13.122	110.774

Simultaneous Mordanting

Control (Poly+Cot)	69.765	-5.602	10.605	11.994	117.870
Alum	69.432	-2.917	9.028	9.488	107.935
Copper sulphate	70.202	-7.794	11.838	14.173	123.383
Ferrous sulphate	69.678	-5.997	10.570	12.153	119.593
Pot. dichromate	70.000	-3.941	12.096	12.722	108.075
Stannous chloride	69.620	-5.414	9.069	10.562	120.860

Post Mordanting

Control (Poly+Cot)	69.587	-5.606	11.244	12.564	116.525
Alum	69.919	-7.416	11.863	13.990	122.034
Copper sulphate	70.099	-10.274	11.635	15.522	131.465
Ferrous sulphate	69.129	-2.938	11.091	11.474	104.867
Pot. dichromate	69.315	-5.508	11.087	12.380	116.444
Stannous chloride	71.016	-6.925	14.399	15.490	115.804

Through L* a* and b* values it can be seen that mordants which show higher values of L* show lighter shades while lower L* values signify deeper shades for the dyed fabrics. Similarly, negative a* and negative b* represent green and blue respectively. These values indicate that the tinctorial value of this natural dye is high in case of silk dyeing. The relative comparison of both the silk and polyester blended fabrics show least K/S value in terms of dye absorption and the

intensity of the shades in case of the blended fabrics. The review suggests that the natural dyes do not have much affinity for synthetics or their blends [6]. Different mordants show change in K/S values as shown in Figures 3.7 and 3.8.

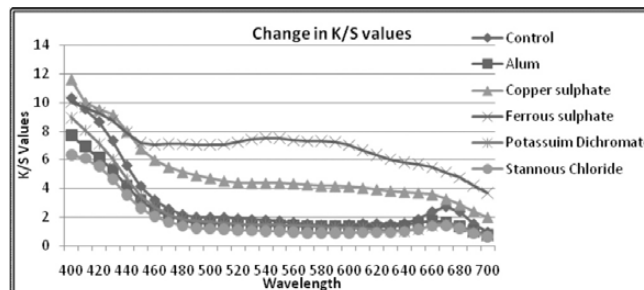


Figure 3.7: Change in K/S values of pre-mordanted silk dyed with ethanolic extract

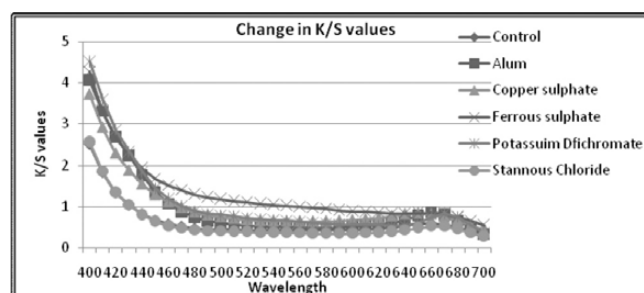


Figure 3.8: Change in K/S values of pre-mordanted polyester-cotton dyed with ethanolic extract

3.5. Fastness of the dyed samples

The dyed samples were tested for wash fastness and grey scale rating was given. Good wash fastness was achieved in pre-mordanted silk and polyester cotton blend with fastness grade of 4 and 5 when compared with other mordanting techniques. The pre-mordanting method forms an insoluble complex between dye molecule and metal mordant resulting in higher affinity (Refer Tables 3.3 and 3.4). The wash fastness of the dyed samples was excellent whereas rubbing fastness was good. Average to good light fastness was observed in samples dyed with this dye.

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Table 3.3: Fastness properties of silk dyed with ethanolic extract of *Sesbania aculeata*

Ethanolic Extract	Fastness Properties			
	Wash	Dry Rubbing	Wet Rubbing	Light
Silk				
Un- mordanted	4	4	3	3.5
Pre-Mordanting	Wash	Dry Rubbing	Wet Rubbing	Light
Alum	4.5	3.5	3.5	3.5
Copper sulphate	3.5	4	3	3
Ferrous sulphate	4	4	4	4
Potassium dichromate	4	3.5	3.5	3
Stannous chloride	3.5	4	3.5	4
Simultaneous-Mordanting	Wash	Dry Rubbing	Wet Rubbing	Light
Alum	4	4	3	3
Copper sulphate	3.5	3.5	3	3
Ferrous sulphate	4	4	3.5	4
Potassium dichromate	4	3.5	4	3.5
Stannous chloride	4	4	4	3.5
Post-Mordanting	Wash	Dry Rubbing	Wet Rubbing	Light
Alum	4	4	3.5	3.5
Copper sulphate	3	3.5	3	3
Ferrous sulphate	3.5	4	4	3.5
Potassium dichromate	3.5	3.5	3	3
Stannous chloride	4	4	4	3.5

Table 3.4: Fastness properties of polyester-cotton dyed with ethanolic extract of *Sesbania aculeata*

Ethanolic Extract	Fastness Properties			
	Wash	Dry Rubbing	Wet Rubbing	Light
Polyester-Cotton				
Un- mordanted	4	3	3	3
Pre-Mordanting	Wash	Dry Rubbing	Wet Rubbing	Light
Alum	4.5	4	3.5	3.5
Copper sulphate	3.5	3.5	3	3.5
Ferrous sulphate	4	4	3.5	3
Potassium dichromate	4.5	3.5	3	2.5
Stannous chloride	3.5	3.5	3.5	2.5
Simultaneous-Mordanting	Wash	Dry Rubbing	Wet Rubbing	Light
Alum	4	4	4	3.5
Copper sulphate	3.5	3	3	3
Ferrous sulphate	4.5	4	3.5	3
Potassium dichromate	4	3.5	3.5	3.5
Stannous chloride	3.5	3.5	4	3
Post-Mordanting	Wash	Dry Rubbing	Wet Rubbing	Light
Alum	4	3.5	3.5	3
Copper sulphate	3	3.5	3	3
Ferrous sulphate	4	4	3.5	3.5
Potassium dichromate	3.5	3	3	3
Stannous chloride	3.5	3.5	3.5	3.5

4. Conclusion

The environmental activists are supportive of using natural colourants as they are seen to be exploiting renewable resources, causing minimum pollution and having less risk to human health. There is currently demand for natural dyes in a niche market that could be expanded. The large scale production of textiles dyed with natural dyes is a new concept for textile industry. Aqueous extract of *Sesbania aculeata* yields shades with good fastness properties. The dye has good scope in the commercial dyeing of cotton and silk giving brilliant colours in conjunction with metal mor-

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I don't think necessity is the mother of invention - invention, in my opinion, arises directly from idleness, possibly also from laziness. To save oneself trouble.

-Agatha Christie

dants with pre-mordanting technique. Preparation of dry powder from the leaves of *Sesbania aculeata* can be a cheap source of natural dye having a good shelf life.

References

1. Duke J.A., *Handbook of Energy Crops*, electronic publication on the New CROPS web site, (1983).
2. Oudhia Pankaj, *Traditional medicinal knowledge about common herb, Dhaincha (Sesbania sp.) in Chhattisgarh, India, 2003*, Research note, www.Botanical.com, retrieved on February 14, (2010).
3. National Academy of Sciences, *Firewood crops*, National Academy Press, Washington D.C., 237, (1980).
4. Vankar P.S., *Handbook on Natural dyes for Industrial Applications*, National Institute of Industrial Research, Delhi, 51, (2006).
5. Kubelka P., *Journal of the Optical Society of America B*, 44, (4), 330, (1954).
6. Gulrajani M.L., *Indian Journal of Fibre & Textile Research*, 26, 191, (2001).

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Greener Method of Dyeing of Silk with Natural Colouring Matters

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Abstract

Silk is normally dyed with acid, metal-complex and selected direct dyes, many of them have been banned now. Eco-friendly, bio-degradable natural colours extracted from vegetables, trees and insects have poor affinity for textile substrate. They are generally applied along with mordants and metallic salts as fixing agent, many of which are not eco-friendly. In this project, wash-fast and light-fast shades on silk were obtained by applying natural colouring matters, namely tea, pomegranate, tesu flower and henna directly after aqueous extraction and in the absence of mordant or any other harmful chemical. Lower colour strength obtained by this greener method of dyeing may be compensated by saving time and energy as well as by elimination of the use of harmful chemicals.

Key words

Dyeing of Silk, Henna, Natural Colouring Matters, Tea, Tesu Flower.

1. Introduction

The dyes, more accurately known as colorants, are highly coloured substances and can be used to impart colour to infinite variety of materials described technically as substrates. Until the end of 19th Century, the colouring materials were all obtained from natural sources. The majority were of vegetable origin; plants, lichen and trees, though a few were obtained from insects and molluscs. Over thousands of years a large number of natural dyes had been used, but only a dozen or so proved to be practically useful, as most of these natural colouring matters are very unstable. From the beginning of 20th Century synthetic dyes of superior properties came in the market and slowly replaced natural dyes completely. After using synthetic dyes for about a century, people started realising that these dyes have spoiled our environment immensely. Most of the synthetic dyes have poor biodegradability and many of the dye intermediates are toxic and carcinogenic. As a result, a large number of synthetic dyes are banned and hunt for eco-friendly natural dyes have started at each corner of the globe [1].

On the other hand, natural colours extracted from vegetables, trees and insects are eco-friendly and biodegradable. However, the extraction of dyes from natural

sources is a slow, inefficient, wasteful and very labour intensive process. They are generally applied along with mordants which have affinity for both substrate and dye. The water-soluble mordants are subsequently fixed or insolubilised by metallic salts such as potassium dichromate, copper sulphate, aluminium salts etc. Many of these salts are not eco-friendly.

The present work is an attempt to study the possibilities of application of aqueous extract of natural colouring matters directly by-passing tedious extraction procedure. Earlier studies by the author showed that dyeing with these substances without mordant on cotton and jute were not satisfactory due to poor fastness and dullness of shades. However, silk and wool inherently contain several substances which may act as mordant. Silk has its own lustre and hence dullness of shade is not a constrain for application of natural dyes on silk. Silk materials are generally used and washed under mild conditions. Hence, relative is poor fastness properties of natural dyes may not be a barrier for their use on silk. The proposed method is definitely a greener method of textile coloration eliminating the use of non-biodegradable and toxic dyes and chemicals.

A brief description of the natural colouring matters used in this project are discussed below.

1.1 Natural Colourants

1.1.1 Tea

The botanical name is *Camellia sinensis*. Tea leaves

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contains many compounds, such as polysaccharides, volatile oils, vitamins, minerals, purines, alkaloids (e.g. caffeine) and polyphenols (tea tannins called catechins and flavonoids). It gives brown shade with acceptable fastness rating. The colour of tea liquor is entirely due to the flavins and the arubigins [2]. Even exhausted tea leaves after extracting liquor for drinking contain considerable colouring matters for use in dyeing. A study revealed strong affinity of tea for wool and silk between pH 2-4. Light fastness and wash Fastness rating were reported to be 5 and washing fastness 4 respectively [3].

1.1.2 Pomegranate

The other names are anaar and dalim. The botanical name is *Punica granatum*. The dye is extracted from the fruit rind. The colour obtained exhibit good fastness to washing, rubbing and light. This dye is also used as mordant and is over-dyed with other natural dye to improve fastness [4]. The chemical composition of pomegranate rind is as follows: tannin-33%, sugar-10%, ash-11%. The tannin present in rind is of the myrobolan type. Pomegranate tannins are called as gallo tannins and elagic tannins. Pomegranate tannins have polyhydric alcohol structure (a direct class of dye). It gives yellowish shades with acceptable fastness rating.

1.1.3 Tesu Flower

Its common name is Flame of the Forest. It is also known as palas or kingsuk. The botanical name is *Butea monosperma*. Native to India, Flame of the Forest is a medium sized tree growing from 20 to 40 feet high. From January to March it truly becomes a tree of flame, a riot of orange and vermilion flowers covering the entire crown. Its dried flower is used to dye different textiles. It gives yellowish shades with acceptable fastness rating.

1.1.4 Henna

Henna is a flowering plant used since antiquity to dye skin, hair, fingernails, leather and wool. The name henna is also used for dye preparations derived from the plant and for the art of temporary tattooing based on those dyes. It is also known as Mehendi. The botanical name is *Lawsonia inermis*. Henna is a tall shrub or small tree which grows 2-6 m high.

1.2 Behaviour of Silk in Dyeing

Silk being a natural polyamide or polypeptide fibre, its dyeing properties are very similar to those of other natural polypeptide fibre, wool as well as synthetic polyamide fibre, nylon. They can be dyed by similar

methods. Very fine fibrillar structure and high orientation of fibre molecules are the two characteristic properties of silk which determine its dyeing behaviour. The filament of *Bombyx mori* silk is only about 0.8-1.4 denier. These fine fibrils produce a large fibre surface. Firstly, this means that the colour yield on silk is on an average 50% of that of wool or synthetic polyamide fibres, so that about twice the amount of dye must be used to attain the same shade depth. Secondly, it means that a given dye or class of dyes produces lower wet fastness properties on silk than on the other two fibres in equivalent shade depths. The large fibre surface also leads to a high strike rate even at very low temperature of 20-30°C, comparable to the kinetically most rapid-dyeing carpet wool fibres. The fast strike rate is due to rapid saturation of the freely accessible amino groups at the fibre surface. The uptake of about 60-80% may occur at the very beginning of dyeing. Once the superficial saturation with dye takes place, the high orientation of the fibres which is actually a barrier to diffusion causes the remaining dye to be absorbed very slowly in the same way as a highly drawn polyamide fibre for the clothing sector [1].

2. Materials and Methods

2.1 Fabric:

Mulberry woven silk fabric was used in this project.

2.2 Preperation of Silk

Degumming was done to remove unwanted sericine gum from silk fabric by the following procedure:

- Step 1 : The fabric was treated in a solution containing 5 g/l soap and 2 g/l soda ash (pH 10.5) at boil for 2 hours (M:L ratio - 1:40).
- Step 2 : The fabric was subsequently treated with 5 g/l soap only at boil for another 2 hours (pH 8.5).
- Step 3 : Cold Washing.
- Step 4 : Treat the fabric with 5 g/l liquid ammonia at room temperature for 15 min.
- Step 5 : Cold washing. The weight of mulberry silk in raw state and after degumming were 50 and 38 gm/sq. metre respectively.

2.3. Natural Colouring Matters Used

- 1) Three varieties tea namely - CTC, strong liquor type grains (C), Fennings, mixture of leafs (F), common tea bag for instant tea (T),
- 2) Pomegranate (P),
- 3) Tesu flower (TF),
- 4) Henna (H).

2.4. Mordant

Myrobolan:

Botanical name: *Terminalia chebula*

Commercial name: Harda or Haritaki

Myrobolan is dry fruit of tree *Terminalia chebula*. This is used as greenish yellow dye for textile. This is also used as natural mordant in many cases as substitute of tannic acid.

2.5. Fixing Agents

- 1) Potash alum, K_2SO_4 , $Al_2(SO_4)_3$, $24H_2O$ (A)
- 2) T.R. Oil or sulphated castor oil (O)
- 3) Tartaric acid, $[CH(OH)COOH]_2$ (TA)
- 4) Ferrous sulphate, $FeSO_4 \cdot 7H_2O$ (FS)

2.6. Extraction of Colouring Matters

At first 600 ml water was taken for each extraction. The water was heated and then the required amount of colouring matter (depending on g/l required) was added into the water. The liquors were boiled for 20-25 minutes till it becomes about 500 ml. The volume was adjusted, whenever necessary and then the solution was filtered.

At first dyeing was carried out with three varieties of tea without mordant under acidic, alkaline and neutral conditions to compare the colour strength of three varieties immediately after extraction as well as after storage for 10-20 days.

In the second stage, tea (CTC), pomegranate, Tesu flower and henna (all 20 g/l) were dyed directly as well as after mordanting followed by treatment with fixing agents.

2.7 Mordanting and Fixing

Step 1 : In the mordanting step, the fabric was treated with 20 g/l extracted solution of Myrobolan (extraction procedure as above) at 80°C for 30 min (M:L ratio = 1:100).

Step 2 : In the fixation step, the mordanted materials was treated in a bath containing 20 g/l T.R. oil, alum, tartaric acid or ferrous sulphate (each separately) at 80°C for 30 min (M:L ratio = 1:100).

Step 3 : In the dyeing step, dyeing was done separately under acidic, alkaline and neutral conditions.

Step 4: This was followed by soaping and washing.

2.8. Dyeing Conditions

Weight of fabric - 2 gms

Material: liquor ratio - 1: 100

Dyeing was carried out by the extract of colouring matters (20 g/l) with and without mordant under the following three conditions at 85-90°C for 60 minutes:

- 1) Acidic (AC): 1% (o.w.m.) acetic acid
- 2) Alkaine (AL): 1% (o.w.m.) soda ash
- 3) Neutral (N): 10 g/l sodium chloride (no addition of acid or alkali).

The pH of the four colouring matters after extraction and after addition of acid and alkali are shown in Table 2.1.

Table 2.1. pH of the Extract of Natural Colouring Matters

Colouring Matter	pH after extraction (20 gpl)	pH with soda ash	pH with acetic acid
Tea	5.8	7.1	4.8
Pomegranate	4.5	5	3.7
Tesu flower	6.6	7.9	5.4
Henna	6.2	7.7	4.6

2.9. Soaping

After dyeing, the samples were washed with cold water followed by soaping with non-ionic detergent at 65°C for 15 minutes. Then the samples were washed and dried.

2.10. Evaluation of Fastness Properties

The washing fastness was measured following ISO washing fastness test method-3 (ISO 105 C01-C05) but soda ash was not used as natural dyes are very much sensitive to pH. Light fastness was tested by exposing samples in Xenotest 150S light fastness tester following standard method (BS: 1006 B02-1078). The rubbing fastness were tested using Crockmeter following standard method (BS 1006 X12: 1978).

2.11. Instrumental Measurements of Colour

The transmittance was measured using UV-VIS Transmittance Spectrophotometer made by Systronics (India). The reflectance values were measured by Color Eye 2180UV Spectrophotometer of Gretag Macbeth (USA).

3. Results and Discussion

3.1 Transmittance Curves

Transmittance of extracted solutions were measured with spectrophotometer from 340 nm to 740 nm. For proper measurement, it was necessary to dilute the dye solutions to varying extent. The dilution factor (DF) is a number (mentioned in transmittance curve) to indicate the degree of dilution made during measurement. DF = 8 means that the original solution was diluted 8 times.

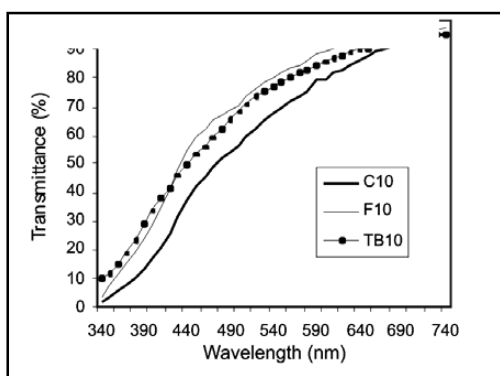


Figure 3.1 Transmittance Curves of Different Varieties of Tea (DF = 8)

Figure 3.1 shows transmittance curves of three varieties of tea solutions (each 10 g/l concentration). The number in the legend indicate type and concentration in g/l e.g. C10 represent 10 g/l CTC grade tea. The transmittance curves show that the colour of Fennings (F10) and tea bag extracts (TB10) are quite close as both are in leaf form, while grain form CTC variety of tea (C10) is strongest and different in colour. The latter variety (CTC) was used for further studies.

3.2. Stability of the Extracted Solution

The stability of the extracted solution of natural colouring matters were tested by measuring transmittance characteristics of the extracted solution before dyeing i.e. fresh and after storing for 5 and 10 days.

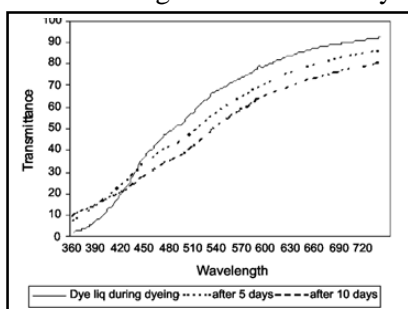


Figure 3.2 Transmission Curves of Tea, F 10 (DF= 8) During Storage

Figure 3.2 shows the transmittance curves of tea (Fennings, 10 gpl) immediately after extraction, after 5 days and 10 days of storage. The transmittance decreased continuously with storage, but after 5 days of storage, the rate of degradation was slow. The same trend was observed for other two varieties also.

3.3. CIELAB Colour Diagrams

In CIELAB system colours are expressed by three parameters namely L* (lightness), a* (redness-greenness axis) and b* (yellowness-blueness axis). a* and b* values are plotted in a rectangular space along horizontal and vertical axes respectively.

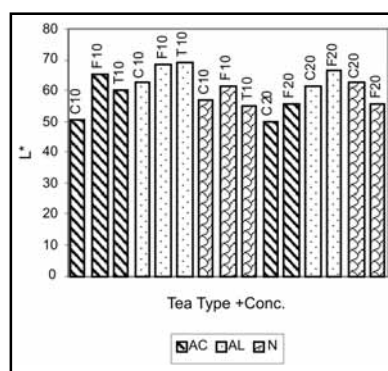


Figure 3.3 Lightness of silk dyed with Tea under Different Conditions

Figure 3.3 shows lightness of silk dyed with three varieties of tea of concentrations 10 g/l and 20 g/l (C10, F10, T10, C20, F20) under acidic (AC), alkaline (AL) and Neutral (N) conditions. Lightness values are rough indicators of shade depth. Samples dyed under acidic conditions showed little lesser lightness values indicating comparatively darker shades while samples dyed under alkaline conditions were having lighter shades. The lightness varied between 50.4 and 69.5 with an average of 59.9. The samples dyed with 10 g/l and 20 g/l tea have very less differences in lightness values. This means tea have poor build up properties.

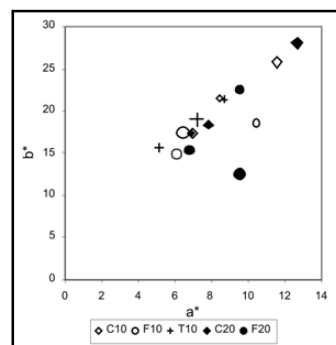


Figure 3.4 (a*.b*) Diagram of Silk dyed with 3 varieties of Tea under 3 Conditions

Figure 3.4 shows CIELAB a^*b^* diagram of silk samples dyed with different varieties teas at different concentrations. The CTC (C), fennings (F) and tea-bag (T) varieties are represented by square, circle and addition markers respectively. The unfilled and filled signs represent 10 g/l and 20 g/l samples, while big, medium and small markers represent acidic, alkaline and neutral conditions during dyeing respectively. The colours of silk dyed with tea under all conditions lie close to a straight line with a specific slope radiating through origin; only a few samples showed some deviation from average trend line. This means they all have similar hue angle or similar hue. In fact, the hue angles varied from 65.7° to 71.9° with an average value of 68° . The samples dyed with CTC tea (both 10 and 20 g/l) under acidic conditions are far away from the centre and represent higher chroma or saturation. The samples dyed under alkaline and neutral conditions are located nearer to the centre indicating lower chroma.

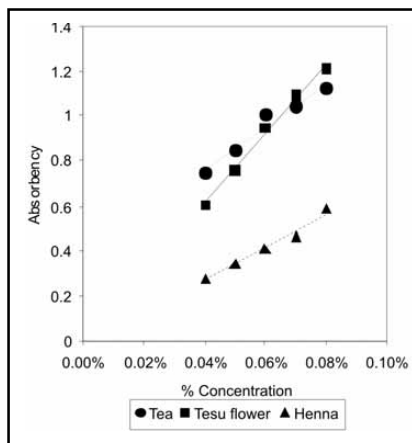


Figure 3.5 Absorbency or Optical Density of Various Colouring Matter Extracts

Figure 3.5 shows the relation between absorbency or optical density and concentration of colouring matters namely tea, tesu flower and henna. The rate of increase in the optical density of extract with increase in concentration was more or less similar for tea and henna and slightly higher in case of tesu flower. Moreover, at a particular concentration, optical densities of tea and tesu flower are much higher than that of henna indicating stronger colours of the extract of tea and tesu flower.

Figures 3.6-3.9 shows a^*b^* diagrams (CIELAB) of silk dyed with tea, pomegranate, tesu flower and henna respectively. In each figure, location of colours dyed without mordant (WM) and mordanted and fixed with

T.R. oil (O), tartaric acid (TA), potash alum (A) and Ferrous sulphate (FS) are shown. Samples dyed under acidic, alkaline and neutral conditions are represented by big, medium and small markers respectively. All colours lie between red and yellow axis. The colours of samples dyed with all natural colours using FS-fixing agent under three conditions lie close to origin near $+a^*$ axis indicating the colours are all black or grey with very poor chroma but reddish tint.

In case of tea (Figure 3.6), the colours are quite close, only some samples dyed under alkaline conditions are nearer to centre indicating poor chroma. All lie close to a straight line with a specific slope passing through origin indicating similar hue angle or hue.

For pomegranate (Figure 3.7), samples mordanted and fixed with alum (A) under all three conditions showed higher hue angle i.e. nearer yellow (b^*) axis or yellower in colour. Rest colours showed similar hue angle or hue.

For tesu flower (Figure 3.8), all colours except those fixed with TA have similar hue angles or hue. But hue angles are higher than those in case of tea and pomegranate indicating yellower shades.

For henna (Figure 3.9), the colours were quite distributed indicating wider colour variations. Without mordant (WM) samples are quite different and yellower in shades. Hue differences are also more for samples fixed with the same fixing agent but dyed under different condition (acidic/alkaline/neutral).

In all cases, silk dyed after mordanting and fixed with TA showed highest chroma followed by colours of samples dyed without mordant. Samples dyed with A-fixing agent showed deviation towards yellow axis.

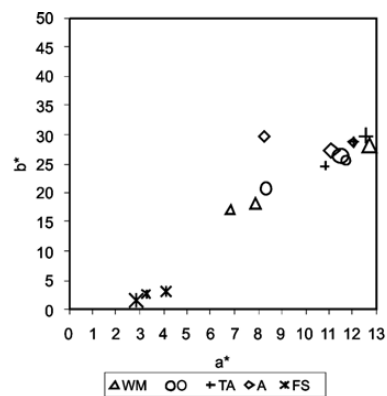


Figure 3.6 a^*b^* Diagram of Colours of Silk dyed with Tea

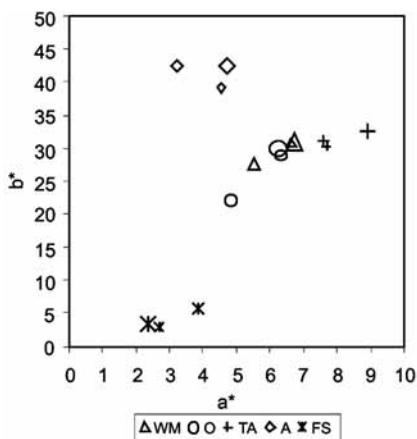


Figure 3.7 a*b* Diagram of Colours of Silk dyed with Pomegranate

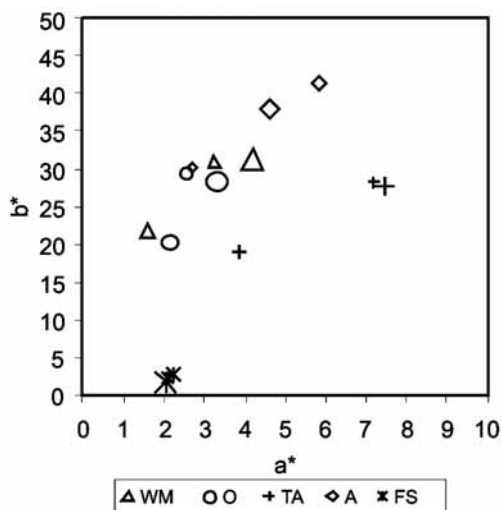


Figure 3.8 a*b* Diagram of Colours of Silk dyed with Tessu Flower

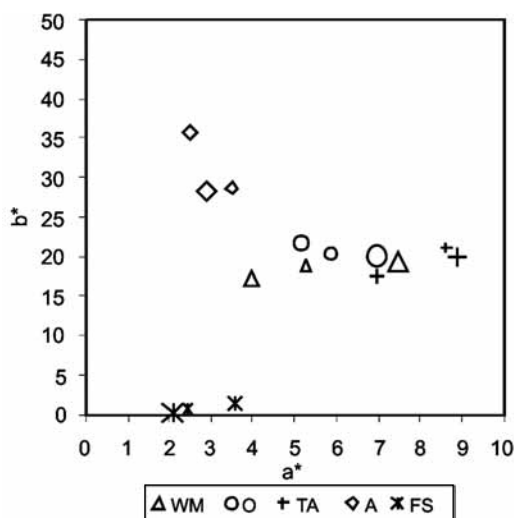


Figure 3.9 a*b* Diagram of Colours of Silk dyed with Henna

3.4. Colour Strength

Colour strength value is a single numerical value related to the amount of colour absorbing material (colorant) contained in a specimen. Colour strength

$$\frac{K}{S} = \frac{(1-R_\lambda)^2}{2R_\lambda} \tag{4.1}$$

value of specimens measured on a spectrophotometer most often involves calculation of Kubelka-Munk function (K/S value) at one or more wavelength intervals (Eq.4.1).

Where, K = coefficient of absorption

S = coefficient of scattering

R_λ = reflectance at wavelength λ.

$$WSUM = \frac{\sum_{\lambda=1}^n \left[\left(\frac{K}{S} \right)_\lambda \bar{x}_\lambda E_\lambda + \left(\frac{K}{S} \right)_\lambda \bar{y}_\lambda E_\lambda + \left(\frac{K}{S} \right)_\lambda \bar{z}_\lambda E_\lambda \right]}{n} \tag{4.2}$$

WSUM denotes K/S weighted by visual functions namely standard colour matching functions, \bar{x}_λ , \bar{y}_λ , \bar{z}_λ functions and SPD of D65 illuminant, E) and summed over all wavelengths within the visible spectrum, then divided by the number of wavelength intervals summed (Eq. 4.2).

E = Spectral power distribution of illuminant (normally D65)

$$\% \text{Colour strength} = \frac{WSUM_{\text{Sample}}}{WSUM_{\text{Standard}}} \times 100 \tag{4.3}$$

\bar{x}_λ , \bar{y}_λ , \bar{z}_λ = tristimulus weighing values for selected observer (normally 10⁰)

n = number of wavelength interval used.

% Colour strength is the relative difference in colour strength between standard and a sample [5] (Eq. 4.3). Figures 3.10, 3.11, 3.12 and 3.13 graphically represent % strength WSUM values of the silk samples dyed with tea, pomegranate, tesu flower and henna respectively without mordant or mordanted and fixed with T.R.oil (O), potash alum (A), Tartaric acid (TA) and ferrous sulphate (FS). In each case, the % strength WSUM of samples dyed under acidic condition without mordant was considered as standard i.e.100% strength.

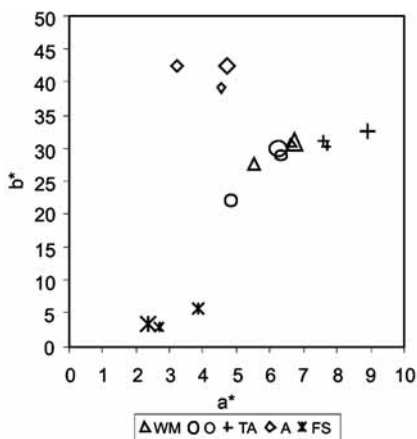


Figure 3.7 a*b* Diagram of Colours of Silk dyed with Pomegranate

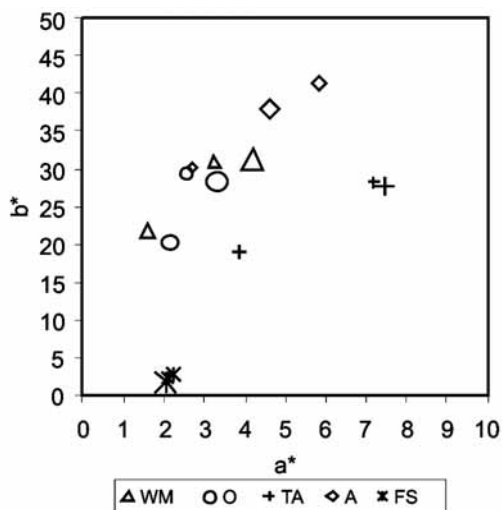


Figure 3.8 a*b* Diagram of Colours of Silk dyed with Tessu Flower

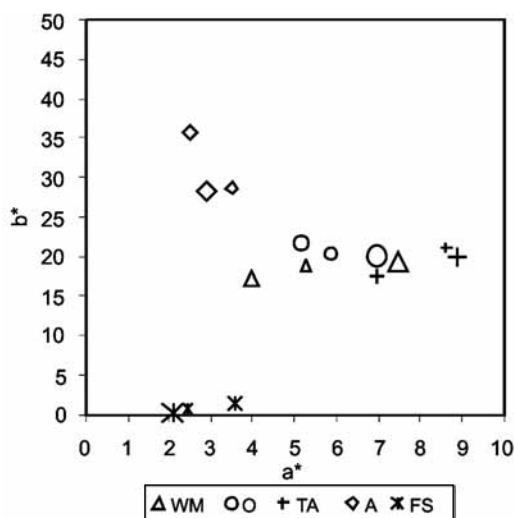


Figure 3.9 a*b* Diagram of Colours of Silk dyed with Henna

3.4. Colour Strength

Colour strength value is a single numerical value related to the amount of colour absorbing material (colorant) contained in a specimen. Colour strength

$$\frac{K}{S} = \frac{(1-R_\lambda)^2}{2R_\lambda} \tag{4.1}$$

value of specimens measured on a spectrophotometer most often involves calculation of Kubelka-Munk function (K/S value) at one or more wavelength intervals (Eq.4.1).

Where, K = coefficient of absorption

S = coefficient of scattering

R_λ = reflectance at wavelength λ.

$$WSUM = \frac{\sum_{\lambda=1}^n \left[\left(\frac{K}{S} \right)_\lambda \bar{x}_\lambda E_\lambda + \left(\frac{K}{S} \right)_\lambda \bar{y}_\lambda E_\lambda + \left(\frac{K}{S} \right)_\lambda \bar{z}_\lambda E_\lambda \right]}{n} \tag{4.2}$$

WSUM denotes K/S weighted by visual functions namely standard colour matching functions, \bar{x}_λ , \bar{y}_λ , \bar{z}_λ functions and SPD of D65 illuminant, E) and summed over all wavelengths within the visible spectrum, then divided by the number of wavelength intervals summed (Eq. 4.2).

E = Spectral power distribution of illuminant (normally D65)

$$\% \text{Colour strength} = \frac{WSUM_{\text{Sample}}}{WSUM_{\text{Standard}}} \times 100 \tag{4.3}$$

\bar{x}_λ , \bar{y}_λ , \bar{z}_λ = tristimulus weighing values for selected observer (normally 10⁰)

n = number of wavelength interval used.

% Colour strength is the relative difference in colour strength between standard and a sample [5] (Eq. 4.3). Figures 3.10, 3.11, 3.12 and 3.13 graphically represent % strength WSUM values of the silk samples dyed with tea, pomegranate, tesu flower and henna respectively without mordant or mordanted and fixed with T.R.oil (O), potash alum (A), Tartaric acid (TA) and ferrous sulphate (FS). In each case, the % strength WSUM of samples dyed under acidic condition without mordant was considered as standard i.e.100% strength.

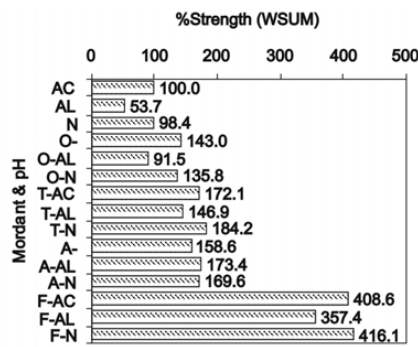


Figure 3.10 Colours Strength of Silk dyed with Tea under Various Conditions

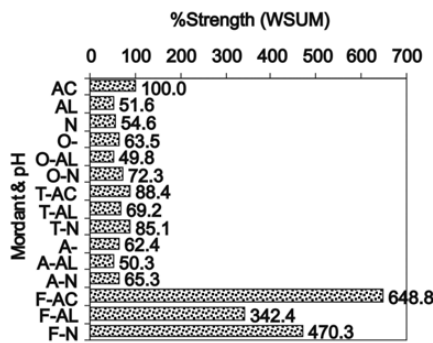


Figure 3.11 Colours Strength of Silk dyed with Tea under Pomegranate under Various Conditions

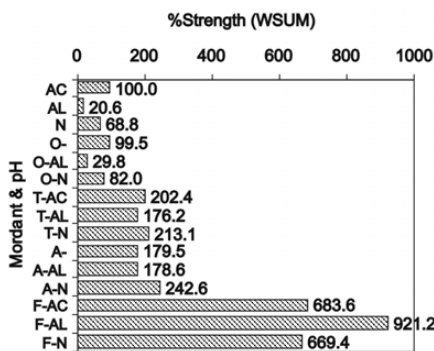


Figure 3.12 Colours Strength of Silk dyed with Tesu Flower under Various Conditions

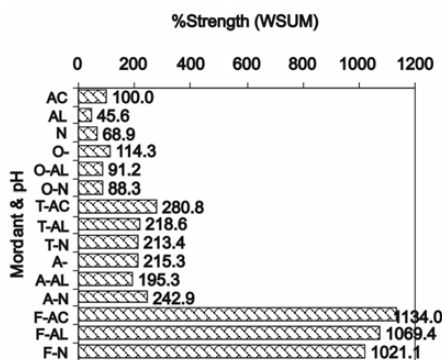


Figure 3.13 Colours Strength of Silk dyed with Henna under Various Conditions

In most of the cases, samples dyed under acidic condition (with or without mordant) showed highest colour strengths compared to samples dyed under alkaline and neutral conditions. Except for pomegranate, the colour depth of samples mordanted and treated with fixing agent showed much higher colour strength (roughly 130-200%). The colour strength is more than double with TA and A in case of henna. In case of pomegranate, the colour strength was very poor for all mordanted samples, probably because it is mordant itself and further mordanting has not improved the situation.

For all colours, samples dyed after mordanting and fixed with FS showed highest colour strength, because most of the shades were almost black.

Washing, light and rubbing fastness properties of silk dyed with tea and pomegranate are shown in Table 3.1 and those for tesu flower and henna in Table 3.2.

3.5. Washing Fastness

The fastness assessment by following standard method at the first instance were vherly much problematic because the shades of most of the dyed silk materials (except those dyed using ferrous sulphate as fixing agent) darkened during washing fastness test with 5 g/l soap even in the absence of soda ash and showed sharp contrast against original samples. The apparent fastness gradings were very poor (1.5-3.0) though there was no actual fading of colour.

But when these samples were washed for second time following the same washing method, little or no change in colour was observed during test and the ratings improved to 4.5-5 in most cases. Washing fastness properties of silk dyed with tea and pomegranate, with or without mordanting and irrespective of the fixing agent, were excellent in most cases (grading of 4.5-5 in general except with ferrous sulphate fixing agent). Staining properties of silk dyed with tea and pomegranate on silk and cotton were excellent - grading of 4.5-5 i.e. no staining.

The washing fastness properties of the silk samples dyed with tesu flower and henna were moderate to excellent in most cases (4-5). However, in some cases, grading was as poor as 2-3. But the poor grading followed no specific trend i.e. they were distributed randomly. The reason for poor grading in some cases may be due to further darkening of colour during washing

Table 3.1. Fastness Properties of Silk Dyed with Tea and Pomegranate

Mordant	Fixing agent	Dyeing condition	Washing fastness			Light fastness	Rubbing fastness	
			CC	CSS	CSC		Dry	Wet
Colouring matter: Tea								
No	-	AC	4.5	5	5	6	4.5	4.5
No	-	AL	4.5	5	5	4	5	4.5
No	-	N	5	5	4.5	6	5	5
Yes	O	AC	5	4	4.5	6	5	5
Yes	O	AL	5	4.5	5	4	4.5	4.5
Yes	O	N	4.5	5	4.5	6	5	5
Yes	A	AC	5	5	5	1,darker	5	4.5
Yes	A	AL	5	5	5	1,darker	5	4.5
Yes	A	N	4	5	5	1,darker	5	5
Yes	T	AC	5	4.5	4	2,darker	4.5	4.5
Yes	T	AL	5	5	4.5	4,darker	5	4.5
Yes	T	N	4.5	4.5	4	1,darker	4.5	4.5
Yes	F	AC	4	5	5	7	5	5
Yes	F	AL	4	5	5	7	5	5
Yes	F	N	4	5	5	7	5	5
Colouring matter: Pomegranate (Dalim)								
No	-	AC	5	5	4	1,darker	5	4.5
No	-	AL	4.5	5	4.5	1,darker	4.5	4.5
No	-	N	4.5	5	4.5	1,darker	5	4.5
Yes	O	AC	5	5	4.5	1,darker	4.5	5
Yes	O	AL	5	5	4.5	1,darker	5	5
Yes	O	N	5	5	4.5	1,darker	5	4.5
Yes	A	AC	4.5	5	3.5	1,darker	4.5	4.5
Yes	A	AL	4.5	5	4.5	1,darker	5	5
Yes	A	N	5	5	4	1,darker	5	4.5
Yes	T	AC	4.5	5	3.5	1,darker	5	5
Yes	T	AL	5	5	3.5	1,darker	5	4.5
Yes	T	N	5	5	3	1,darker	4.5	5
Yes	F	AC	4	5	4.5	7	5	5
Yes	F	AL	3	5	4.5	7	5	5
Yes	F	N	4.5	5	4.5	7	5	4.5

Note (for both Tables 3.1 and 3.2): O = T.R. Oil, A = Alum, T = Tartaric Acid, F = Ferrous Sulphate, AC = Acidic Condition, AL = Alkali Condition, N = Neutral Condition + Salt, CC = Colour change, CSS = Colour Staining on silk, CSC = Colour Staining on Cotton.

Table 3.2. Fastness Properties of Silk Dyed with Tesu Flower and Henna

Mordant	Fixing agent	Dyeing condition	Washing fastness			Light fastness	Rubbing fastness	
			CC	CSS	CSC		Dry	Wet
Colouring matter: Tesu flower								
No	-	AC	4.5	5	5	6	4.5	4.5
No	-	AL	2	5	4	3	5	5
No	-	N	2.5	5	5	2(4)	5	4.5
Yes	O	AC	3	5	5	2(3)	5	5
Yes	O	AL	4.5	5	5	4	5	4.5
Yes	O	N	3	5	4.5	2	4.5	4.5
Yes	A	AC	4	5	4.5	1,darker	5	5
Yes	A	AL	4.5	5	4.5	1,darker	5	4.5
Yes	A	N	4	4.5	4.5	3,darker	5	5
Yes	T	AC	5	5	4	6	5	5
Yes	T	AL	5	5	4.5	3	5	4.5
Yes	T	N	4.5	5	4	4	4.5	5
Yes	F	AC	3	5	4.5	7	5	4.5
Yes	F	AL	2.5	5	4.5	7	5	5
Yes	F	N	3	5	4.5	7	5	5
Colouring matter: Henna								
No	-	AC	4	5	5	5	4.5	4.5
No	-	AL	3	5	5	4	5	5
No	-	N	4.5	5	5	4	5	5
Yes	O	AC	3.5	5	5	5	5	4.5
Yes	O	AL	4.5	5	4.5	4	5	5
Yes	O	N	3.5	5	5	6	5	5
Yes	A	AC	4	5	4.5	1,darker	5	4.5
Yes	A	AL	4.5	5	5	1,darker	5	5
Yes	A	N	4	5	4.5	2,darker	4.5	4.5
Yes	T	AC	5	5	4.5	5	4.5	5
Yes	T	AL	4.5	5	4	6	5	5
Yes	T	N	5	5	4.5	5	5	4.5
Yes	F	AC	3	5	5	7	4.5	4.5
Yes	F	AL	4	5	5	7	5	5
Yes	F	N	3	5	5	7	5	5

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fastness test. The samples dyed under acidic conditions mostly showed good to excellent fastness. Properties. Ferrous sulphate mordanted samples particularly showed poor fastness preoperties. Staining properties on silk and cotton were again excellent for silk dyed with tesu flower and henna.

3.6. Light fastness

- ◆ The samples dyed with all natural colorants shows highest light fastness in presence of ferrous sulphate as fixing agent.
- ◆ The light fastness of the most of the samples dyed with tea and henna were good to excellent.
- ◆ All the samples dyed with pomegranate except those dyed using ferrous sulphate showed very poor fastness to light as the shades become darker on exposure to light. This is probably because of the presence of a good amount of tannic acid in the dye.
- ◆ All samples dyed after mordanting and fixed with alum showed poor light fastness due to darkening of shades.
- ◆ For Tesu flower light fastness rating varied widely from poor to very good.
- ◆ Light fastness of unmordanted samples were good to excellent.

3.7. Rubbing fastness

Rubbing fastness ratings, both wet and dry, were excellent (4.5-5) for all silk samples dyed with different natural colouring matters with and without mordant.

4. Conclusion

Many natural colouring matters can be used directly after extracting them simply with boiling water. The extracted liquor may be stored for a few days without any problem.

Silk dyed with tea, pomegranate, tesu flower and henna with or without mordanting lie between +a* (red) and +b* (yellow) axes, indicating all yellow-red in colour. Samples mordanted with ferrous sulphate are almost black in colour and they lie very near to centre of a*-b* diagram indicating absence of hue or chroma.

Grain form and CTC variety of tea provided strongest colour in solution as well as on silk. It provided brightest

shade i.e. highest chroma, particularly when dyed under acidic condition. Silk samples dyed with three varieties of tea under three pH conditions showed similar hue angle or similar hue.

Tea and tesu solutions have higher optical density than that of henna.

For tea, silk dyed without mordant and with mordant and subsequently fixed with T.R. Oil, tartaric acid, alum all were very close in colour, they have similar hue angle and hue. This is true for silk dyed with pomegranate also, except for the samples mordanted and fixed with alum. For tesu flower, samples mordanted and fixed with tartaric acid showed different colour, rest are similar in colour. For henna the colours are quite distributed indicating wider colour variations.

The samples dyed under acidic condition (with or without mordant) showed highest colour strengths compared to samples dyed under alkaline and neutral conditions. The colour depth of samples mordanted and treated with fixing agent showed much higher colour strength (roughly 130-200%) in all cases except for pomegranate. This means that dyeing without mordanting and fixing may require considerably higher amount of natural colouring matters as compared to mordanted and subsequently fixed samples. The samples dyed and fixed with ferrous sulphate was quite different in colour.

Natural colours are very sensitive to pH. The colours darken during soap boiling for wash fastness test, though there was no actual fading of colour. The wash fastness was then re-tested after treating the samples with soap. For most of the samples, the shades did not darkened during second soaping.

Washing fastness properties of silk dyed with tea and pomegranate, with or without mordanting and irrespective of the fixing agent, were excellent in most cases. The washing fastness properties of the silk samples dyed with tesu flower and henna were moderate to excellent in most cases (4-5) and very poor (2-3) in some cases due to further darkening of colour.

The light fastness of most of the samples dyed with tea and henna were good to excellent. For Tesu flower, light fastness rating varied widely from poor to very good. With pomegranate the shades become darker in exposure to light. Light fastness properties of unmordanted samples are good to excellent. Rubbing

fastness ratings, both wet and dry were excellent for all samples.

The most important observation is that for all natural colouring matters under study, the silk dyed under acidic condition without mordant showed excellent washing fastness, especially for tea and pomegranate. Lower fastness was observed for silk dyed with tesu flower and henna, when dyed under alkaline condition (also under neutral condition in case of tesu flower).

It can, therefore, be concluded that silk can be dyed directly with natural colouring matters without mordant to obtain wash-fast and light-fast shades. Lower depths by such methods may be compensated by elimination of mordanting and fixing steps saving time and energy and eliminating use of harmful chemicals. The process is greener as compared to conventional method of dyeing pre-mordanted textile materials with natural colours.

References

1. Roy Choudhury A.K., *Textile Preparation and Dyeing*, Oxford & IBH, New Delhi and Science Publishers, New Hampshire, USA, (2006), Second Ed. SDC India, (2011).
2. Sarma S., Biosynthesis of precursors for liquor and flavour characteristics in black tea, *Global advances in tea science* (ed. N.K. Jain). Aravali Books International (P) Ltd., New Delhi, p. 723, (1999).
3. Das D., Bhattacharya S.C., Maulik S.R., Dyeing of wool and silk with tea, *Indian Journal of Tea Science*, 4B, 17-25, (2005).
4. Website of AMA Herbal Laboratories Ltd (www.amaherbal.com).
5. AATCC Committee RA36 Document, 'Instrumental color measurement', AATCC, March, (1995).

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Extraction of Ecofriendly Dye from Industrial Waste and its Application in Textile Dyeing

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Abstract

The colourfastness properties of the dye extracted from Curcumin industrial waste on cotton fabrics have been studied using different concentrations like 3%, 6% and 9% of the various mordants such as alum and Harda. The wash, rubbing, light and perspiration fastness of the dyed sample have been evaluated. It is found that Curcumin waste dye can be successfully used for dyeing of cotton fabrics. With regards to colourfastness, tested samples exhibit good fastness to washing, rubbing, light and perspiration fastness except for sample premordanted using Harda which shows good fastness properties in alkaline media.

Keywords

Colourfastness, Curcumin waste, Extraction of natural dye, Mordant.

1. Introduction

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 [1, 2]. Archaeological findings have shown that natural colours were being used in dyeing, printing, painting and preparing cosmetics among primitive communities throughout the world [3]. Natural dyes have been vital source of coloration by craft dyers, printers since time immemorial. The colouring matters were procured from roots, stems, leaves, flowers (plant origin) besides this, many dyes were procured from animals and minerals of natural origin. Most natural dyes are non-substantive dyes, which means that they have very little colouring power within themselves and require the aid of mordant to penetrate into the fiber [4, 5].

Today, dyeing is a complex, specialized science. Dye-stuffs are now produced from synthetic compounds. This means that costs have been greatly reduced and certain application and wear characteristics have been

greatly enhanced. But manufacturing of synthetic dyes involve many carcinogenic chemicals and the effluents which are discharged in the river or emitted into the atmosphere this results in ecological imbalance, pollution problem and disturbed environment due to the ample usage of hazardous chemicals and particularly synthetic dyes [6,7]. As a result, attention moves towards scope of natural dyes. Present work was aimed at developing ecofriendly natural dyes from Curcumin waste from Industry for textile application and study conducted to assess colourfastness of dyed samples.

1.1. Curcumin

Curcuma Longa (Turmeric) is the main species of commerce and is cultivated for its rhizome in India, China and also in Sri Lanka, Indonesia, Jamaica, and Peru. India is the major grower with almost 80,000 hectares under this crop producing 1,44,000 tonnes per annum. The plants are grown for powder, oleoresin and curcumin. Genetic improvements have been attempted and high yielding curcumin varieties have been developed through tissue culture techniques [8, 9].

In addition to being an important culinary spice, the dried rhizomes of turmeric also have a long history of medicinal use. Traditionally, turmeric has been used for a variety of purposes. It has found use as an appetite stimulant, a digestive aid, a general tonic, as well as for treating diarrhea, dyspeptic complaints, flayulence, and

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gallbladder complaints. It is also commonly used as an anti-spasmodic in different ethnic communities. The yellow-orange color of turmeric is derived from curcumin, bright yellow, phenolic pigment. Turmeric, commonly known to be an anti-inflammatory herbal remedies producing far fewer side effects than conventional pain relievers [8].

Curcumin is the main biologically active phytochemical compound of turmeric. Curcumin consists of a mixture of three naturally occurring curcuminoids, curcumin (diferuloylmethane), demethoxycurcumin, and bisdemethoxycurcumin.



Figure 1: The plant of Curcuma Longa

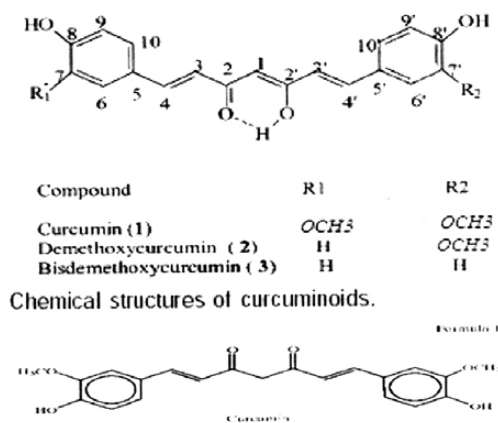


Figure 1.2: Chemical structures of curcumin

Table 1.1: Physical and Chemical Properties of Curcumin

Molecular Formula	C ₂₁ H ₂₀ O ₆
Colour	Yellow range
Molecular Weight	368.4
pH	5-8
Odour	Almost odourless
Solubility	Insoluble in water And slightly soluble in Alcohol
Heavy Metals	Heavy metals like Lead , Mercury, Arsenic and Cadmium are absent
Microorganism	E. Coli - Absent

Curcumin has got wide uses and applications in the field of pharmaceuticals especially in the field of herbal medicine. In the present study we have collected waste from herbal pharmaceutical industry. The solid waste management is the problem of the industry. This waste is ecofriendly as it is generated from curcumin. Haldi oil utilized for medicinal value was extracted from curcumin by using isopropanol and then isopropanol was recovered by vacuum distillation so the waste is free from any added chemicals.

2. Materials and Methods

2.1. Material

In the present work, Curcumin waste from industry is collected for the extraction of the dye. 100% bleached cotton material is used for dyeing. Mordants like Alum and Harda are used. The other chemicals like acetic acid, common salt and sodium carbonate were used for the study.

2.2. Methods

2.2.1 Dye Extraction

The extraction of dye from Curcumin waste and its application to fabric is carried out. The industrial waste is in solid form. This waste is converted into fine powder and screened for removal of unwanted solid materials. The fine powder thus obtained is polyphenolic in nature & therefore it is insoluble in water. To make it soluble, base like sodium hydroxide is used. Curcumin waste powder is pasted with small amount of water and sodium hydroxide is added into the bath and the solution is boiled for 1 hour to facilitate quick extraction.

Then it was filtered and filtrate was collected in separate beaker.

2.2.2. Dyeing Procedure

The cotton fabric is dyed with dye extract by keeping M:L ratio as 1:10. Dyeing was carried out at 80°C and continued for 1 hour.

2.2.3. Mordanting

The cotton fabric samples were treated with different mordants like Alum and Harda by following method. Cotton fabric is pre mordant with alum and Harda by using 3%, 6% and 9% concentration at 80°C for 45 min keeping the material to liquor ratio (M:L=1:10). This mordanted fabric was used for dyeing without any washing. The pre-treated cotton fabric was introduced into dye bath containing required amount of dye ex-

tract and water. For better exhaustion, sodium chloride was added into the bath. Then dyeing was carried out for 1 hr at 80°C. The dyed samples were taken out, squeezed, washed with water and dried at room temperature.

2.2.4. Evaluation of colourfastness properties

Various fastness tests for dye extracted from Curcumin waste were carried out. These tests assess how permanent the dye is on the fabric.

Colour fastness to washing of the dyed fabric samples was determined by using BIS No IS - 3361-1979 wash fastness method. The wash fastness rating was assessed using grey scale by evaluating loss of depth of shade.

Colourfastness to rubbing (dry and wet) was assessed by using BIS No IS - 766-1988 Method by using manually operated crockmeter. In this test, the dyed specimen is rubbed 10 times using a crockmeter which has weighted a finger covered with the piece of undyed cotton cloth (5×5cm).

For wet rubbing, the cotton cloth is wetted out before being rubbed on the dyed sample. The cotton rubbing cloth is then examined for dye which may have been removed and assessed by using the grey scale for staining.

Perspiration fastness was assessed by using BIS No IS - 791-1983 Method; composite specimen was prepared by placing the test specimen between two adjacent pieces of cotton and stitched all among four sides.

The sample was soaked in the test solution (acidic) separately with M:L 1:50 for 30 min at room temperature. The sample was then placed between two glass plates of perspirometer under load of 4.5.Kg. The apparatus was kept in oven for 4 hr at 37°C. Then specimen was removed and dried in air at temperature not exceeding 60°C and samples were assessed for change in colour using grey scale.

Light fastness was determined by keeping samples in daylight, method is based on BIS No IS - 2454-1985. The samples were exposed to daylight for 4 hr. The fading of each samples were determined by using blue wool scale.

3. Results and Discussion

3.1. Preparation and Optimisation of Extract of Curcumin waste

Curcumin waste powder 1gm to 5gm is pasted with small amount of water Sodium hydroxide is added into the bath and solution is boiled for 1 hour to facilitate quick extraction. It was observed that colour of dye extract was yellow orange.

3.2. Dyeing Behaviour of the dye extract

The dye extracted was found to be suitable for cotton fabric. The cotton fabrics were dyed with chemical and natural mordants. It was observed that, the dye uptake was found to be good in premordanting method. Fastness properties of dye extracted from Curcumin waste are tabulated in Table 3.1

The dye extract was found to be suitable for cotton fabric. Various hues of colour were obtained from

Table 3.1 Colour fastness properties of Curcumin waste applied on cotton fabric sample using different concentration of Alum

Concentration of Mordant	Washing Fastness		Rubbing Fastness			Perspiration		Light Fastness	
	Rating	Remark	Wet	Dry	Remark	Rating	Remark	Rating	Remark
100% CW	2	Poor	2	2	Poor	3	Fair	2	Poor
3%	3	Fair	3	2	Poor	2	Poor	4	Good
6%	3	Fair	3	3	Fair	4	Good	4	Good
9%	3	Fair	3	3	Fair	4	Good	4	Good

CW: Curcumin waste

pre-mordanted cotton fabric with Alum and Harda.

The evaluation of colour fastness to washing, rubbing, perspiration and light using alum in aqueous medium is presented in Table 3.1 At 3% concentration of alum, washing fastness was fair, rubbing fastness in wet condition was fair and in dry condition, it was poor and perspiration fastness rating also was poor. At 6% concentration of alum, washing fastness is same as that of 3% concentration of alum. Rubbing fastness indicates fair fastness in wet and dry condition and perspiration fastness rating is also good. At 9% concentration of alum, washing fastness is same as that of 3% concentration of alum, rubbing fastness indicates fair fastness in wet and dry conditions and perspiration & light fastness ratings are good.

At 3% concentration of harda, washing fastness rating indicates good fastness as compared to alum concentrations, but rubbing fastness indicates poor fastness

Table 3.2 Colour fastness properties of Curcumin waste applied on cotton fabric sample using different concentration of Harda

Concentration of Mordant	Washing Fastness		Rubbing Fastness			Perspiration		Light Fastness	
	Rating	Remark	Wet	Dry	Remark	Rating	Remark	Rating	Remark
100% CW	2	Poor	2	2	Poor	3	Fair	2	Poor
3%	4	Good	2	2	poor	2	Poor	4	Good
6%	4	Good	4	4	Good	4	Good	4	Good
9%	3	Fair	2	3	Fair	2	Fair	4	Good

and perspiration fastness is also poor. At 6% concentration, it was found that washing and rubbing fastness are good and perspiration fastness is also good. At 9% concentration, it was found that washing fastness is fair.

Rubbing fastness ratings are fair in dry and wet conditions and perspiration fastness is fair. Light Fastness rating is also good. Among mordants, it was found that 6% concentration of harda gives better fastness properties as compared to alum mordant. It is found that Curcumin waste dye can be successfully used for dyeing of cotton fabrics.

Textsmile

Insanity is doing the same thing, over and over again, but expecting different results.

- Narcotics Anonymous

4. Conclusion

In present research work it was found that Curcumin industrial waste can be used for colouring textiles. Various shades in various tones & hues can be obtained using chemical and natural mordant. The parameters like concentration of dye, temperature and timing for dyeing are also optimised for better results. With regards to colourfastness, tested samples exhibit good fastness to washing, rubbing, light and perspiration. Heavy metals such as antimony, arsenic cadmium and lead were not present in the dye extract so this dye will not cause any skin problem to wearer and also not pollute the environment.

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References

1. Ashish kumar and Priti Agrawal *Indian J. Fibre Text. Res.*, **34** (12), 384, (2009).
2. Kamat SY and Alat D.V, *Indian Textile Journal*, **3**(1), 66, (1990).
3. R. Siva, *Current Science*, **92**(4), 986, (2007).
4. Avwioro OG, Aloamaka PC, Ojiana NU, Oduola T, Ekpo EO, *African journal of Biotechnology*, **4**(5), 460, (1999).
5. S.Ganesh, *Indian journal of traditional knowledge*, **7**(1), 125, (2008).
6. Kumarsen M, P.N.Palanisamy and P.E. Kumar, *Indian J. Fibre Text. Res.*, **37**(6), 194, (2012).
7. Saravan P. and Chamndra mohan G., *Universal journal of Environmental Research and Technology* **1**(3), 268, (2012).
8. <http://www.fao.org/fileadmin/templates/agns/pdf/jecfa/cta/61/Curcumin.pdf>
9. Saima Umbreen, Shaukat Ali, Tanveer Hussai and Rakhshanda Nawaz, *RJTA*, **12**(4), 1, (2008).

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Comfort Studies on Jute/Cotton Blended Fabrics

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Abstract

In this research, an attempt has been made to blend the jute fibre with the cotton material. The blended yarn was used as a weft and the pure cotton yarn was used in warp. The produced fabric was treated with cellulase enzyme for softening purpose. Further the silicon-polyurethane finishes were applied on the fabric to improve the comfort properties. Hence this study reveals the effect of enzyme treatment with consecutive silicon -polyurethane softening treatment on comfort properties of Jute/Cotton union (warp - cotton; weft - Jute/Cotton) fabric. The results indicates that the enzyme treated, silicon - polyurethane finished fabric had significant ($P < 0.05$) improvement in all comfort properties like wicking, water absorbency, air and water vapour permeability, thermal conductivity.

Key words

Comfort properties, FTIR, Enzyme treatment, Jute/Cotton union fabric, Silicon-polyurethane.

1. Introduction

Jute is a lignocellulosic fiber with hemicellulose (24 %), cellulose (60%) and lignin (14%) as the main constituents [1]. Jute is coarser variety of bast fibre which is available in inexhaustible quantities and at comparatively low prices and hence has the potential to replace several expensive fibres and scarce forest resources. It has inherent advantages namely agro-renewability, bio-degradability, good tensile strength and modulus, high moisture regain, good dyeability and low price [2].

Main inhibitions to the usage of jute are harsh feel, brittleness, variation in fiber length and difficulty to launder, these can be overcome by blending this fibre with other fibres and finishing. Hence the techniques of blending and softening could be utilized to upgrade the quality of jute and thus form a new class of jute based fabric having an expanding market within and outside the country. It is therefore necessary to raise awareness among users of jute and its blends, to promote its production as well as its usage. In this context, the comfort behavior of Jute/Cotton fabrics have been studied.

Comfort is one of the most important aspects of all clothing [3]. Several Studies have used these methods to measure the effect of fabric construction or finishes on changes in hand [4,5] and correlations were generally good between these mechanical properties and sensory hand responses[5-9]. However, the comfort characteristics of jute and its blends have hardly been discussed in literature.

The fabrics made from jute and cotton blends have a distinct prickly sensation when in contact with the skin. This is due to rigid jute fibers protruding from the surface [10 -12]. The properties of jute fiber can be improved through biochemical retting by removing the pectin sheath, the jute fiber is softened [13]. Jute/Cotton blend fabrics have a handle that is rather hard and stiff unless they are treated with finishing components. Unless the quality of the fabric is improved, garments made with Jute/Cotton are not smooth and soft and will not perform well. Hence in this study the Jute/Cotton union fabrics were treated with cellulase enzyme and silicone polyurethane softener. Cellulases have had the most impact on textile processing in recent years. These are nontoxic capable of significantly improving the hand, appearance properties of cellulosic materials and environmentally friendly biocatalysts. Cellulases perform best at a specific pH range and temperature approximately 40- 55°C, and both tolerable temperature and pH have become much more

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flexible [14]. Researchers revealed that enzyme treatment of jute fibers leads to an increased pore volume (46.2%), a larger surface area of lignin accessible to the oxidant (30%), and hence leads to improved bleaching. They also noted that enzyme treatment increases transverse swelling (14%) and reduces bulk torsional rigidity (12.5%), making the fibers more flexible and therefore softer [15].

Fabric softeners such as cationic or nonionic surfactants are used in textile wet processing to improve fabric hand and mechanical properties. Adhesion of these softeners to the fiber surface is by a weak electrical attraction without any chemical linkage [16]. Durable silicone textile softeners confer additional performance properties on treated fabrics, such as improved wrinkle recovery, crease resistance and improved wear comfort [17, 18].

This study aims to develop a Jute/Cotton union fabric with Jute/Cotton blended thread in weft with two different ratios of jute and cotton namely 50/50 and 40/60. The developed fabrics were treated with cellulase enzyme and silicon-polyurethane softener to improve the comfort properties of the union fabric. In the second phase of the work, the finished union fabric were analysed for the improvement in comfort properties in terms of wicking, water absorption, water vapour permeability, air permeability and thermal conductivity. The statistical analysis (ANOVA) was also performed to ensure the significant changes in the comfort properties.

2. Materials and Methods

2.1. Materials

Jute/Cotton union fabric with cotton yarn in the warp and jute yarn in the weft direction with the following fabric specifications are used in this study as in Table 1.

Table 2.1: Fabric specifications

40/60 Jute/Cotton blend	50/50 Jute/Cotton blend
EPI - 24	EPI - 22
PPI - 21	PPI - 21
Warp count - 60s Ne	Warp count - 60s Ne
Weft count - 35s Ne	Weft count - 35s Ne
Weight (mg/cm ²)- 14.05	Weight (mg/cm ²) - 16.65

2.2. Methods

The union fabrics were subjected to the pre-treatments like desizing, scouring, bleaching and mercerisation [19]. To improve the softness, low stress mechanical properties and hand value, the fabrics were given two types of treatments, namely enzymatic and silicone-polyurethane finish. The chemicals and auxiliaries mentioned elsewhere in this study were of analytical grade. The enzyme used in the study was cellulase enzyme (supplied by Resil chemicals, India). The hot brand reactive dye used was supplied by Yoshiaki Chemicals Company Pvt. Ltd, India.

2.3. Enzymatic treatment

After the pre-treatments, the union fabrics were treated with enzyme to impart softness with the following recipe.

- ◆ Cellulase enzyme - 5% (owf)
 - ◆ Acetic acid - 0.5% (owf)
 - ◆ Temperature - 55°C
 - ◆ Time - 30 minutes
 - ◆ MLR - 1:20
- (owf - On weight of fabric)

2.4. Silicone polyurethane finish

After the cellulase enzymatic treatment the union fabrics were dyed with reactive dye. The amino functional based polymethylsiloxanes silicone softener treatment was given by Pad-dry-cure method on the reactive dyed union fabrics, with 10 gpl of amino silicone softener and 10 gpl of polyurethane solution at pH 6.0 (maintained by acetic acid) and temperature 40°C for 15 minutes with the pressure of 1 kg/cm² in order to get optimum pick-up of 0.8% owf. Then the fabrics were dried at 100°C for 3 min and cured at 150°C for 4 min in drying and curing chamber respectively.

3. Characterisation

3.1. SEM analysis

The SEM analysis was done (JOEL scanning electron microscope of model JSM-6390, Japan; 20kV, magnification 500 X) in order to study the surface structure of both the untreated and treated fabrics. It helps to determine the changes occurred in the fabric due to the application of softening finish.

3.2. FTIR spectra test

FTIR spectra (SHIMADZU spectrophotometer - USA) for both treated and untreated union fabric were measured to identify the groups present in the finishes.

3.3. Comfort property analysis

The treated Jute/Cotton union fabric was evaluated for comfort properties in terms of wicking (BS 3424), water absorption (AATCC 79: 2000), air permeability (IS 110 56-1984), Water vapour permeability (ASTM E 96) and thermal conductivity [20].

3.4. Statistical analysis

To analyze the significant difference between low stress mechanical properties of untreated fabric and the fabrics treated with silicone - polyurethane softener, the critical difference at 95% probability level was calculated using ANOVA - single factor analysis.

4. Results and Discussion

The untreated and the finished Jute/Cotton fabrics were subjected to various tests to analyse the comfort and handle properties and the results are discussed below.

4.1 SEM analysis

SEM micrographs of treated and untreated fabrics taken at the magnification of 1500 X and 500 X are shown in figures. The primary function of fabric softening is to make the fabric surface smooth by coating the fibre as a thin film layer. Figure 4.1(a) and 4.2 (a) shows an untreated fibre with short fibres and rough edges; Figure 4.1(b) and 4.2 (b) indicates about the fibre coating and smoothing of the rough edges of fibers. It is also observed that treated fabric has smooth white layers of the silicone polyurethane finish. The polymer film is the main cause for changes on the surface and mechanical properties of the silicone-treated fabrics. The formation of the polymer film increases the uniformity of the surface and decreases the roughness [21].

4.2 FTIR analysis

Figure 4.3 and 4.4 shows FTIR spectrum of the 40/60 and 50/50 silicone polyurethane treated Jute/Cotton union fabrics respectively. From the spectrum, it is confirmed that the treated fabric shows evidence of deposition of silicone and polyurethane substance on the surface. The absorption peak in the region 1000 cm^{-1} to 1100 cm^{-1} of treated sample confirms the presence of Si-O and Si-O-Si group [22, 23]. This wavelength indicates the presence of silicone softeners on the fabric.

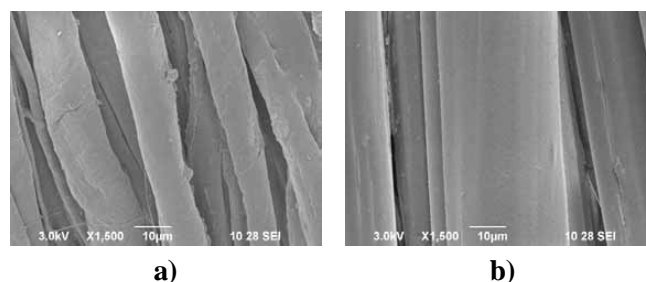


Figure 4.1: a) Untreated 40/60 Jute/Cotton, b) Treated 40/60 Jute/Cotton blend fabric

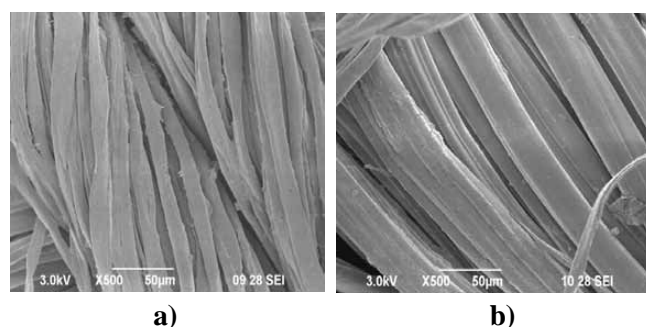


Figure 4.2: a) Untreated 50/50 Jute/Cotton, b) Treated 50/50 Jute/Cotton blend fabric

The absorption peak in the region of 3402 cm^{-1} represents the -NH stretching of the urethane group. The absorption in the region 1593 cm^{-1} represents the -N-H bonding and 1786 cm^{-1} indicates the formation of C=O stretching (free) of urethane group [24]. These wavelengths indicate the presence of PU on the surface of the treated fabric.

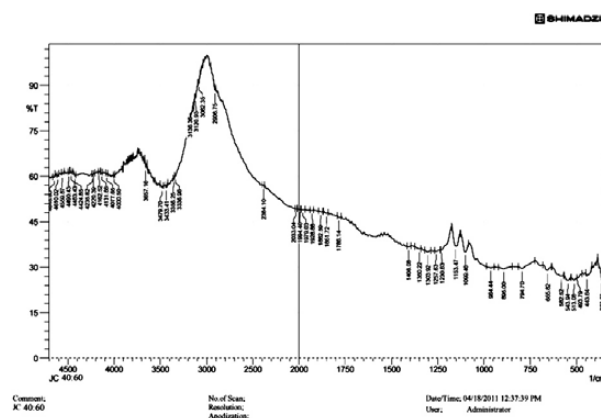


Figure 4.3: Treated 40/60 Jute/Cotton blend Fabric

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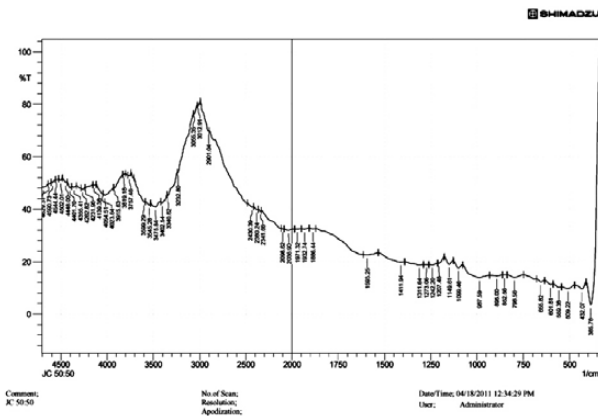


Figure 4.4: Treated 50/50 Jute/Cotton blend fabric

4.3. Wicking

The Table 2 shows the Wicking height of both untreated and treated Jute/Cotton union fabrics.

Table 4.2: Wicking ability of the treated and untreated Jute/cotton blends

S.No.	40/60 Jute/Cotton		50/50 Jute/Cotton	
	Untreated (cm)	Treated (cm)	Untreated (cm)	Treated (cm)
1	5.8	7.65	5.19	7.2
2	5.85	7.7	5.20	7.1
3	5.8	7.7	5.15	7.0
4	5.75	7.8	4.90	6.8
Avg	5.8	7.7	5.1	7.0

When compared to the untreated fabric, wickability of treated fabric is improved significantly ($P > 0.05$) 33% and 37% respectively for 40/60 and 50/50 Jute/Cotton blend. This is because of application of hydrophilic softener which increases the capillary flow in the fabric [25]. The removal of hydrophobic noncellulosic components from the fabric surface by enzyme treatment is another reason for the improved wicking [26].

4.4. Water Absorbency

The water absorbency of treated fabric is improved ($P > 0.05$) 25% for 40/60 Jute/Cotton blend and 18% for 50/50 Jute/Cotton. This is due to application of silicone and polyurethane treatment which improves the spreading action of the fabric which will absorb more water.

Table 4.3: Water Absorbency of the Treated and untreated Jute/cotton blends

S.No.	40/60 Jute/Cotton		50/50 Jute/Cotton	
	Untreated (Sec)	Treated (Sec)	Untreated (Sec)	Treated (Sec)
1	17.10	12.75	19.5	15.96
2	17.15	12.80	19.57	15.87
3	17.15	12.85	19.50	15.78
4	17.20	12.72	19.43	15.87
Avg	17.15	12.83	19.50	15.92

This will give more comfort to the wearer when the garment is worn next to skin. The cellulase enzyme is able to gain access to the cellulose, and in due process, removes hydrophobic noncellulosic components from the fabric surface thus the treatment of enzyme also helps to improve the water absorbency of treated material [27, 28].

4.5 Water Vapour Permeability

Table 4.4 shows the Water Vapour Permeability of both untreated and treated Jute/Cotton union fabrics. Water vapor permeability is an important parameter in evaluating comfort characteristics of a fabric, as it represents ability of transferring perspiration.

Table 4.4: Water Vapour Permeability of the Jute/cotton blends

S.No.	40/60 Jute/Cotton		50/50 Jute/Cotton	
	Untreated (%)	Treated (%)	Untreated (%)	Treated (%)
1	6.55	7.75	5.25	5.52
2	6.69	7.85	4.75	5.65
3	6.82	7.82	5.0	5.8
4	6.65	7.87	5.1	5.56
Avg.	6.67	7.83	5	5.66

The Water Vapour Permeability of treated fabric is increased significantly ($P > 0.05$) i.e. 17 % and 13% respectively for 40/60 and 50/50 fabric. Two mechanisms can be considered for water vapour transfer through the fabric: one is through fabric pores and the second is through absorption by fabric and then evaporation from fabric surface [29]. In the second mechanism, there is increase in water vapour permeability

because of the softening finish applied which increases the capillary transfer of water vapour through fibre bundles [30]. Further the SEM image (Figure 4.1 & 4.2) it is evident that the surface morphology is modified through the finish and enzyme treatment which reduces the roughness and hairiness of the fabric. This will increase the moisture vapour transmission through the fabric.

4.6. Air Permeability

The Table 4.5 shows the Air Permeability of both untreated and treated Jute/Cotton union fabrics.

Table 4.5: Air Permeability of the Jute/Cotton Blends

S.No.	40/60 Jute/Cotton (cm ³ /cm ² /s)		Jute/Cotton 50/50 (cm ³ /cm ² /s)	
	Untreated	Treated	Untreated	Treated
1	104.50	156.50	154.50	195.67
2	102.65	157.73	155.90	198.50
3	104.80	159.40	156.67	196.54
4	103.54	157.76	155.89	195.48
Avg.	103.87	157.85	155.74	196.55

The Air Permeability of treated fabric is significantly increased by 50% in case of 40/60 and 26% in the case of 50/50 blend in weft. This is because of the softening treatment which modifies the fabric surface by reducing roughness and hairiness which in turn will increase the space between the yarns. This fabric will have more air transfer due to the clean and smooth fiber edges. The application of different chemical treatments result in slight openness of the fabric which will increase the air permeability. This will enhance the comfort of the garment.

4.7. Thermal Conductivity

The Table 4.6 shows the Thermal Conductivity Coefficient of both untreated and treated Jute/Cotton union fabrics.

Table 4.6: Thermal Conductivity of the Jute/Cotton Blends

S.No.	40/60 Jute/Cotton (W/mK)		50/50 Jute/Cotton (W/mK)	
	Untreated	Treated	Untreated	Treated
1	0.0646	0.0750	0.0855	0.0875
2	0.0605	0.0755	0.0870	0.0870
3	0.0640	0.0795	0.0865	0.0875
4	0.0671	0.0720	0.0862	0.0876
Avg.	0.0638	0.0755	0.0863	0.0874

The Thermal Conductivity of treated fabric is increased significantly (P>0.05) by 18% only in the case of 40/60 and in 50/50 blend the thermal conductivity value increases by 1%. This increase in the conductivity is because of weight loss in the treated fabric which in turn allows more heat to pass through the fabric. This will increase the water absorbency, because whenever fibres absorb liquid water or vapour, heat will be released [30]. The results obtained in this research indicate that, the enzymatic treatment and silicon-polyurethane finish improves the various properties of union fabric. As an overall the increase in jute percentage reduces the comfort property of the fabric. From Figure 4.5 it can be noted that, the comfort properties of the fabric improved significantly than raw fabric. Further it can also be noted that the improvement in the fabric properties were high in the case of 40/60 Jute/cotton blend than 50/50 jute/cotton blend. Hence this study suggest that the fabric with 40/60 Jute/cotton fabric has high potential in the commercialisation of apparel fabric.

Textsmile

*Who is more polite?
A fat man and a skinny man were arguing about who was more polite.
The skinny man said he was more polite because he always tipped his hat to ladies. But the fat man said he was the more courteous because, whenever he got up and offered his seat, two ladies could sit down.*

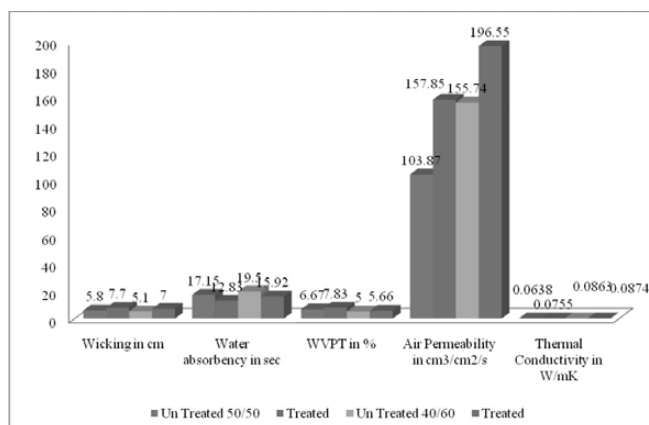


Figure 4.5: Improvement in comfort property of silicon-polyurethane finished Jute/Cotton blend fabric

5. Conclusion

The Jute/Cotton union fabrics are given enzyme treatments followed by silicone polyurethane softening finish. The SEM analysis indicates the improved surface softness of the jute fiber compared to the raw fabric. The FTIR results confirmed the presence of softeners on the fibre surface. The experimental results were evident that there is a significant ($p < 0.05$) improvement in wicking, water absorbency, air and water vapour permeability and thermal conductivity of finished fabric when compared with the raw fabric. This improvement is achieved by the enzymatic processing and finishing of textile with silicon polyurethane finish. This shows a promising result that jute can also be incorporated in our day to day clothing without affecting the comfort properties. However, the scope of this research is identified as increasing the percentage of jute and evaluating their comfort properties and also in the economic point of view.

Acknowledgement

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References

1. Varma, I. K., Anantha Krishnan, S. R., and Krishnamoorthy, S. *Textile Res. J.* **8**, 486 - 494, (1988).
2. Ghosh, P. Samanta, A. K. and Das, D. *Indian Journal of Fibre and Textile Research*, **19**, 277, (1994).
3. Lyman Fourt and Milton Harrist, *Textile Research Journal*, **17**, 256-263, (1947).
4. Grover, G., Sultan, M. A., and Spivak, S. M., *J. Textile Inst.* **84**, 1-9, (1993).
5. Kim, J. J., Hamouda, H., Shalev, I., and Barker, R. L. *Textile Chem. Color.* **2**, 15-20, (1993).
6. Kim, C. J., and Piromthamsiri, K., *Textile Res. J.* **54**, 61-68, (1984).
7. Kim, J. O., and Slaten, B. L., *J. Test. Eval.* **24**, 223 -228, (1996).
8. Schneider, A.M. and Holcombe, B.V., *Research Journal*, **61**, 488, (1991).
9. Margaret E. Whelan, Lloyd E. MacHattie, Goodings, A.C. and Turl, L.H., *Textile Research Journal*, **25**, 197-222, (1955).
10. Pedersen, G. L., Screws, G.A., Cedroni D.M., Mohiuddin. G., *J. Jute Fiber Res.*, **10**, 1-6, (1985).
11. Ghosh, B.L. and Dutta, A.K., *J. textile Inst.*, **71**, 108-116, (1980).
13. Hassan K. Sreenath, Arun B. Shah, Vina W. Yang, Mahendra M. Gharia, Thomas W. Jeffries., *Journal of Fermentation and Bio engineering*, **81** (1), 18-20, (1996).
14. Radhakrishnaiah, P. Meng, X. Huang, G. Wang, Y. Buschle-Diller, G. Walsh, W.K., Fiber Society Meeting, Nashville, (1997).
15. Kundu, A. B., Ghosh, B. S., and Chakrabarti. S. K., *Textile Res. J.* **68**(3), 451-454, (1993).
16. Jang, K. O., and Yeh, K., *Textile Res. J.* **63**(10), 557-565, (1993).
17. Joyner, M., *Textile Clzerrz. Color.* **18**, 34-37, (1986).
18. Shaw, T., Wool Woolens India, **4**(6), 15-50, (1979).
19. Karmakar, S.R., Chemical Technology in the Pre-treatment Processes of Textiles. Elsevier Science B.V. The Netherlands, 69, (1999).
20. C. Vigneswaran, K. Chandrasekaran and P. Senthilkumar, *Journal of Industrial Textiles* **38**, 289, (2009).
21. Tzanov, T.Z., Betcheva, R., Hardalov, I and Hes, L., *Textile Research Journal*, **68**, 749, (1998).
22. Tae Jin Kang and Min Sun Kim, *Textile Research Journal*, **71**(4), 295-300, (2001).
23. Walter N, 1968. "Chemistry and Technology of silicones", p 663-683.
24. Mythili, C V. Malar Retna, A. and Gopalakrishnan, S. *Bull. Mater. Science*, **27**(3), 235-241, (2003).
25. A. K. Prasad, *Journal of the Textile Association*, 39-42, (2007).
26. Shridhar V. Chikkodi, Samina Khan and R.D. Mehta, *Textile Research Journal*, **65**, 564, (1995).
27. M. Michelle Hartzell and You-Lo Hsieh, *Textile Research Journal*, **68**, 233, (1998).
28. Hsieh et al, US patent 6, 066, 494, May (2000).
29. R. Bagherzadeh, M. Montazer, M. Latifi, M. Sheikhzadeh1, and M. Sattari, *Fibers and Polymers*. **8**(4), 386-392, (2007).
30. Parthiban M and Ramesh Kumar M, *Indian Journal of Fibre and Textile Research*, **32**, 446-452, (2007).



Texttreasure

*There are only two ways to live your life.
One is as though nothing is a miracle. The
other is as though everything is a miracle."*

- Albert Einstein

3-Dimensional Solid Woven Architectures and Manufacturing

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Abstract

3D woven structures provide attractive features for use as composite reinforcements and this evolution has been driven in response to need in the emerging industrial applications i.e. for making preforms for construction, automotive ballistics, marine and other applications. The composites produced from 3D woven fabrics have higher delamination resistance, ballistic damage resistance, impact damage tolerance and dimensional stability as well. These fore mentioned properties have been a major problem in composites produced with traditional 2D weaving specially used in military aircraft structures. This paper includes the manufacturing techniques of multilayer, orthogonal and angle interlock - 3 Dimensional solid woven fabrics. Instead of being laid layer upon layer to form the thickness, 3D woven structure can produce the thickness dimension during the weaving process. The amount and types of binder yarns such as carbon, glass, kevlar and ceramic fibres in through-thickness can be used to tailor the properties of composites for specific industrial applications. Also, layer sequence can be arranged based on the requirements. Such kind of fabrics can be fabricated on conventional weaving loom by minor modifications. This will be the future technological challenge in this area.

Keywords

3-Dimensional, Angle interlock, Composites, Multilayer, Orthogonal.

1. Introduction

The term "Three-Dimensional (3D)" is applied in the sense of having three axes in a system of coordinates. If no yarn system penetrating the depth is present, we are confronted with a simple textile flat "Two Dimensional (2D)" fabric. Simple flat fabrics have very good stiffness and strength in two directions i.e. in warp-way and weft-way, but they have problem in thickness direction. This limitation restricts the use of simple 2D fabrics in the field of space engineering, automotive engineering and sports goods where the fabrics can be incorporated.

The 3D fabrics are defined by different authors differently for example; Greenwood said "3D fabrics are those fabrics which have substantial measurement in three dimensions as compared to the conventional fabrics, which will have measurement in two dimensions

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only" [1]. According to Khokar, "3D fabric is defined as single-fabric system, in which the constituent yarns of which are supposedly disposed in a three mutually perpendicular plane relationship", this definition does not consider multilayer and some other type of fabrics to be of 3D type. Hearle gives definition of 3D fabrics as "3D fabrics are thick planar sheets or shaped solid forms with multiple layers of yarns, hollow structures and thin 3D shells".

There are mainly three types of manufacturing systems to produce woven 3D woven fabrics. They are 2D weaving, 3D weaving, and non-interlacing "noobing" method. Other methods like knitting, braiding and laminating principles may also form the 3D fabrics. Conventional 2D weaving device employed to produce interlaced 2D fabric comprises two sets of yarns, while for producing interlaced 3D fabric, three sets of yarns are interwoven. 3D woven fabrics are produced widely by using the multiple warps. An extension of ancient technology for forming double and triple cloth, three-dimensional weaving allows the production of fabrics up to 10 cm in thickness. The binder yarn takes path through the thickness and stuffer yarn along the length.

One of the attractive features of 3D weaving is the ability to taper the shape in all three directions during the weaving process [2].

3D woven fabrics can be fabricated by modifying the conventional weaving mechanisms. When the manufacturing of 3D woven fabric on conventional weaving system (As shown in Figure 1.1) is concerned, it can be produced by these three principle techniques namely:

- ◆ Multilayer principle
- ◆ Orthogonal principle
- ◆ Angle interlock principle

A detailed analysis of the different structures produced by these principles is to be needed to select the appropriate structure for particular application. The technology is used for the production of only speciality industrial fabrics such as for making preforms for construction, automotive, ballistic, and marine applications like carbon fibre preforms for high-performance powerboats, sports goods and various industrial applications. Preforms made by 3D weaving provide several important advantages in composites fabrication. The most important advantage of this material is observed in manufacturing thick composites, owed to a significantly reduced labour time, when multiple layers of 2D fabric plies are replaced by one or few number of 3D plies to achieve the required thickness in a composite structure. 3D preforms appear to be better than the most conformable 2D fabrics. The flexural, tensile and compressive stiffness and strength are better in laminates made from 3D preforms than those made from comparable 2D woven or even knitted fabrics mainly due to the absence of in-plane crimp of yarns in the materials [2].

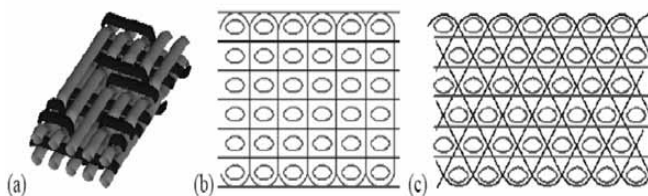


Figure 1.1: Cross sectional views of 3D solid architectures by (a) Multilayer, (b) Orthogonal and (c) Angle interlock Principle

The implementation of composite materials for use in the aerospace, automotive, marine and leisure sectors has increased steadily over the past three decades.

The benefits of advanced composites such as increased design flexibility, structural gains, in particular high specific strength and stiffness to weight ratio, and increased fatigue strength have been well documented. Substitution of conventional metallic materials with composites in various aircraft structures for example consist of successive stacking of layers of a fibrous material.

The fibrous material may already be pre-impregnated with a polymeric matrix material and would be processed in an autoclave or consist of dry woven fabric that is subsequently wet-out in a liquid molding process such as resin transfer molding (RTM). These structures can be tailored to have a specific strength and stiffness in any plane that the fibrous reinforcement exists. However, they have been shown to provide insufficient strength out-of-plane because of lack of reinforcement in this direction. As the limitations of conventional 2D laminates from a manufacturing and a mechanical performance perspective described & address the lack of through-the thickness mechanical performance in the composite laminate, 3D woven preforms can be preferred [3,4].

The benefits of 3D weaving have been discussed, for example, in terms of the ability to tailor the mechanical properties via design of the weave architecture in which an almost endless number of permutations are conceivable. Also, diverse and intricate weave architectures can be created to make near-net-shaped preforms, in which labour and production costs can be reduced because of the implementation of automated textile machinery and by reducing the number of component parts and joining operations required in assembly. However, an engineer designing the component, must also consider the design of the actual weave architecture of the material as well. Therefore, it is essential that a predictive model capable of evaluating the geometric and elastic properties such as stiffness of 3D woven composites be formulated.

3D solids refer to those woven architectures that have solid cross-sections either in a broad panel or in a net shaped perform[5]. There are a number of different ways to form 3D solid architectures; each having its own features structurally and mechanically. In this paper, orthogonal and angle interlock methods are discussed in depth.

Some of the advantages of 3D woven fabrics are listed as follows:

- ◆ The absence of interlacing between warp and filling yarns allow the fabric to bend and internally shear rather easily, without buckling within the in-plane reinforcement which is not in case of 2D fabrics.
- ◆ The presence of Z-direction reinforcement in 3D fabric is an obvious advantage, as dramatic improvement in composite transverse strength and impact damage tolerance is well documented.
- ◆ These have shown improved compression after impact strength, reduced delamination area, and increased number of sub-perforation energy blows required to penetrate the panel.
- ◆ Composites made from 3D preforms exhibit high fiber content (% by weight). Although somewhat lower percentages can be expected, fiber content is still higher than in composites made from comparable 2D fabrics.

2. Manufacturing of 3D Woven Fabric by Conventional Weaving System

Different persons tried different ways to achieve 3D fabrics. Many research programmers have developed a substantial array of 3D reinforced weave architectures that can only be produced on specialist machines but these machines are not commercially available [6,7]. However, only selective structures such as the angle interlock architectures have been widely used [8]. An attempt is made by Greenwood [1] to produce 3D fabric based on orthogonal principle in which all the set of yarns are mutually perpendicular to each other. Another improved way to achieve orthogonal principle based 3D fabric is given by Chen. He developed different weave structures based on above principle using conventional looms and CAD/CAM software successfully [9,10,11]. Some different types of methods are developed by Khokar to achieve 3D fabrics.

In response to the demand of 3D textiles structures, different methods have been used to create 3D textile assemblies, including weaving, braiding, warp knitting, and nonwoven. In weaving, two methods are generally used for the making 3D textile structures. The first is based on the creation of weaving machines which include technologies represented by 3Tex and Biteam. Another method is based on the use of conventional weaving technology. The University of Manchester has been working in this area and has created techniques

and tools for creating different categories of 3D woven fabrics. The advantage of the later includes the readily availability of manufacturing technology to generate the variety of 3D structures. It has been also claimed that the technology route using the conventional weaving lead to low cost of 3D architectures [5].

Either by developing some new 3D weaving machine or by modifying conventional weaving machine, solid 3D fabrics can be produced by following ways:

2.1 Multilayer Principle

In multilayer principle, there are multiple layers of distinctive woven fabrics. There are primarily two ways to produce multilayer fabrics as follows:

- ◆ Joining different layers on weaving machine at the time of picking
- ◆ Joining different layers on sewing machine

In the former case, basically the stitching process consists of inserting a needle, carrying the stitch thread, through a stack of fabric layers to form a 3D structure. In standard textile industry, stitching equipment is capable of stitching preforms of glass and carbon fabrics and there are many high performance yarns that can be used as stitching threads. While in the later case, 3D weaving of multilayer preforms is done on conventional weaving machines equipped with an electronic dobby or jacquard system: this is a well-established textile technology and very cost-effective [5]. As most 3D composites are produced from high performance yarns (carbon, glass, ceramic, etc) standard textile tensioning rollers are unsuitable and tension control on the individual yarns during the weaving is critical in obtaining a consistent preform quality. The cross sectional view of a multilayer composite is as shown on Figure 2.1.

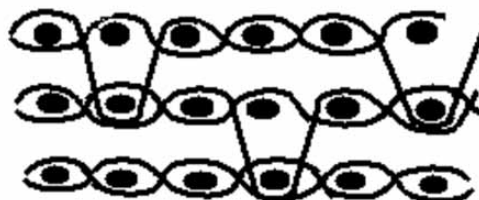


Figure 2.1: Cross-sectional view of 3D fabric using multilayer principle

This is generally accomplished through spring-loaded or frictional tension devices on the creel or through

hanging small weights on the yarns before entering the lifting device. Jacquard lifting mechanisms tend to be used more frequently as their greater control over individual warp yarns offers more flexibility in the weave patterns produced. The weft insertion is accomplished with standard technology (generally a rapier mechanism) inserting individual wefts between the selected warp layers. Variations in the lifting and weft insertion mechanisms to allow multiple sheds to be formed and thus multiple simultaneous weft insertions have also been developed and would allow a faster preform production rate.

The features of this type 3D architecture are:

- ◆ Each fabric layer can be given a different weave to facilitate a "hybrid" property through the thickness of the composite;
- ◆ All warp and weft yarns in the 3D solid textile architectures can be crimped to specified extents to suit the property requirements of the composite;
- ◆ Required amount of vertical stitching can be arranged between any layers of fabrics in the preform to enhance the through-the-thickness property; and
- ◆ Adding straight wadding yarns in any adjacent fabric layer in either warp or weft or both directions can further strengthen the architecture up.

2.2 Orthogonal Principle

3D orthogonal woven fabric is manufactured with a multi-warp yarn system. The main concept of the fabric is to bind straight warp yarns and weft yarns (along 1- and 2-direction) together using binder yarns (along 3-direction). The warp and weft yarns provide high in-plane stiffness and strength, and the binder yarns run through the thickness direction to stabilize the woven structure. 3D orthogonal woven composites have higher inter-laminar fracture toughness and impact damage resistance than laminated composites [5].

The arrangement used to develop different 3D orthogonal structures is shown in Figure 2.2. Some modifications have been done in conventional mechanical dobby loom to develop 3D structures. As shown in the Figure 2.2, two warp beams were used. The lower beam is used for the ground warp, which was arranged in longitudinal direction in different layers. The upper beam is used for the binder warp, which traveled vertically

and is used to bind the warp and weft yarns. As shown in the Figure 2.2, ground warps are divided into different groups and each group of thread is passed through a separate heald frame. One heald frame is used for the binder warp (number of heald frames depends on number of binder yarns). The reed profile is made in such a way that five consecutive ground warp threads are passed through one dent and in the next dent a single binder warp is made to pass. This is shown in the Figure 2.3.

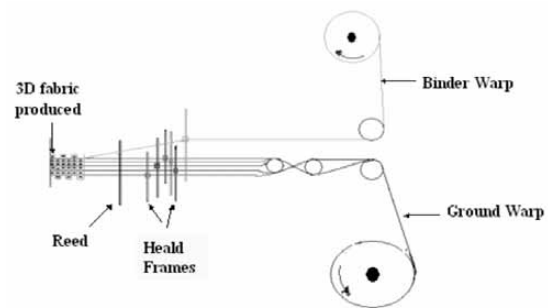


Figure 2.2: Arrangement to produce 3D orthogonal fabric

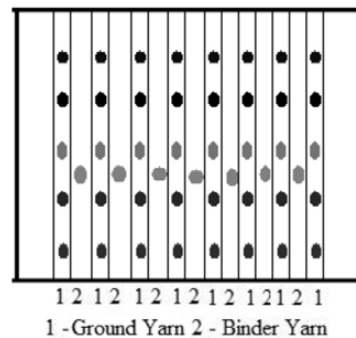


Figure 2.3: Reed profile to produce orthogonal fabric using single binder yarn

Lifting plan of the heald frames is decided in such a way that five-ground warp layers are arranged one above the other and the picks are inserted in between them. There is no interlacement in between the warp and weft layers.

Suppose the heald frames are given numbers 1 to 6 where 6th one is for the binder warp. To produce 3D fabric heald frames numbered 1 to 5 are raised one by one and after raising each of the heald frame picks are to be inserted. For example suppose first heald frame is raised and then pick is inserted, then in the next step, first and second heald frames are in up position and other pick is inserted. After rising of 5th heald frame and the insertion of pick, 6th heald frame which is

holding the binder warp is raised and beating is done. In this way, the binder thread is arranged vertically in the structure and helps to hold the non-interlaced warp and weft layers of the yarn.

After this, the heald frames start going down one by one starting with the 5th heald frame then 4th and so on and the picks are inserted after moving any of the heald frame to down position, finally binder thread moves down and then beating of the fabric takes place. These steps to produce orthogonal based 3D fabrics are shown in Figure 2.4.



Figure 2.4: Steps for producing 3D Fabric using Orthogonal Principle

In this way we can produce fabric, which have considerable thickness. Binder threads are in vertical position in the fabric and are used for the firmly gripping of the warp and weft yarns in the structure. Without binder thread, stability of the structure cannot be achieved. A cross-sectional view of the structure formed by this method is shown in the Figure 2.5.

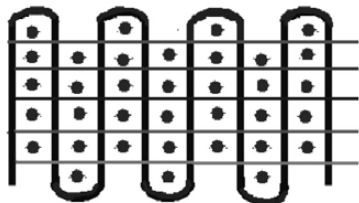
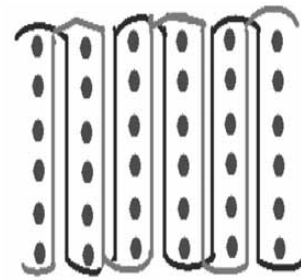


Figure 2.5: Cross-sectional view of orthogonal 3D structure using single binder yarn

Another kind of 3D orthogonal fabric using 7 heald frames (2 for binder warps and 5 for Ground warps with weave repeat of 12 picks) will have lifting plan and cross sectional view as shown in Figure 2.6.

Pick 12		×	×	×	×	×	×	×	
Pick 11		×	×	×	×	×	×	×	
Pick 10		×	×	×	×	×	×	×	
Pick 9		×	×	×	×	×	×	×	
Pick 8		×	×						
Pick 7		×	×						
Pick 6	×		×	×	×	×	×	×	×
Pick 5	×		×	×	×	×	×	×	×
Pick 4	×		×	×	×	×	×	×	×
Pick 3	×		×	×	×	×	×	×	×
Pick 2	×		×	×	×	×	×	×	×
Pick 1	×		×	×	×	×	×	×	×
Healdshaft	1	2	3	4	5	6	7		
	Binder Yarn		Ground Yarn						

(a) Lifting plan



(b) Cross-sectional View

Figure 2.6: (a) Lifting plan and (b) cross sectional view of orthogonal 3D structure using two binder yarns

The features of the orthogonal principle based 3D fabrics are:

- ◆ All yarns in the three principal directions are laid straight, therefore they are able to take the load directly and most effectively;
- ◆ Required amount of vertical yarns can be arranged by the binding weave specification;
- ◆ The interlinking depth can be altered easily within the same preform, leading to variable preform thickness;
- ◆ Structure can be either isotropic or anisotropic; and
- ◆ Fiber volume fraction is 45-55%.

2.3 Angle-Interlock Principle

The basic arrangement to produce 3D fabric using angle interlock principle is same as used in orthogonal fabric, means to use two warping beam, which is shown in Figure 2.2. Two series of warping yarns are to produce angle interlock structure :

- ◆ Stuffer Warp (Which are straight, can be used to increase fiber volume fraction and in-plane strength.)
- ◆ Binder Warp (Which are used to bind several layers of weft (or warp) yarns together)

The lower beam is used for the Stuffer warp, which was arranged in longitudinal direction in different layers. The upper beam is used for the Binder warp, which travels diagonally and is used to bind the warp and weft yarns.

One kind of 3D angle interlock fabric using 7 heald frames (3 for stuffer warps and 4 for binder warps with weave repeat of 8 picks) will have lifting plan and cross sectional view as shown in Figure 2.8. During

drawing-in process two sets of heald frame has to be used for stuffer and binder yarn. Total number of heald frame depends on number of stuffer and binder yarns. The reed profile is made in such a way that consecutive stuffer yarns are passed through one dent and in the next dent a binder yarns are made to pass. Group of yarns passed through one dent will depends on number of stuffer yarns, Binder yarn and reed count. Reed profile or denting ordered to produce above angle interlock fabric is shown in the Figure 2.7.

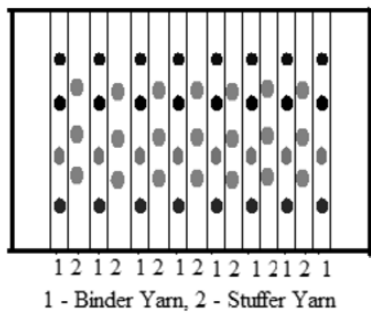
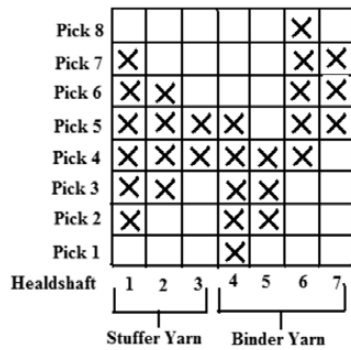
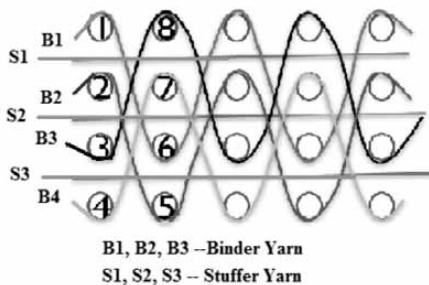


Figure 2.7: Reed profile to produce angle interlock fabric using four binder yarn and three stuffer yarn.



(a) Lifting plan



(b) Cross-sectional View

Figure 2.8: (a) Lifting plan and (b) cross sectional view of Angle Interlock 3D structure using seven heald frames

Suppose the heald frames are given numbers 1 to 7 where first 3 heald shaft is for the stuffer yarn and remaining four heald shaft for Binder yarn. To produce

3D fabric, heald frames numbered 1 to 7 are raised accordingly given ordered of particular pick in lifting plan. For example at the time of first pick insertion to raised fourth number heald frame only and then in the next step, first, fourth and fifth heald frames are in up position and second pick is inserted. After completion of first four pick, beating is done. Similar way to insert other four pick - fifth, sixth, seventh and eighth to complete repeat size and again beating is done. In this way, the binder thread is arranged diagonally in the structure and helps to hold the stuffer warp and weft layers of the yarn.

In this way we can produce fabric which have considerable thickness. Angle interlocked fabrics are quite distinctive class of preforms, which have been scantily explored to achieve interlocking of fabric layers during the weaving stage. They provide the advantage of cost effective preform manufacture with control over layer interlocking density based on weave variations apart from imparting higher impact and delamination resistance to the fiber reinforced composites.

Another kind of 3D angle interlock fabric using 8 heald frames (3 for stuffer warps and 5 for binder warps with weave repeat of 4 picks) will have cross sectional view as shown in Figure 2.9.

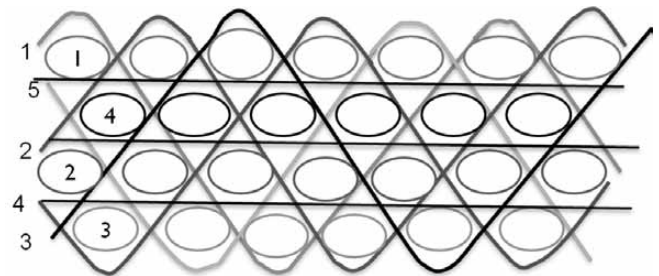


Figure 2.9: The cross-sectional view of 3D fabric made using angle interlock

Some of the features of angle interlock 3D fabrics are:

- ◆ It is a multilayer fabric used for flat panel reinforcement.
- ◆ It is normally woven on a shuttle loom.
- ◆ Warp yarns are taken directly from the creel.
- ◆ Warp yarns are used to bind several layers of weft yarns together or vice versa.
- ◆ Stuffer yarns can be used to increase fiber volume fraction and in plane strength [12].

3. Conclusion

It is found that 2D fabrics have limited applications for some industrial applications like automotive ballistics, marine, military aircraft structures, and other application where 3D fabrics can fulfill the requirements. Solid 3D fabrics can be successfully developed by three major principles viz. multilayer, orthogonal and angle interlock by modifying the conventional weaving systems. The multilayer principle consists of mainly two methods like joining layers on the sewing machines or joining layers on the conventional weaving system. In the orthogonal principle, the 3D structure can be produced using number of binder yarns while angle interlock principle involves the use of binder as well as stuffer yarn to give third dimension for production of 3D fabric. Varieties of 3D structures can be produced by varying the number of binder and/or stuffer yarns.

References

1. Greenwood K., United state patent 3818951; June, (1974).
2. Khokar N., Second generation woven profiled 3D fabrics from 3D weaving. The first world conference on 3D fabrics and their application, 10-11 April, (2008). www.texeng.co.uk/conference
3. Stobbe, D., and Mohamed. M., 3D woven composites: Cost and performance viability in commercial applications. The 48th International SAMPE Symposium, Long Beach, CA. (2003).
4. McIlhagger, A.T., Quinn, J.P., & McIlhagger, R.; the tailoring of composite mechanical properties by textile reinforcement design. Proceedings of the SheMet University of Ulster, (2003).
5. Chen X., CAD/CAM of 3D woven fabrics for conventional loom. The first world conference on 3D fabrics and their application, 10-11 April, (2008). www.texeng.co.uk/conference
6. Mohammed M.H., and Zhang Z.H., Method of forming Variable Cross-sectional Shaped Three-dimensional Fabrics. United state patent 5085252; February, (1992).
7. Burgess K.E., Fiber-reinforced Composite Structures and Methods of Making The Same. USP 5346774; September, (1994).
8. HITCO., Thick Woven Fabrics. United state patent 1296369; November, (1972).
9. Chen X., Knox R. T., McKenna D.F. and Mather R.R., Automatic Generation of Weaves for the CAM of 2D and 3D Woven Textile Structures; *J. Text. Inst.*, **87**; No. **2**(1), 356,(1996).
10. Chen X., and Potiyaraj P., CAD/CAM of the Orthogonal and Angle-interlock Woven Structures for Industrial Applications. *Text. Res. J.*, **69**(9), 648, (1999).
11. Chen X., and Zanini I., An Experimental Investigation into the Structure and Mechanical Properties of 3D Woven Orthogonal Structures. *J. Text. Inst.*, **88**, No.4 (1), 449, (1997).
12. Tong L. M., and Bannister M.K., 3D Fiber Reinforced Polymer Composites. *Elsevier Science Ltd*, (2002).

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The Textile Association (India)

South Gujarat Chapter

hosting

11th INTERNATIONAL & 69th ALL INDIA TEXTILE CONFERENCE

Theme: INDIAN TEXTILES: GLOBAL PROSPECTS AND PERCEPTIONS

Date: 20th-21st December, 2013

Venue: The Gateway (TAJ) Hotel, Surat (Gujarat)



Prof. Dr. N. Sekar, Ph.D

Dr. Sekar is currently working as a Professor in Tinctorial Chemistry and is Head of the Dyestuffs Department at ICT, Mumbai. He is also a Coordinator for the center for physico-chemical aspects of in textiles, fibres, dyes and polymers (UGC-SAP).

In his immense professional service, he is identified as an Expert Scientist from India for synthesis of colorants for immunoassay and environmental monitoring. He has been appointed as an Expert Committee Member by DST, Govt. of India to look into the pollution problems of colorants Industry in Ankleshwar and is also an Expert member on UGC-CAS in JNDU University, Amritsar.

He is Fellow of many renowned associations which includes, Society of Dyers and Colourists, (UK), Indian Chemical Society, Association of Chemical Technologists, India, Indian Membrane Society and Indian Mathematical Society.

He also serves as an examiner for M.Tech in Textile Technology and Ph.D. in Industrial Chemistry, Organic Chemistry and Physical Chemistry for different Universities.

He is also on the Reviewer and the Editorial board of various renowned Journals like Dyes and Pigments, Fibres and Polymers, Coloration Technology and many others.

He has donned various publications under his name; 64 International/National Research Papers. More than 250 general articles, few book chapters. He has attended more than 90 conferences.

Currently he is guiding more than 30 Doctorate students and 6 Masters students. He also has a post Doctorate student under his guidance.

From reactive dyes to reactive auxiliaries

N. Sekar

Dyestuff Technology Department Institute of Chemical Technology

Almost 100 years after the synthesis of the first artificial dye reactive dyes were made. Before the advent of reactive dyes the coloration of cotton was achieved by direct, vat, azoic, sulphur, solubilised vat, solubilised sulphur, and basic dyes (after mordanting). In all these cases dyes were held onto the fibres by different attractive forces. The possibility of attaching dyes with fibres with a covalent bond has long been attractive to dyestuff chemists because attachment of dye molecules to the fibres by physical adsorption and mechanical retention have the disadvantages of high cost, low wet fastness and elaborate dyeing methods (except direct dyes).

Early attempts to have a covalent bond between the dye and the fibre were to produce dyes on the fiber itself. However, the formation of covalent bond during the process of dyeing first appeared commercially in 1956, after their invention in 1954 by Rattee and Stephens. In a reactive dye the chromophore contains a substituent that is activated and allowed directly to react with the substrate. The chemical bonding between the dye and the fiber implies good wash fastness properties. Since any simple dye molecule can be converted into a reactive dye by attaching a reactive function many simple and smaller dye molecules (which otherwise cannot be used in the coloration of cotton) could be converted into a reactive dye and applied onto cellulosic substrates. Naturally smaller chromophoric units have brighter colors and thus the reactive dyes became

the preferred choice for cotton and blended fabrics containing cotton. The then available bright basic dyes could be dyed only after mordanting and they are inferior in terms of light fastness too. Thus reactive dyes emerged as a very convincing class for the coloration of cotton.

The practical requirements were that the unreacted dyes need to be removed, and the dyes need to be totally non-substantive to remove the unfixed dye. From the perspective of a synthetic chemist both the above aspects were achieved by incorporating several solubilising (sulphonic acid) groups into the dye molecule. Reducing the substantivity to zero by putting a large number of sulphonic acid groups demanded enormous amount of electrolyte during exhaustion. The requirement of large amount of water after fixation (to remove the unfixed dye) and the consumption of huge amount of electrolyte were detrimental and the dyes containing more than one reactive function emerged as an environment-friendly alternative. Incorporation of more reactive functions means stretching the structure which leads to some increase in the substantivity. The concepts like bifunctional reactive dyes, low-salt reactive dyes all emerged. All this could be achieved only with a synergistic combination of synthetic organic chemists and physical chemists.

The problem associated with the requirements of alkali during fixation, requirement of electrolyte dur-

ing exhaustion and heavy usage of water during washing could never be compromised in spite of many such developments. A few trials in replacing the mineral alkali with an organic base emerged in the interlocation of reactive dyes containing cationic charges - the neutral fixing reactive dyes - which by

default allowed circumventing the anionic charge on cotton surface and thereby reducing the electrolyte requirement. This concept led to another innovative concept of making the cotton surface itself cationic so that thermodynamics and kinetics play a role in transferring the dye from the dye bath into the

fibre by an ionic attraction followed by reaction. Thus cutinizing cotton surface became a practical solution to many problems. The specialty chemicals or auxiliary chemicals in this context has become the present day need to have a more viable and environmental friendly reactive dyeing.

A milestone in the history of The Textile Association (India)



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Ecological Concerns in Denim Washdown Processes

Sustainable wet processing of textiles is the need of the hour. Denims, one of the most favoured sub spheres of textiles, are no exception. It is therefore our utmost important duty to understand the hazards of the contemporary chemicals used in denim washing and then take efforts to minimize these hazards.

One of the most important process in denim washing is bleaching or indigo fading. Unfortunately this is an inevitable step and hazardous chemicals are used in this process only. Sodium hypochlorite and po-

100% sulphur black denim fabric to get unique effects. Hydrogen peroxide is rarely used as bleaching agent when very less colour loss is required or if fabric is topped with sulphur dyes. The bleaching process helps to get Greyer cast & also protects the lycra/spandex, retain elasticity.

Along with indigo many other colourants are also used to give attractive aesthetic appearance.

Various colourants for tinting in denim wet processing
Thus the facts mentioned above

pains to bring such harsh facts to the notice of consumers by undertaking exhaustive surveys. Therefore, denim washdown processes is an area of tremendous potential for research.

The basic requirement in this case is of a bleach formulation which is equally effective as that of sodium hypochlorite and potassium permanganate and yet an environmentally friendly one. The possible way could be to use a suitable oxygen bleach process to bring about the same chemical reaction. Oxygen bleach utilizes hydrogen peroxide as bleaching agent aided by auxiliaries such as detergents. Nowadays, there is notable research going on to develop detergents with in-built oxygen bleach formulations so that the concerned washdown effects could be brought about at low temperatures and less concentrations. In conclusion, one can say that denim washdown process sector is one of the most dynamic yet most criticised sector these days. From research point of view this is a challenge worth accepting. It is absolutely mandatory for us not to ignore these facts but to carefully analyse them and earnestly attempt to innovate for green future.

*By- Chet Ram Meena
& Shyam Phadke*

tassium permanganate are commonly being used for every medium to vintage denim. Potassium permanganate is also being used on

depicts the dangers posed by the various ingredient of denim processing. Also, there are NGOs like Greenpeace which have taken

Dyes			Pigments
Direct	Reactive	Sulphur	
Economical	Costly	Economical	Cost Efficient
Wide range of shades	Wide range of shades	Shades are dull	Styling (limited to dull shades)
Short Cycles	Long Cycle	Short to long Cycle, depends upon shade	Short to long Cycle
Ease of Application but poor	Water Consumption High	Sulphur Odour & harsh hand feel	Machine contamination, but hard to obtain consistency, harsh hand feel
Smooth Appearance	Smooth Appearance	Smooth Appearance	Smooth Appearance

Attention
All Members of
THE TEXTILE ASSOCIATION (INDIA)

Please update their profile & contact information by
Sending us e-mail to update our website
www.textileassociationindia.org
E-mail: taicnt@gmail.com,



TAI - AHMEDABAD

DIWALI GET TOGETHER

The Textile Association (India) Ahmedabad Unit arranged Diwali get-together function for the family members of the association. Shri T. L. Patel, President of the Association welcomed all the members at the function and wished all Happy & Prosperous New Year. During the function many senior members also exchanged best wishes for NEW YEAR to each other. Mr. A. D. Bhagat, Vice President spoke about the Diwali get-together and requested participation in Annual Get-together function. Mr. V. A. Trivedi, Hon. Secretary proposed the vote of thanks of the function.



Diwali Get-together function of 2012 addressed by Office Bearers

2nd ICTA - 2012

2nd ICTA-2012 (International Conference on Textile & Apparel) held on 23rd - 24th Nov, 2012 at Hotel Lake Shore, Gulshan, Dhaka, Bangladesh. The theme of the conference was "Efficient use of Resources in Textiles Production". The Textile Association (India) was one of the Association partners of the conference. As promotional activities of Governing Council members, The Textile Association (India) sent a business delegation to visit the ICTA-2012 at Bangladesh. From TAI-Ahmedabad Unit Shri T. L. Patel, V. A. Trivedi, K. J. Patel, M. G. Shah & P. V.

Patel attended the same. About 25 GC members of TAI from all over India joined in the tour. The tour created good impact on strengthening the ties of TAI & Bangladesh Textile Industry.



Business Delegation of TAI to ICTA-2012, at Bangladesh



Mr. Pankaj Saran, Indian Consulate General, Bangladesh with business Delegation of TAI at ICTA-2012 held in Dhaka.

5th GC Meeting of TAI

Six GC members from The Textile Association (India) Ahmedabad Unit attended Vth GC meeting of The Textile Association (India) held on 29th Nov, 2012 at Hotel Kohinoor Park, Veer Savarkar Marg, Prabhadevi, Mumbai - 400 025. All GC members actively participated during the discussion of meeting as per AGENDA. The meeting was over very peacefully.

Best Unit Trophy 2011-12

The Textile Association (India) Central Office and Mumbai Unit have jointly organized 10th International & 68th All India Textile Conference held on 30th Nov & 1st Dec, 2012 at Hotel ITC Maratha, Sahar Road, Andheri (E), Mumbai - 400099. During the conference The Textile Association (India) Ahmedabad unit was awarded Best Unit Trophy for the year 2011-12 and also Service

Memento was awarded to Shri Hasmukh S. Patel but due to his absence Shri T. L. Patel, president of TAI-Ahmedabad Unit received the said memento on his behalf.



Office Bearers receiving Best Unit Trophy (2011-12) awarded to TAI-A'bad Unit at the All India Textile Conference at Mumbai by the Textile Commissioner.



Service Memento" 2011-12 of TAI awarded to Shri H. S. Patel (TAI-A'bad Unit) received by Shri T. L. Patel in AITC 2012.

Felicitation Function

The Textile Association (India) Ahmedabad Unit organized a felicitation function of newly elected Minister's & MLA's Gujarat State during assembly election of Gujarat. Also it felicitated Mr. T. L. Patel, President and Mr. V. A. Trivedi, Hon. Secretary for bringing great honor at the Ahmedabad Unit for three times hat-trick continuously by winning "Best Unit Trophy" at all India level from the Textile Association (India).



Shri T. L. Patel delivering his welcome address with invited dignitaries on dais



Shri Pradipsinh Jadeja, Minister of State Law & Justice, Legislative & Parliamentary Affairs Receiving memento from Shri B. A. Shah



Shri Hasmukh Patel, MLA Gujarat State Receiving memento from Shri H. J. Patel



Shri T. L. Patel, President TAI-A'bad Unit Receiving memento from Shri Rajnikant Patel



Shri Rajnikant Patel, Minister of State Home, Civil & Defence Receiving memento from Shri A. D. Bhagat



Shri Jagdish Panchal, MLA Gujarat State Receiving memento from Shri K. J. Patel



Shri V. A. Trivedi, Hon. Secretary TAI-A'bad Unit Receiving memento from Shri Pradipsinh Jadeja

TEXTTEST INSTRUMENTS

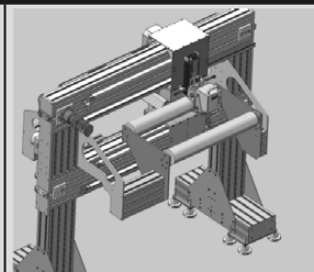
COMPUTER TECHNOLOGY BASED AIR PERMEABILITY TESTER, ONLINE AIR PERMEABILITY TESTER, PORTABLE AIR PERMEABILITY TESTER, AIR BAG TESTER, DIGITAL ELMENDORF, PICK COUNTER, MOISTURE METER



Air Permeability Tester



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Union Budget (2013-14)

INVESTMENT ENVIRONMENT & TAX ASPECTS

VIEWS ON UNION BUDGET - 2013



*Mr. D.R. Mehta,
National President, TAI*

Mr. D.R. Mehta, National President, The Textile Association (India) has welcomed the Union Budget 2013-14 presented by the Finance Minister, Mr. P. Chidambaram presented for Creating environment of optimism and growth of the Industry.

He further said that "We are delighted that excise duty on branded apparels along with other progressive measures like restoration of zero excise duty for the cotton & manmade sector at the yarn, fabric and clothing stages and also sanctioning of funds for key textile sectors".

He further mentioned that this budget was needed for the boost the industry.



*Mr. A Sakthivel,
Chairman, AEPC*

The Union Budget 2013-14 presented by finance minister P Chidambaram today, have cheered the textiles and garments industry immensely. The reason: the government has finally agreed to unanimously remove the excise duty on readymade garments imposed two years ago.

As A Sakthivel, Chairman, AEPC opines, "We thank the FM for accepting the demand of the industry to restore 'zero excise duty route' for cotton and manmade sector (spun yarn) at the yarn, fabric and garment stage. We also thank him for accepting the demand of the industry, for which lakhs of workers, entrepreneurs extend their compliments." Sakthivel also appreciated the fact that the ministry shall continue TUFs in 12th Plan with an outlay of Rs 2,400 crores. The creation of apparel parks within SITP and Rs 10 crores allocation will go a long way in increasing exports of value added textile chain.



The industry also welcomed the allocation of Rs 1,000 crores for skill development and hopes that substantial allocation would be made for the readymade garments sector, which allows immediately absorption of workers, displaced from agriculture and undertake lot of responsibility of the government in solving employment problem.

On behalf of the domestic garments industry, CMAI welcomed the removal of excise duty on branded garments. "The industry, as so correctly described by the FM, is in the throes of a crisis, and this lifeline was desperately needed to bring back some vigor to this beleaguered sector. The reversal to the optional route not only provides zero percent duty to the industry, it will also provide some form of protection to the domestic industry from cheap imports. Moreover, it will encourage foreign retailers setting up shop in India to manufacture in India, rather than import from outside," said Rahul Mehta, President CMAI.

Experts point out this move will revive consumer sentiment as prices will reduce, and minimize the grey market. "It's good for the whole value chain as consumer sentiment will revive when prices come down," opines Aamir Akhtar, CEO, Arvind Lifestyle Fabrics. Agrees Rajiv Dayal, MD, Mafatlal Denim as he says "removal of duty will

lower MRPs of garments and augurs well for the industry." It will provide much needed boost to brands and manufacturers to scale up and move to the organized sector. With the industry going back on a growth path, one of the biggest positive fallout will be increased employment opportunities, especially for unskilled and semiskilled workers, and more specifically for women workers.

Ramesh Poddar, Chairman & MD, Siyaram Silk Mills feels, the Budget has brought a ray of hope for the industry. "We have been demanding this for a long time and finally our appeals have been heard. This move will ultimately benefit the consumer and help the industry grow. We also appreciate the fact that the government has allocated Rs 500 crores for environmental issues in the textile industry. This will help companies be responsible towards the environment and help them reduce their carbon footprint."

Manish Mandana MD, Mandhana Industries says the whole industry is relieved that excise will go. "It's fantastic news. People are thrilled because the excise hit their business. Paperwork became difficult. This is a huge relief for retail and clothing companies. About Rs 500 crore has been allotted for environmental issues in the textile industry. This is good and that's what we need moving forward. Infrastructure will get better with this. About Rs 1,000 crores will be allotted to enhance youth skills. This is also a fantastic move. In India we have so much talent and potential that can help the industry grow this move will help bring in fresh blood in the industry."



Mr. Naresh Mistry, President of ITAMMA

TAMMA concludes a mix trend for Supply Industry in the Central Budget- 2013-14

Shri Naresh Mistry, President of ITAMMA wishes to put his observations as below, in regard with the provisions for Textile Engineering Industry, on the Central Budget - 2013-14 presented by the Finance Minister, Shri P. Chidambaran, today in the Parliament.

1. A new scheme called the Integrated Processing Development Scheme will be implemented in the 12th Plan to address the environmental concerns of the textile industry.
2. Bringing green revolution to eastern India with an allocation of Rs. 1,000 crore in 2013-14. (In regard with point no's 1 & 2, ITAMMA has already taken initiatives in sustainability & expects that Machine & Accessories manufacturers will invite developments in Energy Conservation & Environment friendly aspects). Zero excise duty at fibre stage in case of cotton might have brought relief to readymade garment industry; however one should not forget that man-made textiles is also important in case of readymade Garments when it calls for frequent changes in design/fashion, & also in case of Green revolution where recycled fibers plays a vital role.

Thus duty of 12 % at the fibre stage in case of spun yarn made of man-made fibre, may discourage its applications as mentioned above & further will have a adverse effect on R&D /Innovations in this field.(thus in this case the Govt. decision of encouraging in-house R & D proves to be on adverse side)

3. Technology Upgradation Fund Scheme (TUFS) to continue in 12th Plan with an investment target of ` 1,51,000 crore.
4. Companies investing `100 crore or more in plant and machinery during the period 1.4.2013 to 31.3.2015 will be entitled to deduct an investment allowance of 15 % of the investment.[Decisions of point no's 3 & 4 are welcomed, however Pre-owned machines should have been exempted from the eligibility under the TUF scheme for textile industry as it affects the local TEI development adversely. Since used machinery is very cheap, there is no need for concessional financing to improve its feasibility or else India will be a junk of second-hand machines (ITAMMA has already warned in its various representations to the respective authorities) - specific notification is not made]
5. Ministry of Corporate Affairs to notify that funds provided to technology incubators located within academic Institutions and approved by the Ministry of Science and Technology or Ministry of MSME will qualify as CSR expenditure.
6. Rs. 200 crore to be set apart

to fund organizations that will scale up S&T innovations and make these products available to the people.

7. A grant of ` 100 crore each made to 4 institution of excellence.
8. Proposal to increase the rate of tax on payments by way of royalty and fees for technical services to non-residents from 10 percent to 25 percent. [the steps taken as per point no's 5-8, clearly indicate that the Govt. wants to encourage & support in-house R&D; however we should not forget that we are still far behind in the infrastructure requirement for R&D, when compared with the International players in the Manufacturing of Textile Machines; & so it would have been wise decision in promoting the transfer/acquisition of new Technologies/innovations & machinery, and R & D as well as joint ventures with leading textile machinery manufacturers from abroad] (Applied R&D in other words).

Also there is a need to see that institutions of excellence apart

from working on the developments in Fiber, Yarn & Fabric, & special finishes, should also give importance to the developments of Machines & Assemblies manufacturing the textiles as mentioned above. At the same time some provision of Funds for the Development of Common Facility Centre (CFC) for various Clusters of Textile Engineering Industry, would have helped in the development of Machines & indigenization of Spares, thus further helping in bringing down the imports & providing the state-of-the art services & products at National level]

ITAMMA- also recommended waiving off the Custom Duty on the Machines which are brought to India for R & D purpose & the same are taken back to their respective Countries after the appropriate Research /Trials. Please note that we should encourage such New Technology Machines coming to India in order to upgrade the knowledge not only of our Students & Technicians but also, to create an appropriate platform to our emerging Entrepreneurs. Presently the

duty structure depends on the duration for which these machines are kept in India.

9. Decisions taken for the benefits for Micro, Small and Medium Enterprises are welcomed including a provision of sum of Rs. 2,200 crore during the 12th Plan period to set up 15 additional Tool Rooms and Technology Development Centres with World Bank assistance.
10. The decision of setting up 1000 crore for this scheme and targeting of skilling 50 million people in the 12th Plan period, including 9 million in 2013-14 & further motivating youth to voluntarily join skill development programmes, through National Skill Development Corporation; is most welcomed by ITAMMA.
11. No change in the normal rates of 12 % for excise duty and service tax has disappointed; but at the same time reduction of customs duty from 7.5% to 5% for Textile Machinery has shown some scope of improvement in investments in this area.

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Indo-French seminar on textiles & technical textiles machinery

FRENCH TECHNOLOGY AND SERVICES FOR THE INDIAN TEXTILE AND TECHNICAL TEXTILE INDUSTRY

DELHI: Tuesday, March 19, 2013

SURAT: Friday, March 22, 2013

INDIA is a major player in the textile industry and more and more in the technical textiles. Growth opportunities are considerable if these industries meet the requirements of their domestic markets for higher quality products and stand up the worldwide competition to take advantage of the globalization of the markets. The Indian authorities fully recognize these sectors and through the Technology Upgradation Fund Scheme (TUFS), want to promote their growth and take part in the financing.

As for the French textile machinery manufacturers, for already a long time they have considered India as a lead market. Very strong ties with industrialists in India already exist and are considered as long time partnerships.

Thanks to local representatives, the regular organization of seminars in the main Indian textile areas and the participation at many shows, the French machinery manufacturers can offer the service of local partners. After the 2007 and 2010 seminars in next March 2013, they are offering the textile and technical textile industrialists the opportunity to meet once more.

In Delhi, they are expecting industrialists from Northern India (Delhi itself, Panipat, Ludhiana, Amritsar etc.).

In Surat, industrialists from all over Gujarat, (Ahmedabad, Silvassa, Vapi, Baroda, Vadodara ect.) which is considered a key region for the textile industries future growth, a region where textile is a reliant industry from the production of the fibre to fabric and garment as well as certain areas of Maharashtra especially Mumbai.

What can French technology and service bring?

France is the 6th largest exporter of textile machinery with annual exports of nearly 1.2 Billion USD. The French companies which will be represented are particularly strong in long fibre spinning, yarn preparation and treatment, modern weaving, dyeing and finishing (fabrics and knits), air conditioning of textile plants, recycling of textile wastes and products, these for apparel textiles, home textiles (including carpet industry), Technical textiles for such applications as the automobile, Personal protection, hygiene, agriculture, medical textiles, composites etc.).

The machines are technologically state of the art, the services include quick assistance, spare parts availability, special design, consulting services in such sectors as safety rules and energy savings.

AESA, ALLIANCE, CALLEBAUT de BLICQUY, DOLLFUS & MULLER, LAROCHE, N. S C H L U M B E R G E R , ROUSSELET, STÄUBLI, SUPERBA, VERDOI and the UCMTF teams look forward welcoming you.

These seminars are free of charge but prior registration is required.

For more information & registration, contact
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DKTE International Alumni Meet 2012 during India ITME 2012, Mumbai

The Textile & Engineering Institute enjoys a unique and prominent place amongst the institutions that are engaged in education, training, research and consultancy in various disciplines of engineering in India. The genesis and growth of the institute was a sequel to the intense desire and the support of the powerful co-operative sector. Keeping in view the fabric of social responsibility, Mr. K. B. Awade, former Member of Parliament, founded D.K.T.E. Society's Textile & Engineering Institute at Ichalkaranji in 1982.

International Alumni Meet was organized on Tuesday 4th December 2012, during India ITME 2012 at ITME square, Mumbai. An overwhelming response was received for the Meet. The occasion was graced by more than 850 Alumni ranging across various batches from various parts of the country and also from outside the country

as well, mainly from USA, Germany, China, Indonesia, Turkey, Bangladesh and Iran. Hundreds of old students of this three decade old Institute, many working on high position in the industry, besides dignitaries, took part in the event.



Dignitaries on Dais

The programme was conducted in the gracious presence of Chief Guest Mr. S.S. Aich, CEO Alok Industries & Mr. Rajnikant Bachkaniwala, Chairman India ITME Society, Prof. D.B. Ajgaonkar, Former Principal, DKTE'S, Textile & Engg. Institute, Shri. K. B. Awade, Chairman DKTE Society's, Shri. P.K. Awade,

Governing Council Member of DKTE, Sou. S.U. Awade, Secretary DKTE, Prof. (Dr.) P. V. Kadole, Principal DKTE's Ichalkaranji, and Ms. Seema Shrivastava, Executive director India ITME. The President of Alumni Association, alumnus, Mr. Dhaval Desai welcomed the alumni and appreciated their zeal to assemble for International alumni meet. Principal, Prof. Kadole took a review of Institute and various ongoing projects in the institute. CEO Alok Industries appreciate the knowledge and work spirit of the students of the Institute and assured that they will continue its support. Various dignitaries also addressed the gathering.

Chief guests of the alumni meet threw the light on various factors of the industry and shared their vast experience. They also expressed their desire to extend all help for the betterment of DKTE alumni association.

Prof. (Dr.) U. J. Patil, HOD Textile, proposed vote of thanks.

OBITUARY



Mr. H.P. Gupta

Mr. H.P. Gupta, Trustee of the Textile Association (India) - Delhi Chapter, passed away on October

29th, 2012. He is survived by two daughters and their families. Managing Committee of TA(I), Delhi paid tributes to Mr. H.P. Gupta in its meeting held on November 10th, 2012. Mr. H.P. Gupta did his textiles education from TIT, Bhiwani in the year 1956. He was a Gold medal recipient from Pt. Jawahar Lal Nehru, then Prime Minister of India. He had worked with major industrial groups of the country and had travelled widely to USA, Canada, Europe, Russia and China. TA(I) Delhi has also benefited a

lot under his dynamic leadership. His invaluable guidance was very useful for organising various events. He was a role model and would always be remembered for his greatness. May God, Almighty grant peace to the departed soul and bestow strength to bereaved family to bear the loss.

On behalf of The Textile Association (India), pray to the Almighty to bestow peace to the departed soul.



"When Vidarbha will wake up???"

Government of Maharashtra has organized a two day Investor's meet -Advantage Vidarbha 2013 to showcase the opportunities available in Vidarbha region during February 25-26, 2013 at Hotel Centre Point, Nagpur.

Federation of Indian Chamber of Commerce & Industry (FICCI) and Vidarbha Industry Association (VIA) supported to this event.

In the two-day conference "Advantage Vidarbha", various pacts worth Rs. 18,461 for various sectors like textiles, food, cement, steel etc. were announced and the memorandum of understanding (MoU) were signed in presence of Maharashtra Chief Minister Mr. Pithivraj Chavan, Industrial Minister, Mr. Narayan Rane, Union Minister for Heavy Industries, Mr. Praful Patel and others.

Mr. Avinash Mayekar, MD & CEO, Suvin Advisors Pvt. Ltd started the technical session by presenting "Weaving Vidarbha's economy." Then as a moderator, Mr. Mayekar started the panel discussion on "Opportunities in Textile Industries: Weaving Vidarbha's Economy" to deliberate on various opportunities available to textile sector in Vidarbha region and how textile industry should strengthen its presence in the region for overall betterment of the economy. Mr. Mayekar moderated the panel discussion with panelists involving Mr. Mohd. Arif (Naseem) Khan, Minister for Textile, Government of Maharashtra, Mr. Sunil Porwal, Principal Secretary-Textile, Government of Maharashtra, Mr. Manoj Soumik, Principal Secretary-Textile, Government of Maharashtra, Mr. Dilip Jiwrajka, Managing Director, Alok Industries Ltd., Mr. K.

K. Agarwal, Chairman, Alps Industries Ltd., Mr. Suresh Kotak, Chairman, Kotak Commodities, Mr. S. K. Gupta, Group CMD, Raymond UCO Denim Pvt. Ltd., Mr. Sandeep Gupta, MD, Shyam Indofab Pvt. Ltd. and Mr. Prashant Kumar Mohota, Managing Director, Gimatex Industries Pvt. Ltd.

The most important discussion by the panel was why Vidarbha has still not responded to Maharashtra Government's Textile policy. In spite of having the best raw material available (both cotton & MMF), investor friendly government schemes, logistical advantage and good connectivity by rail, road, air and industrial peace, there are still not sufficient investments happening in textile sector in Vidarbha region.

The discussion also revealed a valuable insight that even though cotton is abundantly available in Vidarbha region, only 30% is processed in Vidarbha region. Mr. Kotak shared his views on the same expressing that the cotton produced in Vidarbha region is not branded and is not marketed suitably like in Gujarat. He also emphasized the importance of creation of textile specific zones as the only value addition for the cotton is in the spinning industry. Hence for the development of complete supply chain, suitable infrastructure needs to be created in this region. Mr. Mayekar suggested that Maharashtra Govt. should start focusing on branding of cotton.

Coming to Maharashtra from North India, Mr. Sandeep Gupta & Mr. K. K. Agarwal would have their own investments in Vidarbha region by looking in to the potential of the Vidarbha region. Mr. Mohota & Mr.

S. K. Gupta, being the existing players, were of the opinion that there should be new investments in this region.

They also appreciated the efforts of the Government in maintaining the infrastructure and handling other issues which has helped them to get a foothold in this region. In addition to this, Mr. Jiwrajka gave his valuable suggestion on development of garmenting industry in Vidarbha region to boost the backward integration for garmenting.

Mr. K. K. Agarwal & Mr. Mayekar were in consensus regarding no efforts being taken for development of technical textiles in this region as most of the existing players are investing only in conventional segments. With availability of good quality raw material (both natural and MMF) in this region, an entrant in technical textiles can think of value addition with good profit margins. Most of the panelists discussed on the prevailing issues in Maharashtra like higher power tariff in Maharashtra, local taxes like octroi duty, payment of stamp duty etc. Summing up the panel discussion, Mr. Khan announced the de-linking of Maharashtra Textile Policy from the TUFs and giving suitable power subsidy for resolving the power tariff issues in Maharashtra. Mr. Mayekar thanked the panel as well as audience and expressed that he is positive that now the industry would come forward to take the benefits in Vidarbha region in terms of government support, raw material and logistics.

Global Yarn and Fabric Output Rose in Q3/2012

Output of global yarn production rose in the Q3/2012 in comparison to the previous one due to higher output in Asia South and America, while production in Europe and North America was down. Also in comparison to last year's third quarter yarn production rose in all regions apart from North America. Global yarn stocks rose slightly in Q3/2012 in comparison to the previous quarter mainly due to higher stocks in Asia and South America. On an annual basis yarn inventory decreased due to lower stocks in Asia and South America and despite an increase in Europe. Yarn orders in Q3/2012 were down both in Europe and Brazil in comparison to Q2/2012. On an annual basis yarn orders were up in Europe but down in Brazil.

World fabric production increased in Q3/2012 inspite of lower output in Europe due to increased production levels in Asia and South America. Year-on-year global fabric production was down; while it increased in Europe, it decreased both in Asia and South America. Global fabric stocks rose slightly in in comparison to Q2/2012 as a consequence of higher inventories in Asia and South America and despite lower ones in Europe and North America. Year-on-year fabric stocks were up due to higher stocks in South America and despite lower ones in North Europe and America. Fabric orders decreased in Q3/2012 both in Europe and Brazil compared to the previous one and also year-on-year. The estimates for global yarn and fabric production in the 4th compared to the 3rd quarter of 2012

are positive in Asia, stable in Europe and negative in South America. The outlook for global yarn and fabric production in Q1/2013 remains stable. Regional-wise Asia is expecting stable production levels, while the outlook in Europe is negative for yarn and stable for fabric production. In South America the outlook for both yarn and fabric production is positive.

In comparison with the previous quarter, world yarn output rose in Q3/2012 by +7.5% as a result of high production in Asia (+8.5%), due to higher output in China (+9.3%), India (+7.6%), and Pakistan (+1.9%). Yarn production in South America increased by +2.6%. Yarn output fell significantly in North America (-10.0%) and to a lesser extent in Europe (-7.3%). Year-on-year global yarn production rose by +12.8% with output up in South America (+13.5%), Asia (+13.5%) and Europe (+10.2%) but down in North America (-17.0%). Compared with the previous quarter global fabric production rose by +3.0% in Q3/2012 as a consequence of higher output in Asia (+4.0%) and South America (+2.7%). In Europe fabric production fell by -6.5%. In comparison to Q3/2011 world fabric production was down by -5.1% with Asia and South America reporting decreases of -6.3% and -2.5%, respectively. In Europe on the other hand output increased by +4.9 % on an annual basis.

Global yarn inventories fell by -3.8% in Q3/2012 compared to the previous both Asia (-4.7%) and South America (-3.4%) recording lower

inventories, while stocks remained unchanged in Europe. On an annual basis global yarn stocks dropped by -17.8%, a consequence of lower stocks in Asia (-26.8%), South America (-7.1%) and Europe (-0.9%).

Global fabric stocks were up by +0.5% due to higher inventories in South America (+2.4%), and Asia (+0.5%), while inventories in both Europe and North America decreased by -2.0% and -0.4%, respectively. Year-on-year, global fabric inventories increased by +1.0%. This was due to higher fabric stocks in South America (+7.8%) and despite lower fabric stocks in North America and Asia with reductions of -10.7% and -6.7%, respectively.

Yarn orders in both Europe and Brazil were down in Q3/2012 compared to the previous one by -2.9% and -3.3%, respectively. Year-on-year yarn orders rose in Europe by +5.3% but fell in Brazil by -3.6%.

In Brazil and Europe fabric orders in the Q3/2012 decreased by -7.2% and -2.2%, respectively. on an annual basis fabric orders fell with Europe recording a drop of -6.9% and Brazil of -3.7%.

Textsmile

A perfect son

A: I have the perfect son.

B: Does he smoke?

A: No, he doesn't.

B: Does he drink whiskey?

A: No, he doesn't.

B: Does he ever come home late?

A: No, he doesn't.

B: I guess you really do have the perfect son. How old is he?

A: He will be one year old next Wednesday.

oerlikon

Volkmann will show its energy expertise at Domotex 2013

Domotex, the world's most important trade fair for floor coverings, will again attract industry professionals to Hanover/Germany from 12-15 January 2013. Volkmann's trade fair team will be welcoming visitors at the Oerlikon Saurer booth A25 in hall 5. The Volkmann product line will be providing information on its latest technological developments, which are also setting standards in the energy sector.

The Volkmann product line, located in Krefeld/Germany, belongs to Oerlikon Saurer and is the global market leader of twisting and cabling machines for the production of carpet yarns. Sophisticated know-how, innovative strength and market proximity are the traditional strengths of the Volkmann product line.

Now even more economically efficient - only one work process for carpet cabling and heat setting. With Heat-SET, the integration of heat setting in the classical cabling process, the Volkmann product line sets another milestone in carpet yarn manufacturing. For the first time, it is possible to combine the process steps of cabling, heat setting and winding in a single step. Volkmann Heat-SET now combines both finishing steps in one procedure with only one rewinding process. This has clear economic advantages; it reduces the production time considerably, increases flexibility and also produces a high-quality, classic cabled BCF yarn.

The new e-save carpet cabling technology reduces energy costs by up to 40%

The e-save spindles are used in the new Volkmann carpet cabling machines, they can also be installed in existing equipment as a retrofit package. With the expanded e-save spindle family and an energy-saving potential of up to 40%, the Volkmann product line is setting new standards in the market.

Depending on the yarn count range and supply package diameter, the conditions can be optimised with the e-save spindles. This greatly reduces the consumption of energy and simultaneously decreases the yarn strain. Depending on the quality of yarn, higher spindle speeds can be reached, thus increasing the production.

Become up-to-date in quality and economic efficiency with the retrofit packages. Many of the technological innovations are also available in retrofit packages as ideal additions to existing equipment. Our customer support is happy to be able to offer appealing, economically efficient retrofit solutions for older generations of machines. A range of pioneering technological components have been developed for this purpose.

This include

- ◆ Retractable Hi-Lo-creels improve usability
- ◆ Newly developed yarn tensioning systems promote quality and economic efficiency
- ◆ E-save spindles provide a better energy balance of up to 40%

Through its excellent ergonomic

characteristics, the efficient pneumatic retractable Hi-Lo-creel provides the operator with significantly improved usability. With the newly developed pneumatically central, per machine side adjustable roller yarn tensioner, and the individual yarn tensioners such as the crocodile and hysteresis tensioners for the creel yarn, an increase in economic efficiency and quality can be achieved. The newly developed ball yarn tensioner for the two-for-one twisting machine or the up-twisting of BCF single and plied yarns sets another milestone. The ball yarn tensioner covers the entire yarn tension range. Switching to another capsule, as with the conventional capsule tensioners, is no longer necessary. The tension is easily adjustable in 24 steps and the pneumatic threading is always assured - without additional handling.

With the Volkmann product line and its experienced team staff, our customers always have a strong, innovative and reliable partner at their side, ready to answer any questions concerning twisting.

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The Textile Association (India) - Delhi National Textile Seminar - 2013



*Mr. R.K.Vij,
President, TA(I) Delhi*

The Textile Association (India) Delhi Chapter is organizing "**National Textile Seminar - 2013**" on 12th April, 2013 at PHD House, August Kranti Marg, New Delhi - 110016

The Textile Association (India) is the leading and the largest national body of textile professionals in India, established in the year 1939, and has been serving the Indian textile industry for over 7 decades. Currently there are 27 affiliated units at various textile centers in the country, accounting for member strength of over 23,000. The Delhi Unit of The Textile Association (India) was established in 1965 and today it has about 1700 members. It is the third largest TA (I) unit in the country, after Mumbai and Ahmedabad. TA(I), Delhi has been organizing various useful activities like seminars, workshops, industry visits, industry institute interaction and social get-togethers for its members. TA(I), Delhi has been awarded a number of times with the Best Unit Award and many of its members have been honored with Service Gold Medal, Service Memento and Industry Excellence Award. It has organized several successful conferences in the past, including the 1st Asian Textile Conference in the year 1991, the 7th Asian Textile Conference in 2003

and 67th All India Textile Conference recently in 2012. TA(I), Delhi Chapter is now hosting the National Textile Seminar - 2013 on 12th April 2013 in PHD Chamber of Commerce and Industry in the heart of national capital to commemorate Platinum Jubilee Year Celebration of The Textile Association (India). Only a year back, TA(I) Delhi has conducted 67th All India Textile Conference which proved to be a historic event on all criteria on a very high success note. Taking the step forward, TA(I) Delhi has decided to organize NTS 2013 to maintain the enthusiasm created among textile professionals for the betterment of Textile Industry.

Clothing is one of the basic needs of the mankind and textile industry is one of the oldest manufacturing industries in the world. In fact, industrial revolution started with textile industry and this industry has seen lot of developments and innovations since then. Textile industry is a very significant industry for India as well. It generates lot of employment, contributes substantially to the export earnings as well as to the Indian economy. India's total textile and apparel industry size both domestic and exports is projected to grow at a CAGR of 9.5 % to reach USD 223 billion by 2021 from USD 89 billion in 2011.

Mr. R.K. Vij, President, The Textile Association (India) Delhi in an exclusive presentation to the magazine told that Indian textile industry is well poised to grow rapidly in this decade for exports as well as domestic market. One of the important characteristic of textile in-

dustry is Innovation over the years. Theme of Seminar is "Propelling Growth Through Innovation". The seminar shall focus on 'Innovations' in various sectors of textile industry, through panel discussions and presentations by eminent speakers from India and abroad. It will be a very interactive seminar and will deliver value to the participants. NTS 2013 shall not only cover topics on hi-tech research and innovations in textiles but shall also illuminate the participants with applied innovations and techniques from some of the leading professionals of India.

The Objective of this Seminar is to collect and disseminate state-of-art research and technology in the field of textiles with special emphasis on Nano Technology, Advanced Textile Structures and their applications, Innovative Weaving and Processing Technologies and business opportunities in technical textile sector. This event will provide a sophisticated program on emerging technologies such as 3D Weaving, Multi-Axial Weaving, Profiled Woven Constructions, Plasma Processing and Nano Finishing by renowned national and international speakers from industry academia and research institutions.

NTS 2013 will also cover current topic of "Impact of FDI in Retail on the Textile Industry", driving consumer demand in clothing and technical textiles, commercial issues facing the industry, best management practices and innovations in the textile value chain. The Seminar would have three technical sessions comprising of individual presentations from eminent speakers as well as panel discussions. Mr. R.K.Vij further emphasize that delegates would have an opportu-

nity to interact with global and Indian Textile experts. There will be renowned personalities from different countries, government officials, logistical experts, commercial speakers from the machinery manufacturers, raw material suppliers, processors and brand owners. NTS 2013 would attempt to handle issues critical for growth of textile industry such as increasing fuel prices, currency fluctuations, etc. Fresh initiatives need to be taken to create confidence in investors. Rising production costs, technological changes, confliction at international level and social compliance are to be dealt with fresh ideas. The Seminar will give a platform to share the new ideas between professionals.

For the Sponsors and Advertisers, NTS 2013 is just the right platform to market their offerings to a large group of professionals and decision makers in the textile industry. Branding at this event will leave an everlasting impression in the minds of all business associates. Advertising at this gala industry event would provide desired exposure and mileage.

Delegate Registration : The National Textile Seminar - 2013 is a prestigious and much sought after event which is likely to be attended by delegates coming in from all parts of the country and abroad.

You can register as a delegate by paying a nominal registration fee of Rs. 500/- only. Please register yourself by sending a DD/Pay Order/Cheque (at Par) in the name of "The Textile Association (India) - Delhi", payable at Delhi, for Rs. 500/- to: The Textile Association (India) - Delhi 401, Gagan Deep, 12, Rajendra Place, New Delhi -

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Confirm your participation NOW, as limited Delegates will be registered for this prestigious Seminar

Souvenir : TA(I) Delhi is releasing a Souvenir on this occasion. The Souvenir would contain research papers and vital information on textile industry and would reach scores of individuals, organizations, senior executives and policy makers etc in India and abroad. We request you to take advantage of this opportunity to market your products by releasing the advertisement in the Souvenir. The applicable tariff rates are as below:

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Mr. H.N. Jain (+91-9871899690)

Texttreasure

Just the fact that some geniuses were laughed at does not imply that all who are laughed at are geniuses. They laughed at Columbus, they laughed at Fulton, they laughed at the Wright brothers. But they also laughed at Bozo the Clown.

-Carl Sagan

"Sportech- Needs, Challenges & Prospects"

Wool Research Association organized the National Seminar on "SPORTECH- NEEDS, CHALLENGES & PROSPECTS", in collaboration with Indian Exhibition Services, New Delhi at 10.00 a.m. on January 29, 2013 at Pragati Maidan, New Delhi along with India International Sporting Goods Show. The seminar was supported by sponsors Australian Wool Innovation, New Delhi, Raymond's Ltd., Premier Colorscan Instruments Pvt. Ltd., Navi Mumbai.

The seminar on **Sportech- Needs, Challenges & Prospects** aimed to rise the awareness about the importance of various sports items such sports goods, sports accessories, sportswear and their market value and application in India and also to share the ideas to deepen and broaden the concept of Sportech developments. More than 70 participants from various stakeholders in sports field like, manufacturers, distributors, retailers, importers, exporters, Textile Ministry, textile industry and academicians from textile institutions from India attended the seminar.

The seminar was inaugurated by **Shri. Sujit Gulati, Joint Secretary, Ministry of Textiles, Govt. of India**. In his speech, he described the prevailing scenario of Technical textile industry, also elaborated the needs for the advancement in the field of sport textiles. **Shri. S. L. Pokharna**, Senior Vice President, WRA, Thane, highlighted on the significance of emerging technology, which will break the barrier of conventional textiles to user into a new horizon of Value Added High-Tech arena. **Shri. M K Bardhan**, Director, Wool Research Association, Thane, addressed delegates briefly about Centre of Excellence for Sportech. During the inaugural, they released the seminar '**Book of Papers**' & **CD**.

The first technical session started with **Dr. Mrinal Choudhari**, (Deputy Director, WRA, Thane), informing the participants about the Sportech, their Need, Challenges and Prospects. **Dr. K. Gurudatt**, General Manager (G & T) Reliance Technology Group, Reliance Industries Ltd., Mumbai gave pre-

sentation on 'Comfort Demands of Sports Textiles'. His presentation focused on demands from sports textiles, comfort aspects, evaluation techniques for comfort properties, fibres for sports textiles, highlighting the PET and recent trends in sports textiles. **Mr. Amir Sheikh**, Country Manager- India, Woolmark Services India Pvt. Ltd, New Delhi spoke on 'Merino Perform™: Wool in Active Sportswear'. He made the participants aware of the commercial and technical advantages of Merino wool in sports wear application. The session concluded with open discussion about the respective topics and followed by Tea.

The second session started with **Dr. S. K. Chaudhuri**, Chairman, India National Office, The Textile Institute, Manchester. He highlighted the significance of Sportwool, properties and its applications. Prof. **Dr. R. Chattopadhyay**, Head, Department of Textile Technology, IIT, Delhi focused on designing part of the sportswear and highlighted the various fabrics characteristic and properties required for sportswear. **Mr. Dakshesh Desai**, Director, Premier Colorscan Instruments Pvt. Ltd., stressed on the need of testing instruments such as moisture management, fabric touch and colour assessment spectrophotometer for performance testing of sports textiles. The session concluded with open discussion about the respective topics and followed by Lunch.

The third session started with **Prof. Dr. Mangala Joshi**, Department of Textile Technology, IIT Delhi. She presented and talked about high-tech clothing, high comfort multi layer fabrics, and textile based composites in sports goods and specialty finishes required for sports



Lighting of Lamp by Shri. Sujit Gulati, Joint Secretary, Ministry of Textiles, Govt. of India. (Left: Shri M.K. Bardhan, Director, Wool Research Association, Thane)

fabrics. Further the session was followed by speakers from WRA, Thane, **Mr. Jayant Udakhe** & **Mr. Mayur Basuk**, scientists presented the topic on Sports Accessories and Indian Sports Goods respectively. The participants dis-

cussed the issues and prospects after this session such as commercialization of sports products, market access and improvement in sports composites etc.

The Seminar concluded with vote

of thanks by **Dr. Mrinal Choudhari**, (Deputy Director, WRA, Thane) addressing all the delegates, speakers and the sponsors for their support to this seminar.

25 February, 2013: Indo-French seminar on Textiles & Technical Textiles Machinery



French Technology And Services For The Indian Textile And Technical Textile Industry

DELHI: Tuesday, March 19, 2013 at Shangri-La Hotel
SURAT: Friday, March 22, 2013 at The Gateway Hotel

The French Trade Commission-Ubifrance and UCMTF (French Textile Machinery Manufacturers' Association) are pleased to announce the 3rd edition of the Indo-French Textiles & Technical Textiles Machinery Seminar. The event will be organized, under the patronage of the office of the **Textile Commissioner-Ministry of Textiles & the Embassy of France in India**, in collaboration with the esteemed professional organizations like CII, TAI, FAITMA, TEXPROCIL, ITTA, TPA, SGCCI, SASCMA, SRTEPC and ATIRA. Technopak will be the knowledge partner for this event.

France is the 6th largest exporter of textile machinery with annual exports of nearly 1.2 Billion USD. The French textile machinery manufacturers, thanks to local representatives, share already strong ties with industrialists in India. After the 2007 and 2010 seminars, 9 French Textile Machinery companies will share their technology with the Indian industrialists from the textile and technical textile sectors at the

full day seminar on **Tuesday 19th March 2013 at New Delhi** and on **Friday 22nd March 2013 at Surat**.

The participating French companies are particularly strong in long fiber spinning, yarn preparation and treatment, modern weaving, dyeing and finishing (fabrics and knits), air conditioning of textile plants, recycling of textile wastes and products; these for apparel textiles, home textiles (including carpet industry), Technical textiles for such applications as the automobile, Personal protection, hygiene, agriculture, medical textiles, composites ...). The machines are state of the art technologically; the services include quick assistance, spare parts availability, special design, consulting services in such sectors as safety rules and energy savings.

The presentation of the French participants LAROCHE, N. SCHLUMBERGER, STÄUBLI, AESA Air Engineering, VERDOL, SUPERBA, DOLLFUS&MULLER, CALLEBAUT de BLICQUY and ROUSSELET, will be focused on:

- ◆ Sustainable solutions for textile

waste

- ◆ the process of any type of long staple fibre application
- ◆ Trend-setting technology for the weaving industry
- ◆ Air Conditioning - Humidification and Waste Handling Systems for Textile Industries - Quality air with time and energy saving solutions
- ◆ Technical Yarns processing. Multiple breakthroughs in Industrial Yarns, Tire Cord, Carpet Yarns & Glass Yarns twisting & cabling machinery
- ◆ Leading Technology of Heat Setting Line for Carpet Yarns
- ◆ How to improve the feeling, the shrinkage of the knitted and woven Fabrics? How to improve the printing Process?
- ◆ Dyeing & Finishing: when Ecology relates to cost savings - Very high density Dyeing.

These presentations will be followed by B2B meetings in the afternoon.

The seminar is free of charge but a prior registration is required. For registration, please send your full contact details at Mrs Brinder RAULT, Trade Advisor, French Trade Commission-Ubifrance. brinder.rault@ubifrance.fr

‘ASTM Test Methods For Geosynthetics’

BTRA conducted a one-day technical workshop on ‘ASTM Test Methods for Geosynthetics’ jointly with ASTM International, USA at BTRA premises on 22nd January, 2013.

Mr. Sam Allen, Vice-president, TRI

/ Environmental, Inc., USA presented a paper on ‘GRI-GM13 Specifications along with various test requirements’ after a brief introduction on ASTM International and various applications in geosynthetics. He also presented

another paper on ‘Reinforcement Applications using Geogrid and Geotextile growth along with Erosion Control Applications’.

Mr. V.K. Patil from BTRA presented a paper on ‘Our Experience in Testing of Geosynthetics’. He shared the experience with testing of products and problems encountered in testing. He also made various suggestions in test methods that are necessary based on experience and feedback from customers.

Around 40 participants attended the workshop and took active interest in discussions. The workshop was well appreciated by participants and thanked BTRA for organising such an event.



Dr. A.N. Desai, Director, BTRA, delivering welcome speech

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- ◆ Updated data, news and statistics about Indian Textile industry
- ◆ Expert views, opinions, market information and technological developments happening in Textile Industry across the world
- ◆ Serving vast audience within textile industry, including textile processors, manufacturers, retailers and other relevant industry groups
- ◆ Avenue for members to promote their products and services
- ◆ Content B2B opportunities
- ◆ Banner advertising options & sponsoring various sections of website
- ◆ Human Resource Supply Wing for Job placement services
- ◆ Online Journal of the Textile Association (JTA). Website provides a Double Treat opportunity to the journal advertisers.
- ◆ Informative knowledge articles
- ◆ Trade enquiries
- ◆ And many other features.

For more details contact

E-mail: taicnt@gmail.com, jb.soma@gmail.com



Chairman, NITRA Graces 11th Convocation

The 11th Convocation Ceremony for the academic year 2011-12 was held on Saturday, the 9th February 2013 at NITRA, Ghaziabad. Noted industrialists Sh. Sh. R. L. Nolkha, Chairman, Sh. R. K. Jain, Vice Chairman, and Dr. R. C. Jain, Past Chairman, NITRA graced the occasion. 143 students from 11 programs were awarded certificates and medals in this year's convocation.



At the Convocation Ceremony (L-R): Dr. J. V. Rao, Director General, Sh. R. K. Jain, Vice Chairman, Sh. R. L. Nolkha, Chairman, and Dr. R. C. Jain, Past Chairman, NITRA, Dr. M. S. Raizada, Director, NITRA Technical Campus & Sh. Abhijit Pal, Officiating Director, NITRA.

After welcome by Sh. Abhijit Pal, Officiating Director, NITRA, Director General, NITRA Dr. J. V. Rao mentioned that NITRA had set benchmarking standard in professional training and offering industry oriented programs on regular and DLP basis, covering areas such as textile/garment manufacturing, textile/garment designing, merchandising, quality assurance, garment finishing and sewing machine operation & maintenance. He informed that more than 100 renowned apparel and textiles exports companies had recruited NITRA alumnus in the past ten years. Dr. Rao mentioned that under ISDS launched

by MoT in July 2010, NITRA is conducting 98 training programs for textiles and technical textiles sector and would train 16,600 people in five years. He spoke about the "Centre of Excellence" set up at NITRA for carrying out R&D and training in protective textiles and also apprised the audience about NITRA's other R&D and consultancy services.



A student from NTC receiving memento from Sh. R. L. Nolkha, Chairman, NITRA for winning in Tana-Bana, the campus fest. Also seen is Dr. J. V. Rao, Director General NITRA.

Sh. R. L. Nolkha, in his convocation address, opined that the textile ministry and the textile industry had always been encouraging institutes like NITRA for initiating skill development activities both at shop-floor and supervisory levels. He mentioned that NITRA had invested a substantial amount for up-grading its physical and academic facilities such as setting up exclusive training and academic wing NITRA Technical Campus and modernizing other infrastructure. NITRA is providing huge benefit to the Indian Textiles & Clothing industry, continued the Chairman, by developing skilled and well-trained supply line to meet out their manpower needs. Sh. Nolkha awarded certificates and medals to the pass-out students.



A pass-out receiving certificate from Sh. R. L. Nolkha, Chairman, NITRA.

After the 11th Convocation, prizes were distributed to 43 students, winners in various competitions held in Tana Bana 2013 - The Campus Fungama, the first intra-college fest of NTC, the new academic wing of NITRA. Presently NTC is offering MTU affiliated and AICTE approved B. Tech in Textile Technology, and Computer Science & Engineering, and PGDM in Fashion Retail Management.



A section of the audience present in NITRA's 11th Convocation Ceremony at NITRA.

Sh. R. K. Jain and Dr. R. C. Jain, along with the Chairman, greeted the students and distributed prizes to winners in various competitions while Dr. M. S. Raizada, Director, NTC, proposed the vote of thanks.

Texttreasure

Always forgive your enemies; nothing annoys them so much.

-Oscar Wilde

oerlikon The 8th Annual Meeting of China Textile Round Table Forum Co-sponsored by Oerlikon Textile

Surmount the Difficulties and Seek For Future Development

On January 20, 2013, the grand opening of the 8th Annual Meeting of China Textile Round Table Forum was held by China Textile Economy Research Center and the Press Center of China National Textile and Apparel Council, with China National Textile and Apparel Council being the main sponsor, and Oerlikon Textile Group, Beijing Textile Holding Group Co. Ltd., and Beijing Topnew Group being the co-sponsors. The meeting subject of this year was "Surmount the difficulties and seek for future development".



The 8th Annual Meeting of China Textile Round Table Forum

Wang Tiankai, Member of the National Committee of Chinese People's Political Consultative Conference and President of the China National Textile and Apparel Council, Sun Huaibin, Deputy Secretary-General of the China National Textile and Apparel Council, Yao Jingyuan, Special Researcher of the Counselor's Office of the State Council and former Chief Economist of the National Bureau of Statistics, Zhang Yansheng, Researcher and Director of the Foreign Economic Research Institute of the National Development and Reform Commission, Fan Jianping, Researcher and Chief Economist of the National Information Center, Gao Fang, Vice President and Sec-

retary-General of China Cotton Association, Zhu Beina, President of the China Cotton Textile Association, Yu Xiuling, Director of the Clean Production Center of the Ministry of National Environmental Protection, Wen Zongguo, Professor and Doctoral Supervisor of the School of Environmental of Tsinghua University, and representatives from other domestic and foreign enterprises have attended the forum.



Stefan Kroß, President of the Chemical Fiber Division of Oerlikon Textile, gave a speech about "How to Realize Sustainable Development of China's Textile Industry."

In 2012, China was faced with the most sever situations in recent years: shrinking international market, grim exporting situation, slow growth of domestic needs, rising cost of business operation, and the great pressure that textile enterprises were faced with in industrial transformation and upgrade. This forum, with the subject "Surmount the difficulties and seek for future development", is aimed to explore and discuss the options that China's textile industry has to survive through this new circumstance.

The forum was presided by Sun Huaibin. As usual, the forum was

divided into three sections: a brief opening, three keynote reports, and three interactive dialogues on specific topics.

Wang Tiankai gave a brief speech on behalf of the authorities of the sponsor group. He firstly thanked all participants for their presence at the forum, and then gave positive affirmation of the achievements that China Textile Round Table Forum has made during the past eight years. Wang believes that the Textile Industry has entered into a new historical stage of development; He said: "We need to accelerate the pace to make necessary adjustments, transformation and upgrading."



Gao Yong, Vice President and Secretary-General of China National Textile and Apparel Council, talked about the analysis and countermeasures of the economic situation of textile industry in 2013

Yao Jingyuan talked about the Macroeconomic Situation and Relevant Policy of 2013. By comparing the statistics of the energy industry of coal, electricity, oil, etc. in 2012 with that of the previous years, Yao presented to the audience a comprehensive macroeconomic situation, and analyzed from the perspectives of exportation, investment, consumption, etc. the main reasons that lead to the down-

turn of China's economy. Yao believed that the economic situation of this year is more favorable than that of last year. He said according to the requirements of the Central Economic Work Conference, we should make use of the driving forces of both investment and consumption, investment more into the livelihood areas, and support the development of the real economy industries like the textile industry, maintaining the economy growth at a moderate speed and at the same time committed to the reform.

Gao Yong, Vice President and Secretary-General of China National Textile and Apparel Council, talked about the analysis and countermeasures of the economic situation of textile industry in 2013. Gao briefly reviewed the overall situation of the textile industry in 2012 and analyzed and evaluated the industrial economic situation accordingly. He pointed out that in the past year of 2012, although the growth rate of the textile industry slowed down, it still made benefit on the whole, and the exportation realized a slight increase. Gao predicated that the industrial trend of 2013 is going to be steady on the whole, with low growth at first and then followed by increases later.

He said: "Due to the facts that the cost of production factors is comparatively high in China, there is a great gap between the price of the domestic cotton and that of the foreign cotton, our country's international competitiveness declines, etc., the exportation will still encounter with difficult situations; while with the growth of domestic needs and signs of recovery on the international market, we can expect the exportation to increase in the second half of 2013." At last, Gao

emphasizes that China must adjust the industrial structure according to the requirements of the Twelfth Five Year Plan and its specifications on the Textile Industry to adapt to the changes on the overseas market.

Stefan Kroß, President of the Chemical Fiber Division of Oerlikon Textile, on behalf of the entire Oerlikon Textile Group, gave a speech about "How to Realize Sustainable Development of China's Textile Industry." He pointed out that the production capacity of China in manmade fiber production now takes up 60% of the world chemical fiber production capacity, while it is still faced with the challenges of rising costs of raw materials and labors. China's chemical fiber shall development in the direction of high quality and efficiency in the future, and trends like this also provide basis and opportunity for Oerlikon Textile Group. The Manmade Fibers Division of Oerlikon Textile emphasizes on developing green products (e-save) and technologies featuring high efficiency, low energy consumption and low emission according to the needs of customers, especially the Chinese customers. Early in the year of 2007, the Manmade Fibers Division has developed the newest WINGS POY winding machine, of which the sale amount has exceeded more ten thousand by now. Compared with the previous system, the new winding machine has a better performance, takes up less space, produces less silk waste, and consumes less energy with even lower labor cost. He said: "It is because Oerlikon continuously adjusts its strategies according to situations of China's textile industry with active innovation spirit. This is why Oerlikon can realize sustainable development on China's mar-

ket, the largest market in the world." What's more, Kroß also mentioned that as Oerlikon Group is making material adjustment to strip the Natural Fiber and Components Division. Within the three interactive dialogues the experts talked about the following three topics:

Topic One : The Situations on the Domestic and International Markets and the Countermeasures.

Topic Two : Cotton Market and Policy.

Topic Three : Environment and Ecologic Construction.

In each topic discussion, the authorities and experts discussed with each other on the hot topics of changes of situations on the domestic and international markets and the countermeasures, the domestic sales situation, situation of the raw materials, the need to transform the textile industry, new turning points appearing in the textile industry, strategies for textile enterprises to cope with the changes, environment and ecologic construction, etc. opening the thinking space full of challenges for the development of textile industry in the new year.

It was an open discussion and for the first time the experts were asking the government and the authorities to focus on energy topics in the textile industry.

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Indian Textile Accessories & Machinery Manufacturers' Association

ITAMMA registered more than 20% of member-exhibitors during 'India-ITME 2012' exhibition held from 2-7 December, 2012 at Bombay Convention & Exhibition Centre, Goregoan, Mumbai.

The visitors at ITAMMA stall were about 498, out of which 444 were from User Industry and 54 were from Supply Industry, where 7 new members were also registered.

B 2 B meeting on 2nd December, 2012 at 3.00p.m.



Turquoise B2B room

ITAMMA held a business to business meeting where MOU was signed between ITAMMA and ITMF for the transfer of Technologies/ Collaborations/ Tie - ups. Dr. Schindler, Director General of ITMF, Zurich signed on behalf of ITMF and Mr. Naresh A. Mistry, President of ITAMMA signed on behalf of ITAMMA.

Mr. Naresh A. Mistry, further informed that ITAMMA, being an oldest and largest Association in India representing Textile Engineering Industry with its membership nearing 500, has always taken initiatives for the benefit of its members and Textile Engineering Industry as a whole, in the field of knowledge enriching and business growth. To help our members in the adaptation of innovations & new tech-

nologies, ITAMMA had signed MOU's with 15 Textile Research Associations, Institutes & Colleges at National level. And we had further implemented various technological activities viz. Lean Manufacturing Programmes, Design Clinics, Common Facility Centre, etc under under the umbrella of Cluster Development Initiatives at Ahmedabad. ITAMMA had also signed MOU with TEMSAD at International level & expected to sign few more MOU's with Taiwan, UK Textile & BTM Associations very shortly, after signing this MOU with ITMF, Zurich.

Dr. Schindler, Director General of ITMF, Zurich also assured that ITMF will take positive & sincere efforts to execute the various contents of this MOU for the benefit of the Textile Industries of both the countries.



Dr. Schindler, Director General of ITMF, Zurich signed on behalf of ITMF



Mr. Naresh A. Mistry, President of ITAMMA signed on behalf of ITAMMA

Mr. Kaizar Mahuwala, Chairman,

International Networking, Seminars & Public Relations Sub - Committee introduced International delegates of M/s. Smooth Heald & Drope Wire, M/s. Chongqing Jinmao Inpec Co. Ltd. and M/s. Chan Chao International Co. Ltd & Yorkers Trade & Marketing Service Co. Ltd to the members of ITAMMA participated in the meeting.



Mr. Kaizar Mahuwala, Chairman, International Networking, Seminars & Public Relations Sub - Committee introduced International delegates

ITAMMA is expected to sign few more MOU's with Taiwan, UK Textile & BTM Associations very shortly.

ITAMMA also launched a User Friendly Textile Stores & Directory 2012, along with CD during India ITME 2012.



Shri Naresh Mistry - President, ITAMMA, inaugurated The Buyers Guide " Textile Stores & Directory" to his RHS is Mr. Kaizar Mahuwala, Chairman, International Networking, Seminars & Public Relations Sub - Committee, & Mr Jignesh Shroff, Alternate Chairman-Exhibition Sub-Committee; & to his LHS is Mr. Jugal Kishore, Convenor-Export Cell Committee, & Mr. N.D. Mhatre, Dy Director General (Tech)-ITAMMA

During the last 68 years the Association has brought several editions of the Buyers Guide "Textile Stores & Directory" containing information of the Products manufactured & marketed not only by the members but also others engaged in Textile Engineering Industry.

The first edition of the Textile Stores & Directory was published

in 1953 and the present edition is 11th in the series, accompanied by a CD format will be published during India ITME 2012 Exhibition.

As the present scenario of textile industry is encouraging investments and involvement of Engineered Textiles and Green Textiles, special emphasize is given to the Indigenous Manufacturers of Ma-

chines & Accessories of these products, in the content of this publication.

The contents of the Directory are so structured that they are User Friendly to access. It contains the names & addresses, along with the products of the Manufacturers, Dealers, Traders & Merchants of Machines, Accessories & Allied

INDIAN TEXTILE ACCESSORIES & MACHINERY MANUFACTURERS' ASSOCIATION

"ITAMMA" gives an opportunity to its members for participation in 'Poster Display Scheme of ITAMMA at Vibrant Gujarat under ITAMMA Pavilion from 8th - 13th January, 2013 at Ahmedabad'

Vibrant Gujarat had evolved into global event attracting delegates & business visitors from over 100 countries across the globe. This event attracted industrialist & foreign countries, looking at doing business with India providing the best opportunity for networking & accessing new opportunities for Indian companies.

Exports, Investments & collaboration to conquer world market were the focus & target of the participants in Vibrant Textile Pavilion.



Mr. Prashant R. Gandhi-Chairman of Technology Upgradation and Cluster Development Sub - Committee and Mr. Pravin Patel, Liaison Officer, Ahmedabad branch at ITAMMA Pavilion.

"Poster Display Scheme of ITAMMA" specially designed for the ITAMMA members who showcased their strengths, products & services to the world in Vibrant Textile Pavilion, received a good response through 9 ITAMMA members whose details are as below: (Photo attached)

- 1) M/s. Rabatex Industries, Ahmedabad
Manufacturers of Sectional Warping Machines, all types of Creels, Sample Warping / Sizing Machines and Material Handling & Storage Equipments (Beam Trolleys).
- 2) M/s. Laxmi Shuttleless Looms Pvt. Ltd., Ahmedabad
Manufacturers of Shuttleless Flexible Rapier Looms, Terry Rapier Looms, Jute, Canvas & Technical Textiles Rapier Looms, dealers in Flexible Rapier Looms and Weaving Advisory Services.



Mr. Naresh Mistry, President and Mr. Jignesh Shroff, Managing Committee member of ITAMMA in ITAMMA stall.

- 3) M/s. Continental Engineering Industries Pvt. Ltd., Ahmedabad
Manufacturers of Heald Frames & its Accessories, Drop Pins, Electrical Contact Bars, Reeds, Temples, Temple Rings, Riderless Healds, Leno Doup Healds, Selvedge Leno Attachments, Precision Sulzer Spares and Indentor of Second-hand Weaving Machines.
- 4) M/s. Perfect Equipments Pvt. Ltd., Ahmedabad
Manufacturers of Flat End Milling Machines, Flat Clipping Machines pneumatically operated with PLC Control, Flat Tear-off Machines, Automatic Flat Grinding Machines, On Card Flat Grinding Rollers, Traversing Head On Card Flat Grinders pneumatic operated, Roller Mounting Machines,

Bare Cylinder Grinders, Motorised Traverse Wheel Grinders, Motorised Stripping / Burnishing Rollers, Metallic Wire Mounting Machines, Traversing Stone Grinders, Card Bend Grinding Machines, Fully Automatic High Production Perfect Grinding Systems, Auto Cot Grinders without U.V. Treatment Module, Cot Grinding Machines with Auto Feeding Attachments, Cot Grinding Machines, Cot Checking Instruments, Cot Mounting Machines, Hydraulic Cot Mounting Machines, Cot Calendering Machines, Automatic Top Roll Greasing Machines, Arbour Flushing / Cleaning Machines, Ultra Violet Top Roller Treatment Machines, Spindle Lubricating Machines, Bobbin Stripping Machines, Clearer Roller Cleaning Machines, Fluted Roller Truing Machines and Flyer Cleaning Machines.

- 5) M/s. Siddhi Engineers, Ahmedabad
Manufacturers of Aluminium Precision Drawn Tubes, Ropes,

Profiles for Textiles Bobbins Cots and other applications.



Mr. B.A. Shah, Permanent Member of ITAMMA, in ITAMMA stall.

- 6) M/s. Mayur Reeds And Healds Pvt. Ltd., Ahmedabad
Dealers in All Metal Reeds, Droppers, Healds, Heald Frames and other Weaving Accessories.



Mr. N.D. Mhatre, Dy. Director General (Tech) and Mr. Pravin Patel, Liaison Officer, Ahmedabad branch in ITAMMA stall.

- 7) M/s. Gurjar Gravures Pvt. Ltd., Ahmedabad
Manufacturers of Nickel Perforated Rotary Screens & Gravure Cylinders, Galvano Screens, Rotary & Flat Bed Engraving Chemicals & Printing Auxiliaries, Anilox Rollers, Dew Drop Screens, Roll Stamping Cylinders, Special Screens for Pearl, Flock, Embossing & Coating applications and dealers in Direct Ablation Rotary Laser Engraving Machines, Inkjet Rotary Engraving Machines, Spares, Dyes & Pigments.
- 8) M/s. Rintex Industries, District Surendranagar
Manufacturers of Spinning Cans & Accessories with Castors, Aluminium Trolleys and Baskets.
- 9) M/s. Krsna Engineering Works, Ahmedabad
Manufacturers of Textile Processing Machinery, Soft Flow Dyeing Machines, Washing Ranges, Knit Tubular Driers / Mercerisers, etc.

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FX 3000 Hydrostatic Head Tester HYDROTESTER IV

TEXTTEST AG, a Switzerland based manufacturer of testing instruments for technical textiles, is proud to introduce the fourth generation Hydrostatic Head Tester, the FX 3000 HYDROTESTER IV. With close to one thousand delivered units of the previous generations, the FX 3000 series has become the standard instrument for water resistance testing worldwide. The new FX 3000-IV is available in three models with different maximum test pressures, ranging from 500 mbar up to 5 bar (50 m water column).



*FX 3000 Hydrostatic Head Tester
HYDROTESTER IV*

All models can be operated with the optional Automatic Drop Detector, which eliminates the need for an operator to watch the sample during the test. This device automatically terminates the test when the first or the third drop has penetrated the sample.

An Automatic Level Control is available to fill the water reservoir before the first test, and to refill the tank in between tests. Both options greatly increase the testing efficiency.

The manual clamping mechanism, depending on the model supported

by a pneumatic cylinder, provides a constant and very high clamping force, which prevents lateral leakage of water through the sample.

Another interesting new feature is the completely new user interface (touch-screen) with the different possibilities to evaluate and document the results: The FX 3000 HYDROTESTER IV can be integrated into a network, if desired

via Wi-Fi, and the internal memory of the instrument can be accessed, and a comprehensive test report can be generated, from any PC within the network, using the internal local web server of the instrument and any web browser in the PC. Furthermore, all style information, test parameters, and results can be centrally managed from the network.

The FX 3000 HYDROTESTER IV complies to many national and international Standard Test Methods.

RIETER RIETER PARTS Innovative Retrofits for Draw Frames

Many progressive enhancements of the draw frame can be integrated in older machine models with little effort. The non-contact pulse generator B92 EVO facilitates improved measuring accuracy - even with heavy soiling. Thanks to the innovative XR nanocoating the life cycles of the calander disc in the sliver canal are extended. The accuracy of the sliver thickness measurement is thereby improved.

The pulse generator B92 EVO is available for the draw frame types RSB-D 30, RSB-D 30c, RSB-D 35, RSB-D 35c, RSB-D 40 and RSB-D 40c.

Non-Contact Pulse Generator B92 EVO

The magnetic measuring principle of the pulse generator B92 EVO is based on a magnet ring and sensor head. With older draw frame models, an additional shaft is delivered to facilitate this non-contact measuring principle.



*The new pulse generator B92 EVO
consisting of sensor and magnet ring.*

The high shock/vibration resistance and dustproof properties (Protection Class IP67) of the pulse generator B92 EVO allow a faultless application even under extremely dusty environmental conditions with fiber fly. The vibration resistance also ensures a high level of measuring accuracy and functional safety.

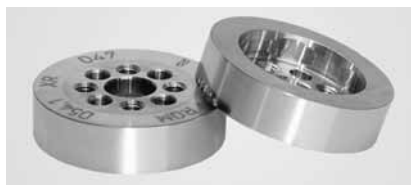
A longer life cycle compared to its predecessor is achieved by the new pulse generator B92 EVO through contact-free measuring. Bearings that could wear out no longer exist.

During the development, great value was placed on simple installation and high ease of maintenance. The main drive shaft only needs to be installed and dismantled when assembling the magnet ring; in contrast to the exchange of the old pulse generator B92, where the shaft had to be completely dismantled every time.

The sensor B92 EVO is attached to a separate holder which allows it to be changed without removal of the main drive shaft. With its lower installation height and the integrated plug, it is very easy to install the new pulse generator B92 EVO and to connect it to the existing socket. This results in a quick re-commissioning of the draw frame following a successful retrofit.

Long-lasting Calander Disc XR with Nanocoating

The calander disc XR can be supplied for all Rieter autoleveler draw frames - from the RSB 951 machine generation.



LoLong lasting calander discs with XR coating

The calander discs are necessary for transporting the sliver in the sliver canal of the draw frame and are thus subjected to persistent stress resp. a higher level of wear. The calander discs are responsible for part of the quality monitoring of

the sliver and for this reason, their surface quality is extremely important.

The XR coating was developed precisely for this application. It exhibits an extraordinary wear resistance which stems from its very high degree of hardness and the nano-structured layer construction.

Due to the special XR process, the roughness of the surface is exactly the same as with an uncoated calander disc. This very smooth, fiber-gentle surface characteristic is retained by the homogeneous layer structure over the entire life cycle. This assures consistent measurement and quality of the sliver over a significantly longer period of time.

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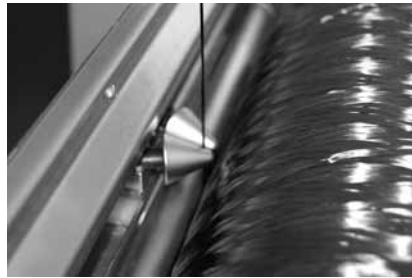
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Oerlikon presents a wide technology spectrum at the JEC in Paris, France Innovations for the materials of the future

If the Eiffel tower had been built 124 years later, Oerlikon would have assuredly played a significant part in its construction. Because what was riveted, screwed or welded together using iron and steel components back then would today be primarily made of composites - and the Oerlikon Textile, Vacuum and Coating segments today supply a wide range of technology and components for their production. These are the focus of the Oerlikon show appearance at the JEC between 12 and 14 March 2013 in Paris (booth number S 75).

Carbon fibres are used in applications where low weight and extreme stability are prerequisites. Carbon fibre-reinforced plastics are used, to name a few areas, in the aeronautics and aerospace industry, wind power plants, automotive industry, safety technology and in high-quality sports equipment such as racing bicycles, tennis racquets, skis and boats.

Oerlikon Barmag has developed a winder specially for the production of carbon fibres called Win-Trax. The two-yarn winding head combines the economic production of top quality carbon fibres with simultaneously perfect package building and identical running lengths. In addition, the new WinTrax-A 2cop produces packages with a diameter of up to 310 mm. The resulting higher package weights reduce tooling times and therefore significantly reduce outlay during composite production. Due to the identical running lengths of all packages, waste is reduced to nearly zero percent.



TEC Win-Trax

The production of composites frequently requires filaments or tapes with particular properties, such as high tensile strength, low elongation or a high modulus of elasticity. The extrusion systems for producing these high-quality tapes, monofilaments and multi-filaments are another information highlight of Oerlikon Barmag at the JEC.

The exhibits also include the independent metering unit GM Control, newly developed by Oerlikon Barmag. Oerlikon Barmag is responding here to the demands of numerous users for an easy to use plug-and-play version of its proven GM metering pump series. The unit can be controlled directly and can also be retrofitted to existing process control systems.

Whether for casting PUR parts, lamination of composite parts, metering additives in an ongoing extrusion process, application of cold adhesives or for flexible use in production systems with changing requirements - the compact and mobile GM Control unit can support all these tasks with the usual high metering accuracy and with even more ease of use.

The core of the GM Control metering unit - the GM pump - is

available for numerous conveying capacities. This means that an appropriate metering unit can be provided for various throughput volumes.

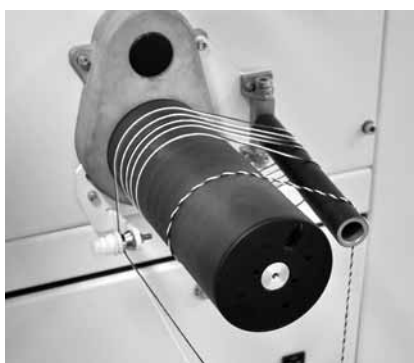


GM Control

Delicate handling of glass filaments thanks to modern technology

Two further brands in the Oerlikon Textile segment are also presenting their latest products in the glass sector: Oerlikon Saurer and Oerlikon Textile Components. At the Oerlikon joint booth, visitors can learn all about the Volkmann GT (GlassTwister), the trend-setting ring twister used for the production of glass filament yarns. Oerlikon Sauer offers its customers the complete spectrum of innovative solutions and services in the glass sector with its product line Volkmann. The GlassTwister is modular in design and the main components are the creel baskets and ring twisting spindles. Both components are equipped with single motor drives and pneumatic brakes. They are supplemented by the central ring rail drive with servo motor. The complete synchronization of all components and the programmable

ring rail guide enables an optimal package build and thereby a perfect processing of the twist packages in the subsequent processing steps. The ergonomic design enables the operating personnel to carefully feed the machine at a comfortable working height, which ensures a careful handling of the spinning cakes and thereby the quality of the feed material.



Volkmann GlassTwister

The Volkmann GlassTwister is able to twist plied yarn structures, e.g. 3-ply yarns and hybrid yarns, when being equipped with a package creel and godet supply units in place of the creel baskets. Production of single or multi-ply yarns from raw materials in the count range between 10 and 5000 tex. Flexible application areas: e.g. PA, PES, CV, Aramid, PVA, Dyneema, PE/PP as multiple or monofilaments.

Oerlikon Textile Components can look back at over 40 years of experience in the production of components specially developed for the glass fibre industry. At the JEC, this business unit will be presenting innovative aprons from the Accotex® series which are used in glass fibre processing. The glass fibre apron Accotex® 964 FG3 was specially developed for super-fine filaments such as BC (4 µm), C (4.5 µm) or D (5 µm).



Fibre Apron

Vacuum pumps are essential in the production of composites

In addition to the innovative Oerlikon Textile exhibits, the Oerlikon Group is also presenting new coating solutions from Oerlikon Balzers at their exhibition booth, as well as aspects of the vacuum technology supplied by Oerlikon Leybold.



Leybold JEC

Oerlikon Leybold Vacuum provides pumps & systems for various applications. The Sogevac, Trivac & SP pump series have proven themselves over the years in degassing, lamination and resin transfer moulding applications. Based on their experience in these difficult processes, Oerlikon Leybold Vacuum can offer optimised vacuum pumps, ranging from 10 to 300 m³/h, and complete systems. The wide motor range enables worldwide deployment of these pumps. Oil-lubricated pumps (Sogevac or Trivac) or dry-running pumps (SP) can be used according to customer requirements. Thanks to specially selected oils, the Trivac & Sogevac series enable long working intervals without maintenance and with adapted optimal performance features.

Major manufacturers of wind generator rotor blades, shipyards, aircraft builders and component manufacturers in America, Europe and Asia trust in technology made by Oerlikon Leybold Vacuum.

More than 90 Oerlikon Balzers Coating Center worldwide

Oerlikon Balzers is the world's leading supplier of surface technologies, which significantly improve the performance and durability of precision components as well as tools for the metal and plastics processing industries. These coatings, marketed under the BALINIT® brand name, are extremely thin and exceptionally hard.



Balzers Diamond

They significantly reduce friction and wear. BALINIT® DIAMOND PLUS is the solution for aluminium alloys and composite materials. An especially smooth, nanocrystalline structure facilitates chip flow and prevents the formation of built-up edges. Cutting forces are significantly reduced. Thanks to the excellent surface quality of the workpieces, no reworking is necessary.

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BACK TO GLORY



International Conference on Challenges Facing Indian Cotton

09th - 10th April 2013

Venue : Indian Institute of Management (IIM) Ahmedabad, Gujarat, India

The Textile Association (India) - Ahmedabad Chapter jointly organizing with Textile Machinery Manufacturers' Association (India) - TMMA & Diagonal Consulting (India)

Back to Glory

"An International Conference on Challenges Facing Indian cotton"

"Whoever says Industrial revolution says cotton" - Hobsbawm. In the sixteenth Century cotton turned out to be the most important manufactured goods in the world trade. In the centuries that followed the bulk of cottons that criss-crossed the globe had their origins in the Indian sub continent, the pre-eminent centre for cotton manufacturing in the world until the nineteenth century Industrial Revolution. Economic Historians Observe "In shaping markets and serving fashion, Indian cottons prepared global consumer markets for the modern industrial age".

Britain's supremacy after the development of mechanized textile industry tilted the scenario in favour of west. India, China and others took the back seat and the scenario continued till early 90's. Serious commitment by Indian policy makers, agro scientists, farmers, ginners and the consuming textile industry post MFA brought in radical change in the status of cotton. Brands and organized retail have started adding values for the growing young and fashionable consumers. Keeping aside China, India leads the globe today in terms of highest land availability for cotton cultivation, span of cotton qualities suitable for coarse to the superfine yarn counts and thereby becoming the second largest cotton producer / exporter.

With over 3100 spinning mills, close to 200 composite mills and 175 large weaving operations, the industry is currently operating with 48.5 mn spindles, 782000 Open End Rotors and 66000



shuttle-less weaving machines. Interestingly, a massive decentralized sector covers 2.3 mn power operated shuttle looms on the top of 2.4 mn hand looms. Knitting sector including Hosiery has turned out to be a major growth sector.

Revolution in seeds, farm practices, advanced ginning and never ending developments by the Indian & global spinning machinery sector have been making the entire cotton value chain believe that India can take the global lead in cottons by 2020.

"Back to Glory – An International Cotton Summit", a premier stage for discussion on challenges & emerging opportunities invites all Indian and International leaders in the field of Cottons.

PROPOSED PROGRAMME

9th April 2013, Tuesday

08:45am – 09:15 am: Registration & Tea/Coffee

09:15 am – 10:30 am: Inaugural Session

- **Shri. Narendra Modi, Hon'ble Chief Minister, Gujarat**
- Shri Saurabhbhai Patel, Minister, Environment & Petrochemicals, Govt of Gujarat
- Shri Maheswar Sahu IAS, Principal Secretary (Industries & Mines)
- Shri. Sanjay Lalbhai, Chairman – Arvind Ltd., Ahmedabad
- S Hari Shankar, Chairman - TMMA, Mumbai
- Mike Mc Cue, Editor, Cotton International, USA

10:30 am – 11:00 am: Networking High-Tea

11:00 am – 01:15 pm

Session I

- * Global Overview of Cotton : Mike Mc Cue, Cotton International, USA
- * Developments in Cotton Seeds & Practices in India: Prabhakar Rao (NSL, Hyderabad), Mahyco -Monsanto
- * China Cotton – Present & Future : Gao Fang, China Cotton Association
- * Round Table Discussion: Cotton Trading in India with special reference to Exports :
Bhadresh Mehta, Suresh Kotak, Dhiren Sheth, Dr. Peter Wakefield, Cargil, Plexus, Olam

01:15 pm – 02:00 pm: LUNCH

02:00 pm – 4:00 pm

Session II

- Indian Spinning Machinery Sector – Rajnikant Bachkaniwala, Past Chairman – TMMA
- Round Table on Ginning Practices in India: Ginners Association of Gujarat, Punjab, Maharashtra, Andhra Pradesh, Bajaj Steel Industries
- Guideline for Emerging Investors in setting up a Cotton Spinning unit : An Expert's View

04:00 pm – 04:15 pm: Tea-Break

04:15 pm – 05:45 pm

Session III

- * Indian Cotton in 2020: Mr. I.J. Dhuria (Vardhman), Bharat Desai (Reliance), Deepok Boral (Bangladesh), Mr. Reiderer (Indonesia)
- * Cotton & its By-products : CIRCOT

10th April 2013, Wednesday

08:30 am – 09:00 am: High-Tea

09:00 am – 11:30 am

Session IV

- Product Developments and Marketing opportunities in cottons as seen by Cotton INC, USA
- India - Africa Cotton Initiative : Matthias Knappe, ITC – Switzerland
- Organic, BCI, Fair Trade in Cotton Branding & Retailing: Arvind Brands, M&S, Madura Garments, Pantaloon, Shopper Stop
- Round Table on “Whither Cotton Spinning”: Rieter, LMW, Truetzschler, Schlafhorst, Toyota, Murata

11:30 Noon – 12:00 Noon : Tea-Break

12:00 Noon – 01:30 pm Valedictory Session

Session V

- * Shri. Babubhai B. Bokhriya, Minister Agriculture, Government of Gujarat.
- * Valedictory Panel on Cotton, Textile Industry & Gujarat Policy - An Interaction with the industry
Arvind, Vardhman, Welspun, Alok, Aarvee, TT and others

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Lunch (9th OR 10th)	INR 5 Lakhs	US\$ 10,000
Networking HighTea (9th OR 10th)	INR 3 Lakhs	US\$ 7,500
High Tea (9th OR 10th)	INR 2 Lakhs	US\$ 5,000

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INDIA

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Date : DELHI : Tuesday, March 19, 2013
 SURAT : Friday, March 22, 2013
Contact : French Trade Commission, Embassy of France in India Mrs. Brinder RAULT, Trade Advisor,
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Tel: 91 11 4319 6324 /6300
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Theme : "Propelling Growth through Innovation"
Date : 12th April, 2013
Venue : PHD House, August Kranti Marg, New Delhi
Contact : Mr. D.K. Singh, Conference Secretary
 The Textile Association (India) - Delhi Chapter
 401, Gagan Deep, 12, Rajendra Place,
 New Delhi - 110 008
Tel. : +91 11-25750224, 25736456,
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ABROAD

AATCC 2013 International Conference

(The annual AATCC International Conference offers presentations, networking, and vendor exhibits covering the entire textile and material supply chain)

Date : April 9-11, 2013
Venue : Hyatt Regency, Greenville, SC.
Contact : AATCC, P.O.Box 12215,
 Research Triangle Park,
 N.C. 27709-2215 USA;
Fax : + 1 919 549 8933
E-mail : nicholk@aatcc.org.

10th Edition of Garfab-TX and the concurrent shows

Venue : SIECC, Surat - India
Date : 12-13-14 April , 2013
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