



ICAR-CIRCOT e-Newsletter

Director's Desk



Dear Readers,

At the outset, I along with my staff members thank all the readers for your valuable support and feedback on our first issue of the e-news letter of CIRCOT, Mumbai.

India's cotton production and area for cotton cultivation during year 2013-14 has been estimated to be around 39 million bales and 11.7 million hectares respectively.

This year also bumper cotton crop is expected and India will oust China as top cotton producer in the world.

*During the last two months many events were organized by the institute for the benefit of stakeholders. CIRCOT organized various training programmes including ICAR short course on '**Application of electrospun nanofibres in crop health and post harvest technology**'. Exhibition cum visitors' room was inaugurated, where institutes R&D processes and products are displayed. **Establishment of a pilot plant for the production of nanocellulose, first of its kind in India** is under final stage of commissioning. This will be yet another milestone in the CIRCOT R&D achievements. I take this opportunity to congratulate the scientists for their excellent achievement by winning the best oral presentation in the international conference.*

CIRCOT is in the process of preparing its vision 2050 document. Demography in India in 2050 will be opening up not only greater opportunities but also pose innumerable challenges. India's population is expected to reach 1.6 billion by 2050 and thereby creating more pressure on the land availability. There would be competition for the usage of land for food and fibre crops. Moreover, the climate changes would induce a lot of uncertainty and may impact agricultural production as well. The technologies of the future would demand social relevancy with greater concerns towards the environment, human hygiene and safe disposal. CIRCOT has envisioned the path ahead and devised long-term strategy with a perspective to attain the vision of "Global Excellence in Cotton Technology".

*On behalf of CIRCOT staff I wish all the readers **Very Happy and Prosperous Deepavali.***

*With best wishes
Dr. P. G. Patil, Director*

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Testing

1. Technology Highlights

○ Cotton/Nylon Core Spun Yarn for Rubber Composites

Textile material requires pretreatment with resorcinol formaldehyde latex to coat with rubber to get better adhesion. This pretreatment is considered to be non eco-friendly due to the use of formaldehyde based products. It was attempted to avoid this pretreatment process. Using the ring spinning process, cotton roving has been wrapped over the nylon as a core with optimised process parameters and a yarn was produced. The yarn was converted to cotton/nylon core spun fabric with 36 (Ends per inch) and 24 (picks per inches) and were coated with natural rubber without using any RFL (Resorcinol Formaldehyde Latex) pre-treatment process for the adhesion. The developed core spun fabric showed good peel strength between the fabric and the rubber as per the IS 7016 Part V standards. The developed technology is totally chemical free and eco-friendly process and interested parties can contact institute for more details.

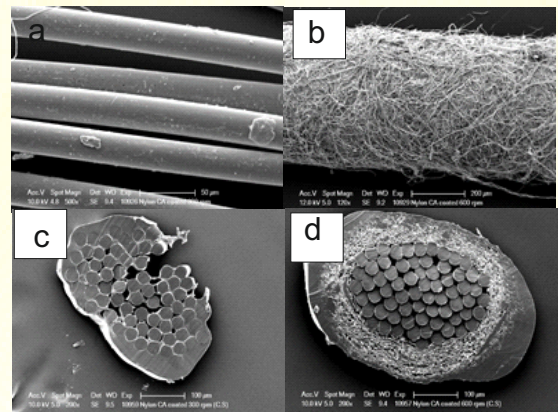
○ Durable Functional Finishing of Cotton Textiles- using nano ZnO

Cotton materials are susceptible to attack by micro organisms. Finishing with nano metal oxide is found to impart good antimicrobial property to cotton textiles. However use of nano-particles poses the practical problem of less durability. It was attempted for in situ production of nano ZnO on cotton material. Zinc nitrate and sodium hydroxide were used as precursors for the in situ synthesis of zinc oxide on cotton fabric. SEM analysis revealed that fine zinc oxide nano particles of 80-130 nm were formed and AAS analysis of fabric showed that the zinc content was 3.2%. It was found that UPF rating (AATCC 183) of treated textile increased from poor (5) to excellent (50+) and it showed 100% antibacterial activity (AATCC 100) against *Staphylococcus aureus* and *Klebsiella pneumoniae*. After four accelerated washing cycles (AATCC 61) which is equal to 20 hand washes, the fabric retained excellent UV protective property (50+) and 100% inhibition against *Staphylococcus aureus* even though the zinc content reduced to 2.4%.

○ Production Technology for Core-Sheath Nanofibre Yarn

Core-sheath nanofibres yarn has very good potential in technical textiles demanding both strength and novel functionalities. A friction spinning collector (negative electrode) is designed and fabricated as an attachment for the electrospinning setup. The attachment comprises of two copper rollers (arranged in parallel) rotating in same direction and kept very close to each other with adjustable gap in between. This gap accommodates a nylon filament on which the nanofibers formed on the copper rollers are transferred due to frictional force. The core filament feeder is kept at the top and yarn collection system is kept below. The controller consists of speed controls for both copper rollers and yarn collection mechanism. Nylon filament is used as core to impart strength while cellulose acetate nanofibres are used as sheath having potential for functional modifications. The gap between copper rollers is maintained at 10 thou and the speed is varied

Figure shows the scanning electron micrographs of friction spun core-sheath yarn produced using the fabricated collector setup. Figures a and c shows the longitudinal and cross section views of neat nylon filament and figures b and d shows the longitudinal and cross section views of friction spun core-sheath yarn (nylon as core and cellulose acetate as sheath).



Scanning electron micrographs of nylon yarn (a), cellulose acetate friction spun on nylon core (b) and the same in cross sectional views (c & d respectively).

2. Training

○ ICAR Short Course on "Application of Electrospun Nanofibres in Crop Health & Post-Harvest Technology"

ICAR -short course on "Application of Electrospun Nanofibres in Crop Health and Post-Harvest Technology" sponsored by the Indian Council of Agricultural Research was organized during September 15-24, 2014 by ICAR-CIRCOT, Mumbai. This course was inaugurated by Dr. P.G. Patil, Director in the presence of Dr. A.J. Shaikh, Emeritus Scientist & Former Director, CIRCOT and Heads of Divisions. Sixteen Scientists & Assistant Professors from ICAR and State Agricultural Universities participated in this 10 day short course that was organized with a view to impart skill on "Electrospinning" process of nanofibre synthesis and their potential application in crop health and post-harvest technology. Dr. S. Sreenivasan Former Director, CIRCOT, Mumbai, distributed the certificates to the participants in the valedictory function. In his speech, he highlighted the importance of nanotechnology in the field of agriculture. This short course was conducted by Dr. N. Vigneshwaran, Senior Scientist as Course Director and Er. A.K. Bharimalla and Er. G.T.V. Prabu as Course Coordinators.



Distribution of certificates to the Participants by Dr. S. Sreenivasan

○ Training programme on “Quality Evaluation of Cotton” at CIRCOT

CIRCOT organized a training programme on “Quality Evaluation of Cotton” during September 8 - 12, 2014. Twenty one trainees from Gujarat, Maharashtra and Madhya Pradesh states attended the training. The topics covered in the training programme included advances in Ginning Technologies, grading of cotton, cotton fibre testing using HVI & AFIS, mechanical processing of cotton, yarn quality and yarn testing. Dr. P. G. Patil, Director CIRCOT, made presentation and highlighted the importance of machine setting, factory layout and best management practices during ginning to produce quality lint.



Trainees with CIRCOT Staff

○ Training programme on “Instrumental and Manual Cotton Classing” at GTC, Nagpur

A week training programme was organised on '*Instrumental and Manual Cotton Classing*' for personnel of *M/s. White Gold Cotton Testing Laboratory, Ahmedabad* at Ginning Training Centre (GTC) of CIRCOT, Nagpur during 18-23, Aug 2014. A series of in-house and guest lectures were arranged on cotton grading, measurement of cotton moisture content, assessment of cotton fibre parameters, interpretation of test results, manual grading of cotton, effect of conditioning on fibre results, etc. In addition, hands on training were also imparted on determination of moisture content using driers, operation of HVI, stapling of cotton etc. Dr. S. K. Shukla, Senior Scientist and Incharge GTC Nagpur was the course co-ordinator for this training.

○ Training programme on “Cotton Processing, Classing and Marketing” at GTC, Nagpur

A week training programme on '*Cotton Processing, Classing and Marketing*' was arranged for ginners, classers and traders during Sept 1-6, 2014 at GTC of CIRCOT, Nagpur. Trainees from different parts of Maharashtra and Madhya Pradesh participated in this training programme. A series of in-house and guest lectures were arranged on different aspects of quality assessment, cotton grading and marketing and by-product utilization of cotton. In addition, hands on training were also imparted on gin settings, automation, stapling of cotton, etc.



Trainees with GTC Nagpur Staff

○ Training programme on “Double Roller (DR) gins” at GTC, Nagpur

A week training programme was organised on Operation and Trouble Shooting of Double Roller (DR) gins for 12 fitters of M/s. Manjeet Cotton Pvt. Ltd., Aurangabad at Ginning Training Centre (GTC) of CIRCOT, Nagpur during Sept 15-20, 2014. Trainees have undergone rigorous practical training for settings of DR gins for different cotton staples and moisture content. A series of lectures were also delivered on preservation of the inherent cotton parameters during ginning operation, increasing the productivity of DR gins, proper grooving of leather rollers, etc. A special lecture on impact of processing of extremely wet cotton on quality of lint and maintenance of DR gin was also arranged. Fitters had also opportunity to discuss their field problems with the experts of M/s. Bajaj Steel industries, Ltd. Nagpur. Shri. S. N. Soni, Managing Director, M. K. Enterprises, Nagpur graced the valedictory function and distributed the certificates to the participants.



Trainees with GTC staff

3. Exhibition/ Field Demonstration/ Awareness meet

Visits of around 150 farmers from different districts of Gujarat and Madhya Pradesh were arranged at Ginning Training Centre (GTC) of CIRCOT, Nagpur under ATMA programme during the month of Aug-Sept 2014. Farmers were explained about maintaining the quality of cotton while picking, storage and transportation, quality based marketing of cotton and preparation of value added products from cotton and its by-produce. In addition, farmers were also demonstrated the pilot plants for preparation of particle boards from cotton stalks. Farmer friendly CIRCOT technologies like small lab model gins, acid delinting machine, farm level axial pre-cleaner, etc. were also demonstrated to the visitors. Several students from different local Engineering Colleges and Polytechnics also visited GTC.



Visitors to GTC, Nagpur

4. Events

○ Hindi Week Celebration

ICAR-CIRCOT celebrated Hindi Week during Sept. 15- 24 2014. Dr. P. G. Patil, Director CIRCOT presided over the inaugural function. Shri Radheshyamji Morya, well known social worker and Shri Vidhyabhushan Tiwari, Assistant Manager (official language) were the guests of honour. Seven competitions were held during the week i.e. kavita pathan, shudh lekhan, varga paheli, samanya ghyan, takniki vakyansh, nibhandh pratiyogita, antakshari and in all 70 employees participated in the various competitions.

On concluding day, a Kavi Sammelan was organised in which renowned poets namely Shri Vanmali Chaturvedi, Shri Pavan Tiwari, Shri Rasbhihari Pandey, Dr. Rajnikant Mishra and Shri Anil Jeenger participated. Further GTC of CIRCOT, Nagpur also celebrated 'Hindi Week' during Sept. 15-20, 2014. The programme was inaugurated at the hands of Dr. A. K. Joshi, General Manager, Regional Remote Sensing Centre of ISRO, Nagpur.



Best Hindi work Award to CBPD Division

○ Exhibition cum Visitors' Room of ICAR-CIRCOT inaugurated

The Exhibition cum visitors' room facility was created in the CIRCOT, Mumbai premises to exhibit the research achievements of the institute for the benefit of visiting dignitaries and serve the educational purpose for the students. The room is well equipped with audio visual facility and a reception room. The exhibition cum visitors room was inaugurated by Dr. K. K. Singh, ADG (PE), ICAR, New Delhi on 25th August, 2014 in the presence of Dr. P. G. Patil, Director(Acting), CIRCOT, Mumbai and the members of the Institute Management Committee (IMC).



Inauguration of Exhibition cum Visitors' room



Inside view of Exhibition cum Visitors' room

○ Institute Management Committee (IMC) meeting organized

The Seventy fifth IMC meeting of institute was held on 25th August, 2014 at the Dr. V. Sundaram Committee Room. The meeting was presided over by Dr. P. G. Patil, Director CIRCOT. Various matters pertaining to institute management activities including research progress were discussed in the meeting. Status report on “cotton blended yarn” was also released during the meeting. Committee also visited various labs & facilities developed by CIRCOT.



Releasing of publication by Dr. K. K. Singh

○ Nanocellulose Expert Committee meeting organized

The fourth Nanocellulose Expert Committee meeting was held on 1st September, 2014 at the Dr. V. Sundaram Committee Room, ICAR-CIRCOT, under the Chairmanship of Dr. P.G. Patil, Director, ICAR- CIRCOT. Dr. R.P. Kachru, Governing Body Member & Former ADG (PE), Dr. S. Sreenivasan, Former Director, ICAR-CIRCOT, Dr. A. J. Shaikh, Emeritus Scientist & Former Director, ICAR-CIRCOT, Dr. M.S. Banerji, Former Director, IRMRA, Mumbai, Dr. S. P. Deshmukh, Associate Professor, ICT, Mumbai and other CIRCOT Staff were present. The meeting was organized to review the progress of work and to seek guidance from the expert members, in the erection and commissioning of Nanocellulose Pilot Plant being established at ICAR-CIRCOT. Er. A. K. Bharimalla presented the action taken report on the recommendations of the 3rd Nanocellulose Pilot Plant Expert Committee. Dr. N. Vigneswaran presented the progress of work in respect of the establishment of Nano Cellulose Pilot Plant.



Experts during discussions about Pilot Plant

○ Cleanliness drive at ICAR-CIRCOT, Mumbai

Cleanliness is next to the godliness. To follow the guidelines from the Council, on September 30, 2014 all CIRCOT staff members voluntarily participated in the cleaning of institute premises by forming human chain.



CIRCOT staff during cleaning activity

○ Meeting of CIRCOT scientists with officials of Rashtriya Chemicals & Fertilizers

A meeting was organized on 23rd August, 2014, at ICAR-CIRCOT, to discuss the proposal received from Rashtriya Chemicals & Fertilizers, Trombay, regarding avenues of collaboration in the field of application of nanotechnology for the production of fertilizers. The meeting was chaired by Dr. P. G. Patil, Director, ICAR-CIRCOT and Dr. Sujata Saxena, Head, CBPD, Dr. N. Vigneshwaran, Sr. Scientist, CBPD, Er. A. K. Bharimalla, Sr. Scientist & I/c TTD, Shri. Abir Banerjee, Executive Director, Trombay Operations, RCF, Shri. V. S. Nandekar, Deputy General Manager (R & D) RCF, were present in the meeting. Various issues like the scope of research collaboration, Financial and contractual terms and conditions, tentative period of collaborative work, future course of action etc. were discussed.



Director is discussing with RCF delegates

○ African initiative: Cotton TAP – Sustainability and scaling-up initiative meeting

A meeting on " Cotton TAP : Sustainability & Scaling-up of Initiatives" was organised on 28th August, 2014. The delegates of the meeting included Dr. S. Sreenivasan, Former Director, ICAR-CIRCOT, Dr. G. R. Anap, International Ginning Consultant, Dr. A. J. Shaikh, Emeritus Scientist & Former Director, ICAR-CIRCOT, Shri. M. B. Lal, Former CMD, CCI, officials from IL&FS Cluster Development Initiative Limited, Noida, Dr AK Krishnakumar, Executive Director, IL&FS and Dr. Milan Sharma, Assistant Vice-President IL&FS Cluster Development Initiative Ltd. The meeting focused on extending the Cotton TAP programme with post-installation and technology backstopping component to ensure the sustainability of the proposed Regional Knowledge Cluster in Benin. Deliberations were also made on scaling up of regional ginning training centre with add-on support infrastructure such as HVI facility and specific capacity building initiatives to be initiated during near future.



Cotton-TAP meeting

○ Visit of Delegates to GTC Nagpur

Dr. A. K. Krishnakumar, Executive Director, IL&FS, New Delhi accompanied by Dr. Milan Sharma, Assistant Vice-President IL&FS Cluster Development Initiative Ltd. IL&FS, New Delhi visited GTC of CIRCOT, Nagpur on Aug 28, 2014. CIRCOT technologies and demonstration facilities were shown and explained to the visitors. Viable CIRCOT cotton processing and by-product utilization technologies for African countries were discussed at a greater length.

5. Seminar/ Conferences/Training attended

○ Director ICAR-CIRCOT attended AICOSCA meeting

The annual general meeting and award function of All India Cottonseed Crushers' Association (AICOSCA) was held on 25th Sept. 2014 at Mumbai. The meeting was presided over by Shri J. S. Saharia, Chief Election Commissioner of Maharashtra and Former Chief Secretary, Govt. of Maharashtra as Chief Guest and Dr. P. G. Patil, Director, CIRCOT and Shri S. K. Roongta, Retd. Chairman and Managing Director, National Seeds Corporation Ltd., were guests of honour. During his speech, Dr. P. G. Patil, Director, CIRCOT insisted upon the importance of scientific processing of cottonseed and need for the mission mode approach on transformation of conventional processing to scientific processing of cottonseed. In this meeting, a technical presentation on "A novel method for gossypol reduction and nutritive quality improvement of cottonseed for its use in non-ruminants feed" was delivered by Dr. V. Mageshwaran, Scientist, CIRCOT.

○ Visit of CIRCOT Scientists to Rashtriya Chemicals and Fertilizers Ltd, Mumbai

On 11th September 2014, an exploratory visit was arranged to Rashtriya Chemicals and Fertilizers Ltd, Chembur, Mumbai under the leadership of Dr. P. G. Patil, Director ICAR-CIRCOT accompanied by Dr. A. J. Shaikh, Emeritus Scientist & Former Director, ICAR-CIRCOT, Dr. Sujata Saxena, Head, CBPD, and Dr. N. Vigneshwaran, Senior Scientist CBPD to explore the possibility of introducing nanotechnological intervention in fertilizers / bio-fertilizers production and its application. Since the objective of RCF, "To make availability of wide range of quality Chemicals and Fertilizers Products including micronutrients, bio- fertilizers etc both from indigenous



CIRCOT scientists at RCF, Mumbai

and imported sources to the farmer" is of matching with interest to ICAR-CIRCOT, this visit was arranged on a mutual interest basis for further collaboration in R&D activities. Dr. Archana Kale and Dr. Satyavikas Gawade from RCF coordinated the activity and the visits to sections viz., NPK fertilizers, biofertilizers, packaging and the R&D unit were made. The stages in production of NPK and biofertilizers were explained by RCF team and possibility of CIRCOT interventions were discussed in detail. Finally it was decided that CIRCOT should suggest the possibilities of nanotechnological intervention in fertilizer production for improved efficacy / better field performance etc.

○ Seminar attended

Dr. Virendra Prasad and Shri A. Arputharaj attended a seminar on " Emerging Technology Trends in Research & Development held at IIT, Mumbai on August 6, 2014.

6. Awards & Recognition

Dr. Kartick Kumar Samanta, Scientist, CBPD presented research paper on “Hydrophobic Finishing of Cotton Textile using Atmospheric Pressure Plasma” authored by Kartick K. Samanta, Gayatri T. N., S. Saxena, S. Basak, S. K. Chattopadhyay, A. Arputharaj and G. B. Hadge, in the International Conference on Natural Fibres held at Kolkata, during August 1-3, 2014. This conference was inaugurated by Honorable President of India, Shri Pranab Mukherjee. This paper was awarded 1st prize in ‘Best oral Presentation’ category.



Dr. K. K. Samanta

7. Human Resource Development

○ MIS/FMS training for ICAR-CIRCOT personnel

To implement management information system (MIS) and financial management system (FMS) in ICAR-CIRCOT, training sessions were arranged for all ICAR-CIRCOT personnel in the month of September, 2014. Shri Pawan Kumar from IBM, India imparted the training to the staff members.

○ Hindi Workshop for Scientists

ICAR-CIRCOT organized one day Hindi workshop on “official language implementation” for ICAR-CIRCOT Scientists on 2nd September, 2014. Shri Suresh Jain, Assistant Director (O. L.) NITI, Mumbai and Dr. (Mrs.) Rita Kumar, Former CGM of CCI, Mumbai have delivered lectures and gave the training.

8. Personnel

Superannuation

Shri C. L. Mundale, T 1-3, GTC of CIRCOT, Nagpur has superannuated from the service w.e.f 30th September, 2014.

Obituary

1. Shri A. B. Sawant (Jestetner Operator) left for his heavenly abode on 29th August, 2014. All CIRCOTians offer heart felt condolences on his sad demise.
2. Shri N. J. Kharat (Skilled supporting staff) left for his heavenly abode on 10th September, 2014. All CIRCOTians offer heart felt condolences on his sad demise.

9.Upcoming events

ICAR-CIRCOT is a pioneering R&D Institute on post harvest technology of cotton and serving the stakeholders since 1924. The following specialized training programmes are scheduled during the financial year 2014-15.

S. No.	Name of the training	Duration
1	Cottonseed: Scientific Processing & Value Addition	Nov.10-14, 2014
2	Advances in Textile Characterization	Nov.24-28, 2014
3	Basics of Nanotechnology & its Application	Dec.08-12, 2014
4	Training on Cotton Spinning	Jan.05-09, 2015
5	Advances in Microscopy (SEM, AFM, Fluorescent & Polarised)	Jan.19-21, 2015
6	Chemical Characterization of Textile Material & Auxiliaries	Feb. 02-06, 2015

10.Facilities available in CBPD of CIRCOT for R & D and Commercial Testing



Fast protein liquid chromatograph



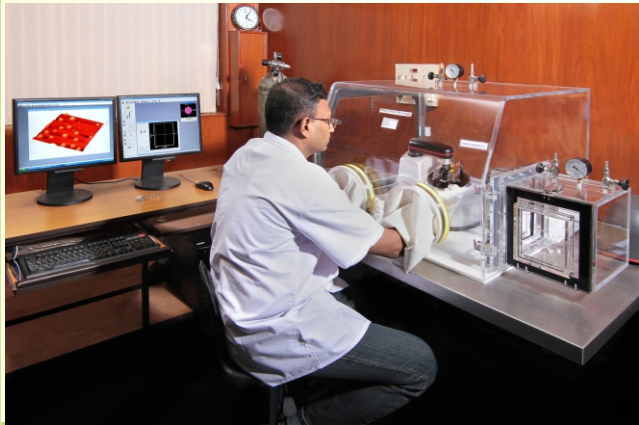
Ultra centrifuge



Fluorescence spectrophotometer



DLS particle size analyzer



Atomic force microscope



Plasma reactor for textiles



Fourier Transformation Infra red Spectrophotometer



Electrophoresis



Gas chromatograph mass spectrophotometer



Atomic absorption spectrophotometer

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