



# WOOL RESEARCH ASSOCIATION THANE

( Linked to Ministry of Textiles, Govt. of India, New Delhi)



## National Seminar cum Workshop on Recent R & D Initiatives and Development Schemes of Wool & Woollens



Organized By  
Wool Research Association, Thane  
And  
Central Wool Development Board, Jodhpur



# WoolTech

*NEWS LETTER*

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# WoolTech

*NEWS LETTER*

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**Editorial Board**

**A. K. Samanta  
V. S. Goud  
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J. S. Udakhe**



## **EDITORIAL**

We are, indeed, pleased to approach you with our second issue of **WoolTech** newsletter.

Ever since its establishment, Wool Research Association has been rendering useful services and technical support to both organized and decentralized sectors including cottage, small, medium, and large composite units. R&D initiatives in wool growing countries like Australia, New Zealand, South Africa, etc are mainly restricted to improvement of wool quality and productivity. Manufacturers of woollen end items like U.K., Italy, China, etc have been engaged in the technological areas of product and process development of woollens as well as machineries development. Other developed countries like USA, UK, Germany, Italy, etc have reported to be engaged in application of cutting edge technologies like Plasma treatment, Nano-Technology, PCM, Smart Textiles, High-altitude clothing, Protective Textiles, etc, besides product and process development.

India has very divergent and heterogeneous structure of the wool sector. Requirement of each sub-sector is greatly different from the other in many cases. As a result WRA's R&D initiatives have to embrace wide range of activities of offering simple solutions and innovations to Small and medium enterprises (SMEs) and also complicated developments in product and process inventions for the large scale manufacturers.

R&D mechanism through innovation and invention is an effective way of developing dependable technology. R&D as such is the process of translating new ideas into productive reality. While looking for the technique of R&D, first step is to identify the 'new idea' based on feedback from the industry, literature survey, consumer demand, academic assessment of gap in knowledge, availability of new investigational technique, cheaper production technique, introduction of new raw material, etc. Conceptually, research accomplishes the first break through in solution of a problem and innovation leads to commercial transaction involving product, process, system or device.

As WRA is required to respond to the R & D needs of SMEs on one hand and the organized sector on the other, the projects were selected accordingly. Besides, the organization could not ignore the expediency to venture into the emerging and cutting-edge technology areas for capacity build-up in the country, particularly for the woollen sector.



In the present issue we have highlighted on WRA's recently conducted R&D projects on application of technologies like plasma and ultrasonic in the processing of wool, Quality norms for worsted yarn processing industry, Natural blend processing aspect of wool with Eri silk, development of new moth proofing agent and synthesis of wool dyes combined with moth proofing properties, which were disseminated threadbare in the National Seminar, organized by WRA, jointly with Central Wool Board, Jodhpur.

We hope the industry at large, both at organized and decentralized set up, would appreciate the efforts taken by WRA in improving the productivity and quality through R&D initiatives and reap benefits.

**Editorial Board**



## **National Seminar cum Workshop on recent R&D initiatives and Developmental Schemes of wool and woollens**

The event jointly organized and convened by Wool Research Association (WRA) & Central Wool Development Board (CWDB) on 28<sup>th</sup> May 2011 at Hotel Intercontinental, The Lalit, Sahar, Mumbai with a vision theme to promote the growth and development of wool & woollen sector of the country, was inaugurated at the hands of Hon'ble Central Minister of State, Smt. Panabaaka Laxmi, as chief guest, who addressed 200 delegates, representing different sectors of the Woollen Industry, NGO's implementing CWDB's SWIS Programmes & Common Facility Centres and various other R&D Institutes, TXC office personnel, officers from Government Organisation etc.

Shri M. K. Bardhan, Director WRA welcomed the Chief Guest, Guest of honour, delegates and others. He mentioned that WRA has been endeavoring to redefine its R & D role for the woollen industry to cater for all subsectors, in the changed technological and economic environment.

In her inaugural address, the Hon'ble Minister took stock of the Woollen Industry and its progress during 11<sup>th</sup> Five Year Plan period and stressed the importance of R&D initiatives for growth in quality & quantity of wool and woollens. She declared about the Govt's concrete move to double the R&D funding as compared to previous year. Shri. A.B. Joshi, Textile Commissioner, the Guest of Honour stressed the need to improve the pace of R&D efforts by TRAs, so that, the findings of Research are timely absorbed by the Industry on Implementation. Shri. Ravikant Kapur, President, WRA gave brief status report on the achievements and R&D initiatives taken by WRA in the recent years and expressed the view that WRA could take up Nodal Agency's role in the Govt. supported "Integrated Skill Development Programme" for the woollen industry. Thereafter, on behalf of the organizing committee, CWDB & Wool Research Association, Shri K.K. Goyal, Executive Director, CWDB, presented vote of thanks to one and all.

After the Inaugural Session, the Technical Sessions were split in 3 parts, the first one, chaired by Shri. S.K. Singhal, CEO, OCM India Ltd in which 6 of the R&D projects completed recently by WRA were disseminated effectively



In the post Lunch Session, Technical Sessions II & III were chaired by Dr. S.A. Karim, Director, Central Sheep & Wool Research Institution, Avikanagar and Dr.S.K.Chaudhuri of International Inspection Initiatives, Faridabad, respectively, dedicated to CWDB Schemes on Wool Development and Common Facility Centers in processing & carpet sector, with presentation of 5 papers in each session. There were 5 presentations from NGOs, decentralized sector.

Presentations of individual paper along with title in each technical session were arranged as follows:

### **1. Technical Session 1**

- a. *“An Overview of Recent R&D Initiatives by Wool Research Association”*, M.K. Bardhan, Director, Wool Research Association, Thane.
- b. *“Synthesis of Moth Resist Dyes for Wool”*, Dr. C. W. Acharya, Scientist, Wool Research Association, Thane.
- c. *“Development of Itch-Free Woollens to Be Worn Next To the Skin by Improvement of Surface Topography of Wool Fibres with the Help of Mechanical/Chemical Processing and Plasma Technology”*, J.S.Udakhe, Scientist, Wool Research Association, Thane.
- d. *“To assess Quality Norms of Worsted Yarns being made by Indian Industry”*, A.K.Samanta, Scientist, Wool Research Association, Thane.
- e. *“Optimum machinery, process and products for Eeri silk /Wool blends”*, P. R. Kulkarni, Senior Technologist, Wool Research Association, Thane.
- f. *“Ultrasound Assisted Scouring of Raw Wool”*, V. S. Goud, Scientist, Wool Research Association, Thane.

### **2. Technical Session 2**

- a. *“Success Story of Sheep & Wool Improvement Scheme (SWIS) Programs”*, Adil Bhai, Mahila Mandal Barmer Aagor (MMBA) Barmer (Rajasthan).
- b. *“CWDB: 11th Plan Schemes and Achievements”*, K. K. Goyal, Executive Director, Central Wool Development Board, Jodhpur.
- c. *“Present status and future strategies of wool production, processing and product manufacture”*, D. B. Shakyawar, Principal Scientist (Textile Manufacture), Central Sheep and Wool Research Institute, Avikanagar, Rajasthan.



- d. “CWDB & Wool processing in Himachal Pradesh”, Rajeev Sharma, Shikhar Handloom & Handicraft Cooperative Society Ltd. Rampur, Bushair, Himachal Pradesh.

### 3. Technical Session 3

- a. “Importance of Wool for Carpet Industry”, Abdul Hadi, All India Carpet Manufacturers’ Association (AICMA), Bhadohi.
- b. “Prospects in HRD & R&D for the Carpet Sector”, Prof. (Dr.) K.K.Goswami, Professor, Director & Member Secretary, Indian Institute of Carpet Technology, Bhadohi.
- c. “Wool Industry in Bikaner”, Kamal Kathuria, Concept Creations, Panipat, Haryana.
- d. “New Opportunities & Future Prospects for Indian Hand Made Carpet Industry”, Mayur Basuk, Scientist, Wool Research Association, Thane.
- e. “Present scenario of Indian carpet industry vis-a-vis international markets”, Shishir Tyagi, Scientist, Wool Research Association, Thane.

At the end of each session the presentation was analysed by audience Interactive Question / Answer perspective & critical appreciation.

The occasion was also earmarked for launching of WRA’s quarterly Newsletter, A Souvenir & a publication on “**Quality Norms for the worsted Industry**” by the Hon’ble MOS.

A small exhibition depicting the products developed as an outcome of the R&D effort was held at the sideline of the Seminar.

Before conclusion, Shri Anil Puri, an NRE from German, addressed the gathering and suggested ways and means with intervention of Government of India to encourage setting up of facilities to certify organic wool, to give a fillip to the growth of eco-friendly production and processing of natural fibre like wool and other specialty animal fibres for trade and business.

Other few suggestions, emanating from the full day deliberations related to:

1. Industrial application of new technologies like ultrasonic assisted wet processing of wool and plasma technology for finishing of wool oriented textiles.



2. To extend the scope of evolving industrial Quality Norms for wool processing by including other parameters like classimat faults & tertiary blends by WRA.
3. There was demand for working out Quality Norms for woollen & semi worsted systems of processing also.
4. Angora Wool Development be concentrated upon to produce regulated consistent quality with < 1% guard hair content.
5. Development of Trained and skilled work force for industry.

Extract of Inaugural Address of the Hon'ble Minister of State, Ministry of Textiles, for the "National Seminar cum Workshop on recent R&D initiatives and Developmental Schemes of wool and woollens".

The textile industry as such occupies a unique position in the Indian economy. Its predominant presence in the Indian economy is manifested in terms of significant contribution to the industrial production, employment generation, export earning etc. Indian wool sector is particularly related to the rural economy with close linkage to remote areas of the country on account of wool growing on one hand, and the small and cottage industry on the other.

One cannot overlook the fact that Indian textile industry is extremely complex and varied with hand-spun and hand-woven sector on one end of the spectrum and the capital intensive sophisticated mill sector at the other, with decentralized power loom and knitting sub-sectors coming in between. The industry uses a wide range of raw material in the form of natural fibres like cotton, wool, silk, jute and manmade fibres like polyester, nylon, acrylic, polyethylene, etc as well as the multiple blends of such fibres and filament yarns. The complex and varied structure of the Industry coupled with its close linkage with our ancient culture and tradition provides it with the unique capacity to produce, with the help of latest technological inputs and design capability, a wide variety of products suitable to the varying consumer tastes and preferences, both within the country and overseas.

Woollen Sector is relatively small compared to cotton and manmade fibre sectors. Even then, the woollen sector plays an important role in linking the rural economy with the manufacturing industry, represented by small, medium and large scale units. The product portfolio also is



widely divergent from textile intermediates to finished textiles, garments, knitwear, blankets, carpets, shawls, etc. This sector caters to both civil and defence requirements for warm clothing.

India is the seventh largest producer of raw wool accounting for about 2% of the world production. Its sheep population is more than 6 crores accounting for 4.2% of global sheep population. Both organized as well as decentralized units are prevailing side by side having their own strength and weakness. The woollen sector employs over 27 lakhs people in the manufacturing industry and sheep rearing and farming sector together.

The production of fine apparel grade wool is not adequate in the country. 95% of such apparel grade wool is imported mainly from Australia. India's import from Australia in last February has seen an increasing trend over the last five years and currently India is the third largest importer of Australian wool in the world. The projected rise in apparel grade raw wool consumption is 10% per annum and there is an estimate that the consumption of apparel grade raw wool of finer variety like merino would touch 90 million kgs during the year 2013-14.

In order to facilitate availability of finer grade apparel wool, she informed, she did lead a delegation to Australia in the recent past, to discuss the modalities for signing a Memorandum of Understanding on Wool Cooperation with the authorities in that country. The elaborate discussion and proceedings led to an agreement to sign the MOU to cover the following:-

- Collaboration with Australian Wool Testing Authority for establishing a world class wool testing laboratory in Mumbai in collaboration with Wool Research Association.
- Collaboration with the Australian Wool Exchange for establishing a wool exchange on similar lines.
- Collaboration with the Australian Department of Agriculture for adopting strong features of CRC programme into Integrated Wool Development Programme of CWDB and a farmer exchange programme for skill up-gradation in shearing practices and breeding.
- Collaboration with Australian Wool Innovation for promotion of manufactured wool products to boost the efforts being made by Wool Texpro.
- Collaboration for grading of Indian wool.
- Collaboration in skill development, up-gradation of research in wool production and processing technology.



It is expected that formulating the MOU between Australia and India will foster concrete opportunities for wool cooperation between our two countries. The co-operation will result in establishment of a world class state-of-the art laboratory at Wool Research Association.

The Seminar cum Workshop has been designed to deliberate on recent Research and Development activities, indigenous wool development schemes and problems and prospects of the carpet sector.

Research to develop softer, light weight fabrics based on finer yarns and fibres, improve blends with other natural and manmade fibres and new finishing techniques will improve the technical performance range and appeal of wool textiles. Casual and sportswear items and non-woven products have come into being. This has seen applications in blankets, building insulations, agro-textiles, industrial felts and functional sportswear among others. R&D efforts are to be focused on the technical problems of the tiny and cottage industry, SMEs and also the organized mill sector. New innovations for traditional production techniques in the hills in northern regions on indigenous fine wool, pashmina, angora, etc for enhancing quality level and productivity, will require a particular approach of research activity. At the same time, the organized sector will require high end of technical innovation and research in the areas of technical textiles, smart or intelligent textiles, electronic textiles, etc. Our coarse and very coarse wool like deccanni, ramnad, bellary, Nellore, etc requires to be modified for spinnability by softening them chemically and segregating the modulated brittle fibres with due mechanical processing. Appropriate research effort may help our wool growers in the South to ensure better utilization of such coarse fibres and remunerative price for the poor wool growers. Various schemes of CWDB are in vogue to improve the quality and productivity of indigenous wool. SWIS, pashmina and Angora development schemes have proven to help the wool grower. Health and Insurance schemes for the sheep implemented through NGOs and state Government wool Boards also have shown promising results. Cross - breeding of sheep of Indian and foreign origin to achieve sustainable fine wool production has not been a worthwhile success. It may be prudent to increase substantially the production of carpet wool like chokla, Magra, Patanwadi, etc by selective breeding as some such wool varieties are best in the world for manufacture of carpets.

Carpet industry of India represents the great Indian heritage of craft and provides employment to over 3.2 million people in rural and semi-urban India, living in the far flung corners of our



country. A notable feature of Indian carpet industry is high versatility of carpet weavers, quality of workmanship and commercial flexibility which make India the only country in the world producing carpets from low knotted 'Hamdan' to the high knotted Kashmir 'Aubussons', Berber, or 'Causacasion' designs. Not only this, India is also considered to be the only country which can produce carpet of any size, any quality from 50 to over 450 knots per square inch. Carpet sector also faces fierce competition from other major carpet producing countries. She was aware that quality carpet production has become difficult due to factors such as substantial increase of wool price, locking of huge capital for long period, higher labour charges, lack of skilled labour force, etc.

'This seminar cum workshop', she observed, would cover R&D initiatives, wool improvement schemes and the carpet sector. For a viable and substantially self generating indigenous technology, there is no alternative but to establish strong and effective research and development, innovation and invention system, duly structured to cater for all sub-sectors of the woollen industry, - from tiny rural cottage industry to decentratized sector and also sophisticated organized sector. Wool Research Association being fully dedicated for research and development in wool science and technology, she was sure, would fulfill the technological requirements of the industry by its concerted effort in research assignments. She assured in the coming year, the number of R&D projects in WRA should be doubled to help all sub-sectors of the woollen industry, and accordingly allocation of R&D funds might be enhanced for Wool Research Association to carry out research. Central Wool Development Board set up at the initiative of Government of India, has been contributing to the cause of the wool growers significantly. The deliberations on the problems and prospects of the Carpet Sector, she hoped, could focus on the future direction to follow. 12<sup>th</sup> Five Year Plan is knocking the door - the outcome of this seminar should provide feedback for the forthcoming Plan in respect of wool and woollens.

While concluding her observations, she wished the event a great success and declared the seminar cum workshop open.



## **WRA'S RESEARCH AND DEVELOPMENT SPECTRUM**

### **To assess Quality Norms of Worsted Yarns being made by Indian Industry**

V.C.Panse, A.K.Samanta, J.Behera, R.B.Chaudhari

#### **Abstract**

It is imperative now-a-days for the yarn manufacturer to produce consistent quality of yarn each time and every time to sustain in this globalization era. Indian worsted industry has potential to produce world compatible quality product by systematic optimization of raw material selection, motivation for proper machine maintenance, and most importantly, sustenance of standard quality level, in pre-spinning processes. In the present scenario, all Indian worsted industries are having individual settings & standards, so it was difficult to judge quality parameters at national level. This research work was aimed for standardization of quality parameters at worsted industry level, so that quality can be judged and maintained prior to export. This work is expected to give a standard goal to be achieved by participating Indian worsted industry and help to assess their present status with respect to the quality level of final product.

**Keywords:** blend, norms, quality, statistics, worsted yarn

### **Synthesis of Moth Resist Dyes for Wool**

Dr. C. W. Acharya & Girish Kherdekar

#### **Abstract**

The damage to the woolen textiles by moth larvae throughout the world is estimated to cost millions of dollars every year. Without effective moth proofing this damage would increase enormously and place wool at a disadvantage as a high quality textile fibre. Considering these facts, it becomes interesting to combine insecticidal & colouring component to produce new molecules to achieve moth proofing & dyeing in single step. During dyeing, such kind of dye being chemically reacting with the wool fibre is expected to provide cost saving and better fastness properties through single bath application. Substituted benzyl 2-methyl – 2 phenyl propyl ethers, substituted benzyl phenyl ethyl ethers and substituted dibenzyl ethers are reported to have potential insect resist properties. The present paper describes the incorporation of these features in the final dye product which are expected to provide moth resist / repellent properties. We have synthesized substituted benzyl propyl ethers with a nitro substituent on the benzyl



moiety, which has been reduced to an amino compound. This amino compound is diazotized and coupled with the regular coupling intermediates like H-acid to obtain the corresponding mono azo and diazo compounds which are highly coloured red dyes. Total seven dyes have been prepared and studied for wool dyeing. The synthesized dyes show good moth resist properties and fastness towards washing and light when compared with commercial dyes.

**Keywords:** moth, combine, insecticidal & colouring component

### **Development of Itch-Free Woollens to Be Worn Next To the Skin by Improvement of Surface Topography of Wool Fibres with the Help of Mechanical/Chemical Processing and Plasma Technology**

Jayant Udakhe, Shishir Tyagi, Neeraj Shrivastava, P. R. Kulkarni, Dr. C. W. Acharya & M. K. Bardhan

#### **Abstract**

Itching due to woollen garments worn next to skin can be attributed to prickling due to protruding coarse fibres, and friction with skin due to sharp scales on wool fibre. To reduce the prickling effect different trials were taken to reduce yarn hairiness, knitwear were prepared using these different yarns but it was found that mechanical processing have very little scope of suppressing prickling effect. Wool top was plasma treated to blunt wool fibre surface scales. After plasma treatment wool top was treated with proteolytic enzyme. It was found that plasma and enzyme treatment reduces the critical bucking force of the fibre, as well as the scales on wool fibres are smoothed out. Plasma and enzyme treated wool tops were used for making yarns. Later on these yarns were used to make knitwear. To further coat the scales polymer coating was given on knitwear and softener treatment was also given to improve the handle and feel. Propensity of itching was tested by designing user trial experiments and it was found that these inner garments are completely itch-free and can be worn next to skin, without wearing the intermediate cotton garment.

**Keywords:** woollen garments, itch-free, plasma, enzyme, polymer and softener



### **Optimum machinery, process and products for eri silk /wool blends**

P. R. Kulkarni & R. S. Bahuguni

#### **Abstract**

Silk is known as the queen of all textile fibres because of its soothing luster and elegance. India produces all the four varieties of silks namely mulberry, eri, tussar and muga. Eri silk is the second largest variety of silk being produced in India and the production grew from 93 Metric Tons in 1950s to over 1500 Metric Tons at present which is nearly 15 times. Eri silk which was earlier considered as wild silk, unlike other varieties, is non continuous filament silk. Due to its compatible character with fine wool; it has been identified as the best component in blends with fine wool to impart soothing luster and strength to the product in homogenous blends, which is otherwise not possible with any other silk variety. Technically, it is quite advantageous to blend it with wool as this provides extra strength to the yarn and also soothing luster which adds to value addition to the blended products. Aesthetic values are far improved due to smooth luster, liveliness and improved thermal properties. Fine suitings, ladies wear; fine knit wears were developed using eri silk and wool blends.

**Key words:** Eri silk, wool, homogenous blend

### **Ultrasound Assisted Scouring of Raw Wool**

V. S. Goud, S. P. Honade, M. K. Bardhan, & T. R. Rao

#### **Abstract**

In the present research work, the role of ultrasound is studied in the scouring process and the results are evaluated in terms of grease, other fatty matter and suint removal efficiency by Soxhlet extraction method. Three types of raw wool fibres viz., fine, medium and coarser grade wool were scoured with and without ultrasound. The results indicate that if all the parameters of scouring recipe are kept same, the fat and suint removal efficiency gets doubled in presence of ultrasound. It was also found that ultrasonic scouring can be done at lower temperature and chemical concentration. The feasibility of using ultrasonic technique at industrial level was studied using immersible type of ultrasonic tube resonators which can either be fixed inside the scouring bowls or suspended longitudinally.

**Keywords:** ultrasound, raw wool, scouring, tube resonator



## **WRA NEWS**

### **WRA ACHIEVEMENTS**

- ✚ Wool Research Association, Textile lab has been assessed and certified for continual accreditation in accordance with the requirements of standard **ISO/IEC 17025:2005** for the Competence of testing with effect from July 2011 in the field of Mechanical and Chemical testing for a 2 year term until, July 2013.

### **SEMINAR AND CONFERENCES ATTENDED**

- ✚ Mr. R B Chaudhari, Mr. Neeraj Shrivastava & Mr. Jagadananda Behera attended seminar on " **Shimadzu TOC Analyzer - TOC-I**" on 3<sup>rd</sup> June 2011 at Mumbai. Organized by Saksham Analytical instruments Pvt. Ltd.
- ✚ Mr. Jagadananda Behera attended a Workshop on " **Estimation & Evaluation of Total Uncertainty in Measurement as per NABL- 141**" at Micro, Small & Medium Enterprises MSME- Technology of Development Centre, Mumbai from 23<sup>rd</sup> June 2011 to 24<sup>th</sup> June 2011.

### **NEW INSTRUMENT INSTALLED AT WRA**

- X-rite Colour i7 spectrophotometer for colour matching.
- X-rite i1 pro portable spectrophotometer.

## **PAPERS PUBLISHED FROM WRA PERSONNEL (DURING MAY-AUG 2011)**

### **✚ Wool in Sports Textiles**

Achintya Kr. Samanta and Aniket Bhute, Colourage, Vol. LVIII No.5, May 2011

#### **Abstract**

The technical developments in the sports clothing industry have resulted in the use of engineered textiles for highly specialize performances in different sports. Peoples are increasingly looking for 'value added' textiles and functional design in sportswear. For achieving high level of performance, sportsmen are looking for such type of clothing which will provide both functional property as well as comfort property. The slow-to-dry and cold-when-wet characteristics of cotton make this material unsuitable in conditions in which there are high levels of moisture either perspiration or precipitation and where the ambient temperature is low. Due to some of its unique properties, application of wool in sports textile brings a new era in new age sportswear.

### **✚ Effect of Low Temperature Plasma Treatment on Tailorability and Thermal Properties of Wool Fabrics**

Varun S. Goud and Jayant S. Udakhe, Pramana-Journal of Physics, Vol. 76, No.6, June 2011

#### **Abstract**

Dielectric barrier discharge type of plasma reactor was used for the low-temperature plasma (LTP) treatment of the wool fabric. Air was used as the non-polymerizing gas for the plasma treatment at different time intervals. Low-stress mechanical properties of the treated and untreated wool fabrics were evaluated using Siro-fast technique which revealed that the tensile, bending, compression, shear, dimensional stability and surface properties were altered after the LTP treatment. Other properties such as thermal conductivity, thermal resistance and pilling propensity were also evaluated. The surface topographical changes of the wool fibres after LTP treatment were analyzed by scanning

electron microscopy. The changes in these properties are supposed to be related closely to the inter-fibre and inter-yarn frictional force and increased surface area of the fibres induced by the etching effect of plasma.

#### **Keratin Based Bio-composites-A Review**

Varun S. Goud, Asian Textile Journal, p.77, June 2011.

##### **Abstract**

This paper deals with brief introduction of regenerated keratin bio-fibres and their composites, methods of spinning such as electrospinning, wet spinning etc, reinforcement with carbon nano tubes, clays and their applications. Like many naturally-derived bio-molecules, keratins have intrinsic biological activity and biocompatibility. They are annually renewable, commercially abundant, of consistent quality, and have guaranteed supply. Wastes from feather keratin, wool, and silk may be suitable for producing keratin based eco-friendly materials such as highly functional composite textile fibres reinforced with multi-walled carbon nano tubes, nano clays and cellulose nano fibres. Potential applications include; films, biomaterials for wound dressing, drug delivery, tissue engineering, bio-plastics, heavy metal adsorbents, keratin scaffolds, hygienic fabrics and bio-composites in construction and building materials such as hurricane resistant roof and agro-textiles for weed control.

#### **Acoustic Textiles**

Girish Kherdekar, Mayur Basuk & Jagadananda Behera, Colourage, Vol. LVIII No.7, July 2011,

##### **Abstract**

Noise has become serious environment pollution in our daily life and is an increasing public health problem. Noise can have the following adverse health effects: hearing loss, sleep disturbances, feel tiredness, cardiovascular and psycho physiologic problems, performance reduction, annoyance responses, and adverse social behavior. Therefore, it is



very important to control or reduce noise from traffic, and in factories, offices, and houses.

Undesirable and potentially hazardous noises are a side-effect of a wide range of modern engineering and other purposes. The problem of noise generated within the closed space can be particularly acute, but several practical solutions do exist. The use of textiles for noise reduction is based on two major advantages of these materials, namely low production costs and small specific gravity. In this paper, Basic introduction to acoustic textiles, sound absorbing material factors influencing sound absorption, performance measurement of sound absorbing material & finally application areas of acoustic textiles are covered.

### **Sewing Threads & their Technical Applications**

Jayant Udakhe & Mayur Basuk, article contributed in [www.fibre2fashion.com](http://www.fibre2fashion.com)

#### **Abstract**

Sewing threads are especially engineered threads to satisfy the requirements of the end product. The overall performance in terms of strength, durability and usefulness of the substrate depends on the sewing thread. Though the consumption of sewing thread is not more than 1% of the textile to be sewn, they are of considerable importance. These threads find the end use applications in almost every technical textile sector i.e. Indutech, Hometech, Meditech, Sporttech, Protech, Packtech, Clothtech etc. The present paper deals with the introduction to the different types of sewing threads along with their compositions, specifications and properties & also different end user applications.

## PLASMA TREATMENT OF TEXTILES - TYPES OF PLASMA

V. S. Goud, Wool Research Association, Thane

The potential of plasma technology for textiles has been widely described in scientific, technical and industrial literatures. Plasma is an ionized form of gas. It contains electrons, ions and neutral atoms and molecules. There are two types of plasma which can be used for application on textiles, namely low pressure plasma and atmospheric pressure plasma.

### **Low Pressure Plasma**

If a voltage is applied across a nearly evacuated gas chamber, under appropriate conditions, plasma will ignite. Low pressure plasma treatments are generally used to achieve varying outcomes of textile substrate. These plasmas will either etch or form radicals on the surface of the processed material. Low pressure plasma systems have certain limitations adhered with them in terms of commercial application. The vacuum creating equipment adds to the cost of treatment and is expensive to run. Also, the operating pressure range allows only for batch processing of material to be possible.

There are certain advantages in terms of application such as etching and coating which can be performed better under low pressure plasmas.

### **Atmospheric pressure plasmas**

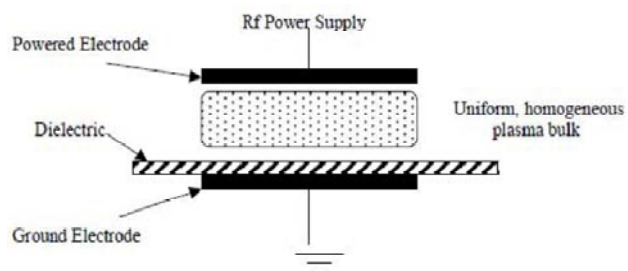
As the name suggests, these systems process materials at atmospheric pressures there by increasing the processing capabilities of the machine while reducing processing costs and loading times.

There are many different ways of the ionization of gases such as Glow discharge, Corona discharge and Dielectric Barrier Discharge. A brief description of these techniques is presented here.

### **Glow Discharge**

It is the oldest type of plasma technique. It is produced at reduced pressure (low-pressure plasma technique) and provides the highest possible uniformity and flexibility of any plasma treatment.

The plasma is formed by applying a DC, low frequency (50 Hz)



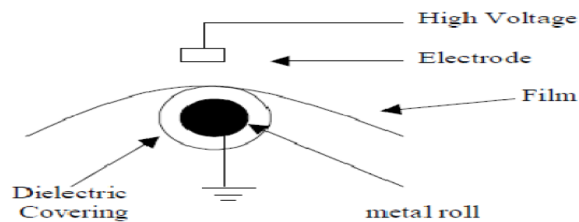
**Fig.1 Glow Discharge**

or radio frequency (40 kHz, 13.56 MHz) voltage over a pair or a series of electrodes.

Alternatively, a vacuum glow discharge can be made by using microwave (GHz) power supply.

### 1. Corona Discharge

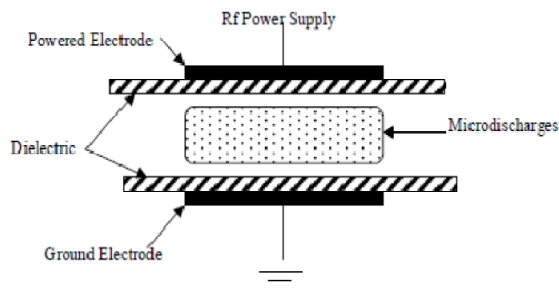
Corona Discharge is generated at atmospheric pressure by applying a low frequency or pulsed high voltage over an electrode pair. Typically, both electrodes have a large difference in size. This kind of discharge consists of a number of small lightning-type discharges. The in-homogeneity associated with these discharges and the high local energy levels make the classical corona treatment of textiles problematic in many cases.



**Fig.2 Corona Discharge**

### 2. Dielectric-Barrier Discharge

Dielectric Barrier Discharge is an atmospheric pressure plasma source. It is formed by applying a pulsed voltage over a pair of electrodes of which at least one is covered by a dielectric material. Such a discharge is characterized by millions of micro discharges. The purpose of the dielectric layer is to rapidly terminate the arcs that form in the region between electrodes.



**Fig.3 Dielectric-Barrier Discharge**

For DBD, a symmetrical electrode arrangement is set up comprising two parallel conducting plates placed opposite to each other, separated by a gap of 1-10 mm, and a high voltage, 1–20 kV, is applied. The gas between the plates is electrically broken down and a plasma discharge is generated. Dielectric-Barrier Discharge is more homogeneous as compared to the corona discharge.



## **NEWS WINDOW**

### **National news**

- In the latest cabinet reshuffle effected by Shri. Manmohan Singh (Hon'ble PM), Shri Anand Sharma, current minister for Commerce and Industry has been given additional charge as the minister of textiles. ( Source- Ministry Of Textiles, Government Of India)
- Presently India produces about 456 lakh kg wool, 1lakh kg speciality hair fibres per year (0.5 lakh kg Angora rabbit hair, 0.1 lakh kg yak fibre and 0.4 lakh kg pashmina wool). The value of these speciality hair fibres is approximately Rs 10 crores which fetch a value of 200 crores after processing and value addition. ( Source-CSWRI ,avikanagar)
- Out of total wool produced in country about 10 m kg is utilised by khadi sector and other village based industries. About 8 m kg of raw wool is used by organised sector for the manufacture of shawl and knit wears in Ludhiana and Amritsar. The remaining quantity of 28m kg is utilised by carpet sector. Due to shortage of carpet grade wool about 50m kg is imported. ( Source-CSWRI ,Avikanagar)
- CWDB is providing Rs 13.50 crores for different schemes like integrated wool improvement & development programme (IWIDP) , quality processing of wool and woollen and social security schemes for the 11<sup>th</sup> 5 year plan concluding year (year 2011 to 2012) . ( Source- CWDB)
- Government proposes to set up new 55 parks throughout India under the Scheme for Integrated Textile Parks (SITP). ( Source- Ministry Of Textiles, Government Of India)
- The Foreign Trade Policy-2009-14 incorporates several measures of incentives for the export sector including the textiles and clothing viz. Inclusion of 26 new international markets.( Source- Ministry Of Textiles, Government Of India)



- The Excise Duty on branded readymade garments was converted from optional levy into a mandatory levy at unified rate of 10 per cent.( Source- Ministry Of Textiles, Government Of India)

### **International news**

- ITMA seals partnership with IWTO to enhance fibre and yarn showcase. The agreement signifies the start of a new partnership that is in line with the introduction of the new fibre and yarn chapter at ITMA 2011. Covered in this new chapter are natural, man-made and technical fibres and natural, synthetic and technical yarns. (Source- IWTO)
- The European REACH (Registration Evaluation Authorisation and Restrictions of Chemicals) legislation puts increasingly serious pressure on wool dyers who still use chrome dyes as it is not eco-friendly dye. ( Source- IWTO)
- The Wool mark Company launches 'The Wool Lab', a seasonal guide to the most innovative, quality woollen fabrics and yarns, presented through the most inspiring fashion trends. The guide will be showcased to professionals from the international fashion and apparel industry: brands, fashion designers, retailers, haberdashers, weavers, spinners, media and buyers. (Source- Textile World.com)

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## **ABSTRACTS FROM PUBLISHED LITERATURE**

### **1. Wool powders used as sorbents to remove Co<sup>2+</sup> ions from aqueous solution**

G. Wen, R. Naik, P.G. Cookso, S.V. Smith, X. Liu and X.G. Wang; Powder Technology Volume 197, Issue 3, 25 January 2010, Pages 235-240.

#### **Abstract**

The Co<sup>2+</sup> sorption of two wool powders was investigated using its radioisotope <sup>57</sup>Co ( $T_{1/2} = 271.8$  days and  $\gamma = 122.1$  and  $136.5$  keV) as a tracer. The effects of the type of buffer, the pH value, the contact time and the initial concentration of Co<sup>2+</sup> on the sorption behaviour of wool powders were studied. The Co<sup>2+</sup> releasing ability of wool powders and the re-use of wool powders to sorb Co<sup>2+</sup> were also examined. The optimum sorption of Co<sup>2+</sup> by the powders occurred at pH 8 in phosphate buffer and pH 10 in ammonium sulphate buffer. Fourier-transform infrared spectroscopy (FTIR) was used to study the changes in chemical structure of the wool after exposure to both buffer solutions. Compared to the untreated wool fibre, the fine wool powders showed rapid sorption rates and high sorption capacities for Co<sup>2+</sup>. Co<sup>2+</sup> ions were recovered after exposing the Co<sup>2+</sup> loaded wool to HCl (0.1 M) and buffer at pH 3 (glycine/sodium chloride). After releasing Co<sup>2+</sup> ions from wool powders, the efficiency of wool powders re-used to sorb Co<sup>2+</sup> was 80% of that of the fresh wool powders. It is concluded from this study that wool powder can be used as an efficient sorbent to remove and release Co<sup>2+</sup> from solution.

### **2. Multifunctional modification of wool using an enzymatic process in aqueous-organic media**

Kh.M. Gaffar Hossain, María Díaz González, Guillem Rocasalbas Lozano and Tzanko Tzanov; Journal of Biotechnology, Volume 141, Issues 1-2, 20 April 2009, Pages 58-63

#### **Abstract**

An enzymatic method using laccases for grafting the water insoluble phenolic compound lauryl gallate on wool fabric was developed. To find the compromise conditions at which the substrate is soluble while the enzyme remains active, the reaction was carried out in an 80/20 (v/v, %) aqueous-ethanol mixture, where the enzyme retains 75-80% of its activity. The enzymatic coating of wool with lauryl gallate provided in a one-step process a multifunctional textile material with antioxidant, antibacterial and water repellent properties.

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## **BRAIN WAVE**

1. The power required for picking in a shuttle loom depends on  
A) Weave of the fabric                      B) Number of heald shafts  
C) Reed width                                  D) Number of picking cams
  
2. If the 50 % span length of a cotton fibre is 13.5 mm and the uniformity ratio is 45 %, then 2.5 % span length of this fibre in mm would be  
A) 10    B) 15    C) 30    D) 35
  
3. Velocity of the sley at its front centre of a loom running at 300rpm will be  
A) 30m/min    B) 15m/min    C) 50m/min    D) 0m/min
  
4. Amongst the following, the only naturally extruded fibre is  
A) Cotton    B) Wool    C) Hemp    D) Silk
  
5. A 4cm long filament is drawn to 20 cm. The draw ratio is  
A) 2    B) 3                      C) 4                      D) 5
  
6. Which of the following yarn is the finest?  
A) 10s Ne    B) 10 Tex    C) 100s Ne    D) 100 Tex
  
7. The following has the highest Index of irregularity  
A) Carded sliver    B) Roving    C) Yarn    D) Drawn sliver
  
8. Length of 2 kg filament of 180 denier polyester will be  
A) 2km    B) 100 km    C) 360 km    D) 180 km
  
9. Fabrics with the same sett but different weaves are woven on a loom. The tear strength will be minimum in a fabric having  
A) Plain weave    B) 3/1 twill weave    C) 5-end satin weave    D) 2/2 matt weave
  
10. Ziegler Natta catalyst is used in the polymerization of  
A) PET    B) Nylon    C) Acetate    D) Polypropylene

### **Answers**

1. c 2.c 3.d 4.d 5.d 6.c 7.a 8.b 9.a 10.d

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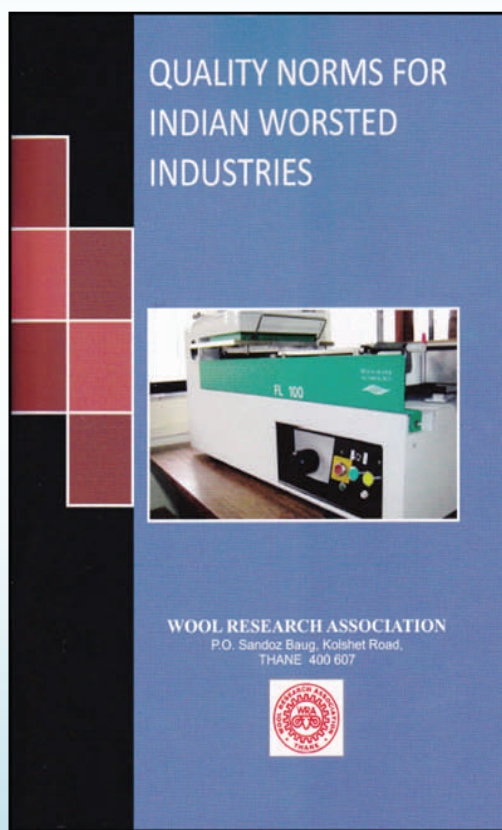
# MAJOR ACTIVITIES OF WOOL RESEARCH ASSOCIATION

- Basic & Applied Research / Projects in Wool Related Technology
- Textile Testing (Physical & Chemical)
- Ecological Testing
- Need Based Courses & Training at site & Consultancy
- Formal Education & Vocational courses
- Miniature dyeing & finishing of yarn & fabric
- CAD-CAM Woven & Knitting
- Woollen & Shoddy Spinning
- Unconventional Spinning (DREF, Repco, etc.)

# WRA'S NEW PUBLICATION

There has been a long awaited requirement from worsted industries, for “quality norms” in the worsted yarn manufacturing process. The present publication enumerates in detail about the “Norms” to be achieved in various stages of spinning. This booklet is divided into three sections named as “Norms”, “Super norms” and lastly as “Benchmark”. This publication has already been well received and accepted by various reputed worsted industries in the country ( such as M/S Raymond Ltd, M/S Oswal Woollen Mills Ltd. etc.)

Individual copy of the booklet is made available to one and all at a reasonable price of Rs. 300/-



***To obtain your copy write to:-***

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