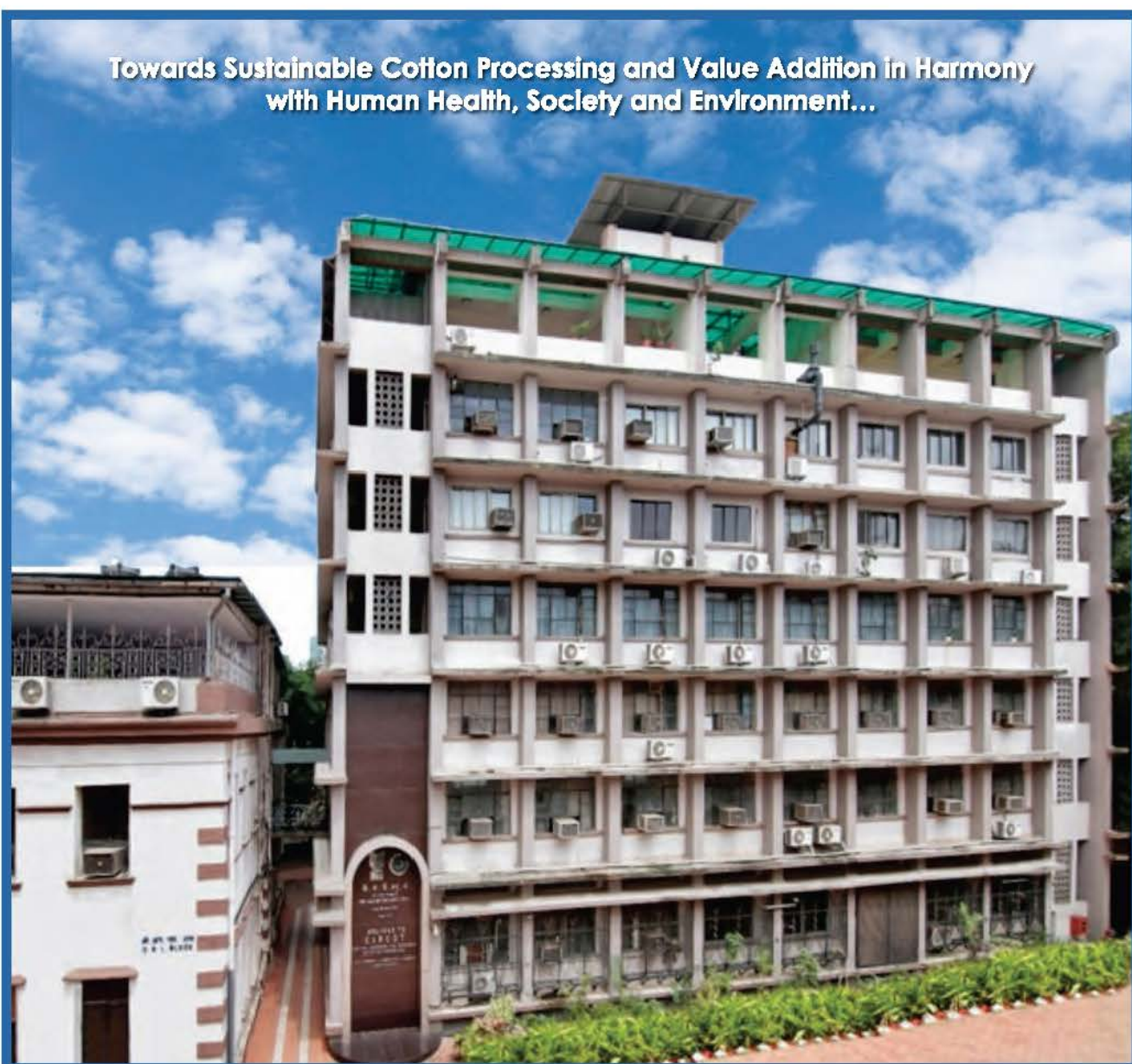


ICAR-CIRCOT

ANNUAL REPORT 2014-15

Towards Sustainable Cotton Processing and Value Addition in Harmony
with Human Health, Society and Environment...



ICAR - CENTRAL INSTITUTE FOR RESEARCH ON COTTON TECHNOLOGY
Adenwala Road, Matunga, Mumbai - 400 019



ICAR-CIRCOT

ANNUAL REPORT 2014-15



ICAR-CENTRAL INSTITUTE FOR RESEARCH ON COTTON TECHNOLOGY

Adenwala Road, Matunga, Mumbai - 400019

(An ISO 9001:2008 certified Institute, and NABL accredited Lab)



ICAR-CIRCOT Annual Report 2014-15

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PREFACE



The ICAR-Central Institute for Research on Cotton Technology (ICAR-CIRCOT) is engaged in actively carrying out research in the field of cotton processing and its utilization for more than nine decades with emphasis on cotton quality evaluation, ginning, spinning and chemical and bio-chemical processing of cotton textiles & value addition to biomass. Though there is a consistent increase in the area and production of cotton in India, the quality worthiness and cost competitiveness are dictating agricultural and industrial operations. So the role of ICAR - CIRCOT has widened many fold and the Institute is gearing up well to fulfill the R&D, skill development and commercial testing needs of the industry. ICAR-CIRCOT has been accredited with the quality management system certification (ISO 9001:2008) by the Bureau of Indian Standards (BIS).

On research front, doffing system has been developed for the ginning machine to minimize dust pollution in the industry. A multiphase electrospinning set up has been fabricated for producing nano fibre mat. A funnel shaped collector has been designed and fabricated to produce electrospun yarn, and this technology has been adopted by the industrial partner. Under the flagship programme a cotton rich bamboo viscose functional fabric has been developed and tertiary blend of cotton, PLA and bamboo viscose is being attempted. Institute is making consistent research efforts in using nano and plasma technology by developing novel synthesis protocols and imparting functional finishing for textiles, using plant extracts for providing durable UV protective finishing.

It is my pleasure to inform that the Pilot Plant facility for production of nanocellulose has been established in the Institute under the NAIP. This facility is an outcome of research achievements made by the Institute in the development of the novel process protocol for synthesis of the nanocellulose. This is a milestone in the R&D achievements of the Institute. ICAR-CIRCOT is acting as the nodal centre for the implementation of the Consortia Research Project (CRP) on natural fibres coordinating 20 centres under the NARS system.

ICAR-CIRCOT is catering to the needs of the industry by providing consultancies and trained manpower to the industry through its skill development programmes. Besides serving the Indian textile sector, the Institute is also involved in the capacity development in textile sector of the African countries under the Cotton TAP programme implemented by the Ministry of External Affairs. International training programmes on 'Post-Harvest Management and Value Addition to Crop Residues' was organized at Malawi, Uganda and Benin. The training programme implemented by the Institute has been revitalized with specialized training programme in the area of Scientific processing of cottonseed, Basics of nanotechnology, Cotton spinning, Advances in textile and chemical characterization, during the year besides the regular training programme on quality evaluation of cotton and ginning technology and value addition to cotton by-products for the traders, ginning industry and farmers.

ICAR-CIRCOT has performed extremely well on revenue generation front generating about Rs. 80 lakhs as against the targets of Rs.66 lakhs assigned by the Council. Institute has obtained a score of 98% and achieved the rating of "Excellent" in the Results Framework Document (RFD) for 2013-14. The Vision 2050 document of the Institute has been prepared and that will provide the guiding force towards sustainable cotton processing and value addition in harmony with human health, society and environment.

P. G. Patil



Preface

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Research Highlights

An automatic lint doffing system and enclosure suitable for the DR gin has been designed and developed to arrest the dust particles that emanate from the ginning point of the DR gins. Industrial trial was undertaken to evaluate the developed system.

A process protocol for ginning of long staple cotton on Rotary Knife Roller Gin has been developed

A Cotton-rich Bamboo viscose Blended Functional Fabric has been developed to enhance the utilization of the cotton in functional textiles.

A totally chemical free and eco-friendly process has been developed for preparation of Cotton/Nylon Core Spun Yarn for Rubber Composites. The process provides better bonding adhesion between rubber and fabric.

Indigenous prototype atmospheric pressure plasma reactor has been fabricated that produces plasma in the presence of helium gas. Hydrophobicity is imparted to the cotton fabric without using any water medium using the plasma technology.

Friction spinning collector for the electro spinning setup has been fabricated. The machine parameters were optimized for the getting desired output of core-sheath nanofibres from the Friction Spinning Collector in the Electrospinning Setup

A novel, eco-friendly natural flame retardant technology using banana pseudostem sap has been developed.

A simple process for eco-friendly durable UV protective finishing of cotton textiles by using plant extracts of dried fruits of Harda (*Terminalia chebula*), Beheda (*Terminalia bellerica*) and rinds of pomegranate (*Punica granatum*) was developed at CIRCOT.

A process for the preparation of in-situ Synthesis of

Nano ZnO for Durable Functional Finishing of Cotton Textiles has been developed

Solid state fermentation technique for producing Gossypol-free Lysine Rich Cottonseed Cake has been developed. This can serve as a better alternative to soybean in the non-ruminants feed, especially for poultry.

A Low temperature process for the preparation of absorbent cotton has been developed.

A simple and efficient process for regeneration of fried cottonseed oil for reuse using a combination of adsorbents has been developed at CIRCOT. This technology could be used effectively for purification of waste cottonseed oil for reuse or for other applications like biofuel preparation

Consortia Research Projects

Consortia Research Project (CRP) on Natural fibres with an outlay of Rs. 120 crore has been approved and ICAR-CIRCOT is the nodal centre for implementation of the project. It is a collaborative project with 6 lead centres and 14 cooperating centres to strengthen the profile of the natural fibre system and provide remuneration to the farmers.

Technology Management

- * Four patents have been filed during the year
- * Seven MoU's have been signed with various parties / organizations for commercialization of technologies.
- * Ten consultancies have been undertaken during this year
- * ICAR-CIRCOT Calibration Cotton, standard reference material for textile testing equipment developed by the institute is showing improved acceptability among the stakeholders, generating a revenue of Rs. 2,44,875 (443 containers sold) during the year.



Training and Capacity Building

Training is an important mandate of the institute aiming to provide skilled man power to the ginning and textile industry and impart knowledge to farmers on value addition to the cotton biomass so as to improve their remuneration.

- * Twelve training programmes were organized for the ginners, farmers and traders on Quality Evaluation of Cotton, Cotton classing and marketing, DR ginning technology, and by product utilization.
- * Six specialized training programmes were organized for the benefit of the various stakeholders in the areas of Scientific Processing of Cottonseed, Nanotechnology and its application, Cotton Spinning, Advances in Microscopy, Chemical and Physical Characterization of textile materials.
- * An ICAR short course on Application of Electrospun Nano Fibres in Crop Health & Post Harvest Technology was also organized.
- * Under Cotton Technical Assistance Programme (TAP), training for the stakeholders of the Cotton sector in the African countries of Uganda, Malawi and Benin were organized on the topic "Post-harvest Management of Cotton and Value addition to Cottonseed and Crop Residues"

Publications/Publicity

- * Twenty-three research papers have been published during the year, Bilingual monthly e newsletter is being published by the institute. A book on "Cotton Sector of Africa – Volume I" has been brought out, besides having contribution in form of book chapters of major publications in the area of Nanotechnology, natural dyes, eco-friendly Chemical Processing finishing using plant extracts of Springer.
- * Institute has participated in 7 major exhibitions

around the country, organised NAIP Agribusiness Idol Camp, NAIP Krishi Parivartan Yatra, and many field demonstration cum awareness programmes.

Awards and Recognition

- * The Institute obtained the Score of 98% and achieved the rating of "Excellent" in the Results Framework Document (RFD) for 2013-14.
- * CIRCOT has been accorded Quality Management System Certification License as per IS/ISO 9001:2008 by BIS.
- * The institute's stall at the ICAR Pavilion won the Best Design Pavilion Award for its attractive & informative display at Indian Science Congress 2015 in Mumbai.
- * ICAR-CIRCOT was awarded 'Rajbhasha' second award for outstanding implementation of Official Language Hindi in the category of 'small offices' of Government of India from Aashirwad, a Literary, Socio- cultural organization on October 31, 2014.
- * Dr. N. Vigneshwaran, Senior Scientist, received NASI-SCOPUS (ELSEVIER) Young Scientist Award-2014 in Agriculture Section.
- * Sh. Sunil Kumar, Administrative Officer, CIRCOT Mumbai was awarded 'Raj Bhasha Samman' award for his excellent contribution in implementing and propagating Hindi in the institute.

Budget Utilisation and Revenue Generation

- * The Institute utilized 99.99 % of the sanctioned budget of Rs. 290.0 Lakhs allocated by the Council under the Plan for year 2014-15.
- * The Revenue generation during the year was Rs. 79.78 lakhs, as against the target of Rs. 66.0 lakhs set by the Council.



This Ninety-first Annual Report of the ICAR-Central Institute for Research on Cotton Technology (CIRCOT) covers the period from April 1, 2014 to March 31, 2015.

Brief History

CIRCOT was established in 1924 by the then Indian Central Cotton Committee (ICCC) under the name of Technological Laboratory of ICCC. After the abolition of commodity committees including the ICCC, the administrative control was transferred to the Indian Council of Agricultural Research (ICAR) and the name of the Institute was changed to Cotton Technological Research Laboratory (CTRL), which was later renamed as Central Institute for Research on Cotton Technology (CIRCOT) with effect from 1st April 1991.

Over the years, CIRCOT has been instrumental in development of cotton ginning technologies (ginning and material handling systems) that made our country not only self-reliant in manufacture of modern machinery but also an exporter to Afro-Asian countries, besides development of skilled manpower for this sector. The Institute also developed blended textiles of cotton with ramie; rubber composites for flexi check dam; miniature spinning system and village level sliver making machine. CIRCOT functioned as technology partner in country's cotton breeding programme to breed varieties that suit industry needs. Calibration cotton developed by the Institute is an import substitute for USDA reference material for the calibration of testing instruments. Eco-friendly textile processing technologies were developed using material like plasma & natural dyes.

CIRCOT is pioneer in application of nanotechnology for imparting functional finishes like anti-bacterial, UV protection, self-cleaning, hydrophobic, flame retardancy, etc. to textile materials. Many technologies have been developed for conversion of cotton stalk into value added products like preparation of particle board,

briquettes, composting, and degossypolization of cottonseed meal for use as feed for non-ruminants. CIRCOT has demonstrated how income of cotton farmers can be enhanced through cotton value chain. The Institute has implemented projects with International collaboration (Common Fund for Commodities) and is presently implementing the Cotton Technical Assistance Programme (Cotton TAP) to strengthen Cotton Value Chain in African countries namely Cotton-4 Countries (Benin, Burkina Faso, Chad and Mali), Malawi, Nigeria and Uganda.

VISION

Global Excellence in Cotton Technology

MISSION

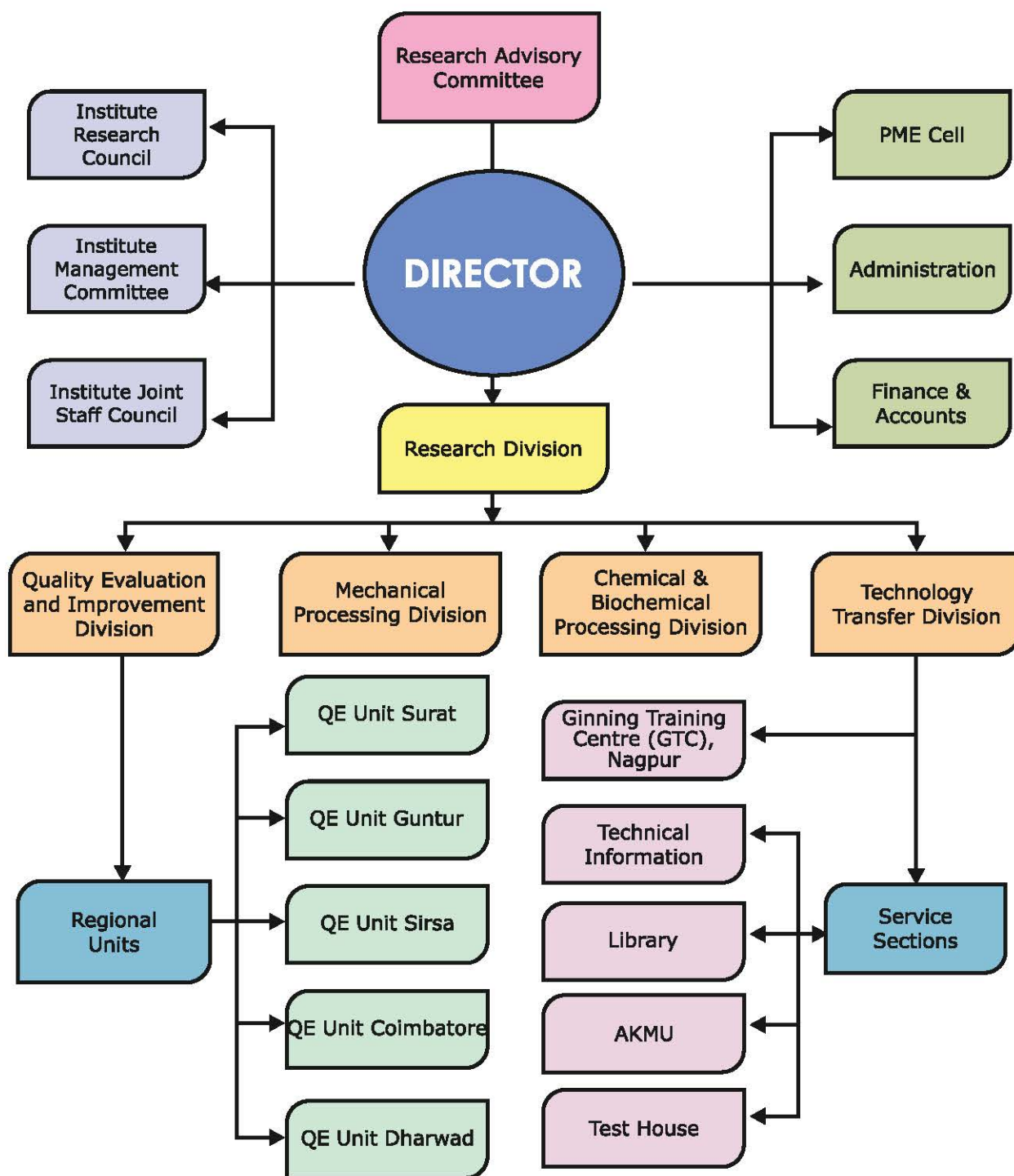
To provide scientific and managerial interventions to post-harvest processing and value addition to cotton and other natural fibres and utilization of their by-products to maximize economic, environmental and societal benefits

Mandate

- To develop new technologies and machinery for better utilization of cotton and other fibres by carrying out basic, applied, strategic and anticipatory research in post-harvest technology
- To extend effective technological support for improvement of quality of Indian cottons and cotton products
- To act as a nodal centre for diversified utilization of cotton plant by-products & processing waste and other crop residues
- To provide services like training, education, consultancy to textile industries, government and private agencies, and
- To function as a referral laboratory for textile testing.



Organisation Structure



Organization

The organization is headed by the Director assisted by the Institute Management Committee (IMC), Research Advisory Committee (RAC) and Institute Research Council (IRC), Institute Joint Staff Council (IJSC) and Grievance Committee.

The service sections viz. Technical Information, Library, Agricultural Knowledge Management Unit (AKMU) and Test House facilitate the information services, maintaining databank of all research, testing and other activities while Administration and Finance & Accounts, deals with the administration of the Human Resource and the finance disbursement and audit of the institute. CIRCOT has six regional units at Nagpur, Coimbatore, Sirsa, Surat, Guntur and Dharwad.

Research, Consultancy, Testing and Transfer of technology including Human Resource and Entrepreneurship Development activities are facilitated and monitored through four research divisions viz. Quality Evaluation and Improvement Division, Mechanical Processing Division, Chemical

& Biochemical Processing Division and Technology Transfer Division.

The research programmes of the Institute are taken up under the following core areas

1. Pre-ginning and Ginning
2. Mechanical Processing, Technical Textiles and Composites
3. Characterization - Cotton and other Natural Fibres, Yarns and Textiles
4. Chemical and Biochemical Processing and Biomass and By-product utilization
5. Entrepreneurship and Human Resource Development

Staff Position at ICAR-CIRCOT (as on 31.03.2015)

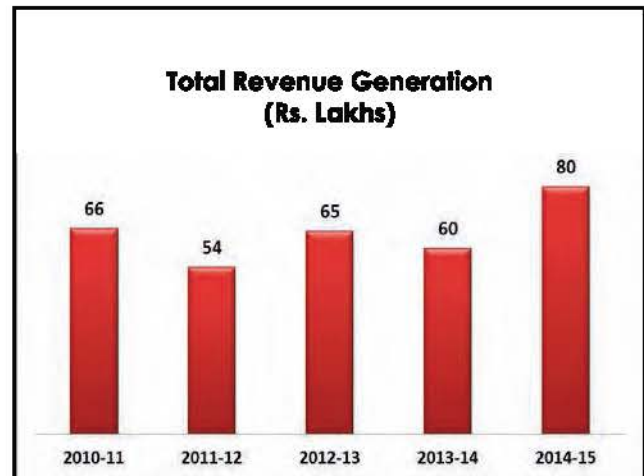
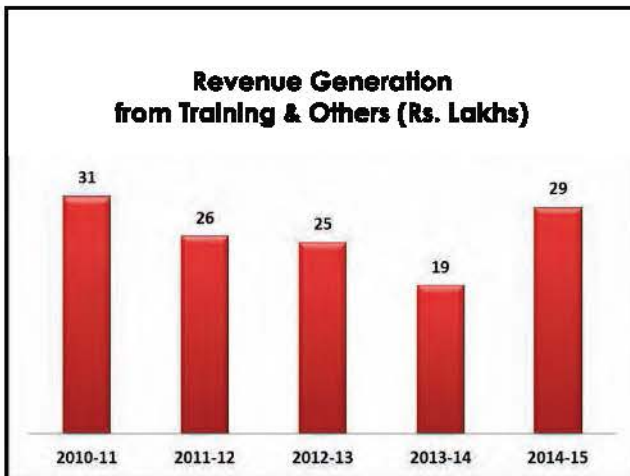
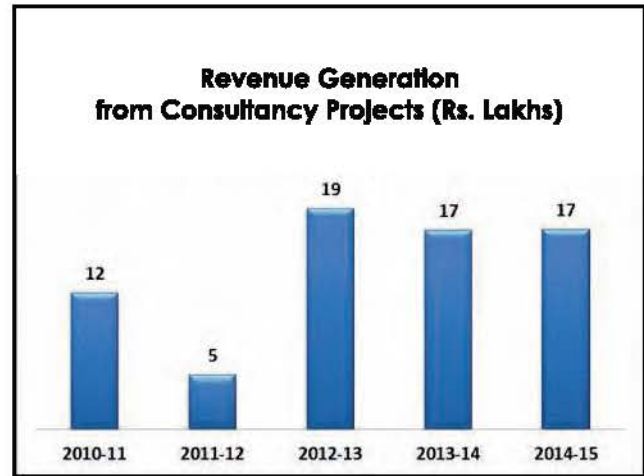
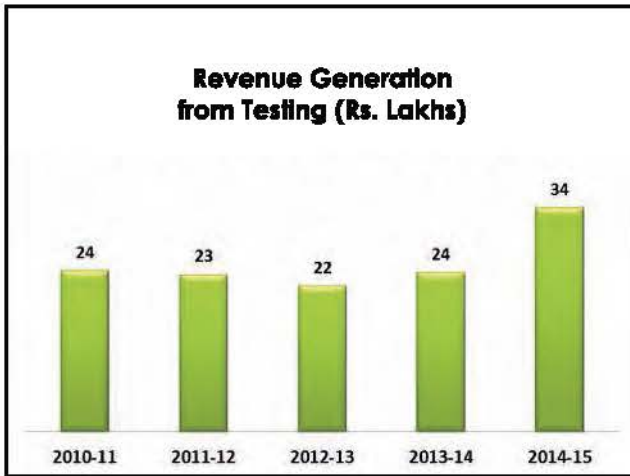
S. No.	Staff Category	Sanctioned	In Position	Vacant
1	Scientific	50	26	24
2	Technical	112	75	37
3	Administrative	47	29	18
4	Supporting	57	46	9



BUDGET & EXPENDITURE FOR 2014-15 (Rs. Lakhs)

Sub-Head	NON PLAN		PLAN	
	R.E. 2014-15	Expenditure 2014-15	R.E. 2014-15	Expenditure 2014-15
CAPITAL EXPENDITURE				
Equipment	5.93	5.92	7.14	7.13
Information Technology	0.00	0.00	19.00	18.99
Library Books and Journals	0.00	0.00	18.00	18.00
Furniture & Fixtures	2.07	2.07	5.86	5.86
REVENUE EXPENDITURE				
Establishment Charges	1214.00	1213.84	0.00	0.00
Overtime Allowance	0.25	0.25	0.00	0.00
Pension & Other Retirement Benefits	1275.00	1224.57	0.00	0.00
Travelling Allowances	5.00	5.00	19.50	19.50
Research Expenses	0.00	0.00	9.50	9.49
Infrastructure	61.80	61.80	76.00	76.00
Communication	4.62	4.61	0.00	0.00
Repair & Maintenance				
i. Equipment, Vehicles & Others	10.77	10.76	41.00	41.00
ii. Office Building	8.87	8.86	33.87	33.87
iii. Residential Building	4.99	4.99	24.00	24.00
iv. Minor Works	6.20	6.19	0.00	0.00
Other (excluding TA)	122.05	122.05	33.50	33.50
HRD Domestic	0.00	0.00	2.63	2.63
Tribal Sub-Plan	5.00	5.00	5.00	5.00
Loan & Advances	3.22	3.22	0.00	0.00
Total	2729.77	2679.13	295.00	294.97

Revenue Generation Scenario in last 5 years.





CORE AREA I

PRE-GINNING AND GINNING

1. Pollution Abatement System for Collection of Flying Dusts from Ginning and Pressing Halls

Dust pollution is a major concern in Indian cotton ginneries. The airborne respirable dust levels in ginneries are much higher than the permissible limits. Ginning point, immature boll picking point and raw cotton feeding points of the Double Roller (DR) Gins are the major sources from where fine dust particles emanate into the gin hall. The study revealed that more than 90% fine particulate matters (PMs) present in a gin hall are from the ginning point of the DR gins.

- An automatic lint doffing system and an enclosure of the DR gins were designed, developed (Fig 1) and evaluated to arrest the fine particles that emanate from the ginning point of the DR gins. It consists of a take up unit, driving and doffing mechanisms.
- Rexin cotton has been found as the most suitable material among six different materials tested for doffing of lint.
- The optimum speed for doffing roller has been found as 100 rpm.
- The new system arrests around 80% of total dust generated from the ginning point of the DR gins.



Fig 1: Enclosure System for DR Gin

2. High Capacity Rotary Knife Roller Gin

Rotary knife roller gins, in spite of being higher capacity ginning machines, are not used on commercial scale for ginning Indian cotton because of the concerns like higher fibre neps and seed cuts. Hence a study was carried out to optimize rotary knife roller gin for efficient ginning of Indian cottons. Experimental trials were conducted at commercial rotary knife ginning plant for optimization of machine parameters. Fifteen experiments with different configurations were carried out. Fibre properties of cottons ginned on rotary knife and double roller gin were tested on HVI and AFIS.

In terms of fibre, yarn and seed quality, ginning was found to be efficient at roller speed in the range of 200-225 rpm, rotary knife speed of 400-450 rpm, feeder roller speed of 18-20 rpm and at a pressure of 80 bar between the roller and the rotary knife. When operated at roller speed of 200 rpm, rotary knife speed of 400 rpm, feed roller speed of 18 rpm and with the gin roll and rotary knife pressure at 80 bar, the capacity of single stand rotary knife roller gin was 425 kg lint/h, which was about six times that of the Jumbo double roller gin.

HVI results indicated marginal increase in 2.5% span length in rotary knife ginning over DR ginning while fibre properties remain unaffected. AFIS results showed higher fibre neps and seed coat neps in rotary knife gin than in DR gin. Fibre neps were found to be 263 cnt/gm and 162 cnt/gm whereas seed coat neps were found to be 42 cnt/gm and 21 cnt/gm for rotary knife gin and DR gin respectively. Full spinning of rotary knife and double roller ginned cotton was done at 50s counts and the yarn properties were evaluated. The lea strength and CSP values were found to be higher for rotary knife ginning than DR ginning. The cut seed percentage for rotary gin and double roller gin was found to be about 4% and 0.5% respectively.

CORE AREA II

MECHANICAL PROCESSING, TECHNICAL TEXTILES AND COMPOSITES

1. Electro Spraying Setup for High Performance Cotton Textiles

Preliminary work was carried out using electro spraying machine for production of UV protective cotton fabrics. Process parameters such as flow rate, voltage and distance were optimized to suit the fabric spraying requirements. The 2/2 twill weave fabric with 260 GSM was used for electro spraying. The cotton fabric was electro sprayed with commercially available UV protection chemical (UV-SUN® CEL LIQ UV absorber) with optimized machine parameters for different spray duration of 20, 25 and 30 minutes.

Experiments were conducted with different spraying duration (20, 25, 30 min) and coating on single as well as on both the sides. It was found that samples electro sprayed on both sides for twenty-five and thirty minutes duration showed better performance with reference to UPF value. UPF rating was found to be 50+ as compared to control fabric value of 30. The double side sprayed fabric gave around 40-50% higher UPF value in 25 and 30 min spraying duration compared to single side spraying. Preparation of cotton UV protection finishing by electro spraying technique is enhancing the performance in terms of UPF values.

2. Coconut Fibre Reinforced Composites

To fabricate the thermosetting composite materials (Epoxy/Coir), the fine raw and fibrillated coconut fibre was mixed with epoxy resin in the weight ratio of 1:10 (Coconut fibre: epoxy resin). The coconut/Epoxy web was kept into steel mould in compression moulding machine with the temperature upto 100°C and pressure 20 KN for a duration of 60 minutes. The mechanical properties of coconut fibre/epoxy composite samples were analyzed by universal testing machine. The raw

coconut fibre reinforced epoxy composite tensile strength was 18.2 MPa. The fibrillated coconut fibre reinforced composite had a tensile strength of 25 MPa. The Tensile strength (Stress Strain Curve) of the raw coconut and fibrillated coconut reinforced composites are presented in the Fig. 2 & 3.

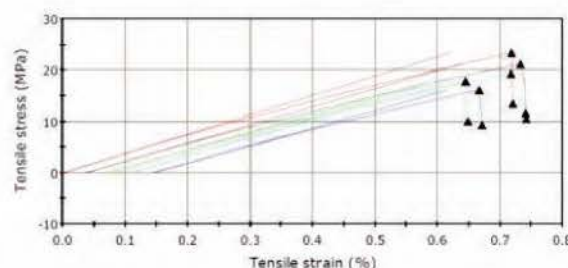


Fig. 2: Tensile Strength of Raw Coconut Fibre composite

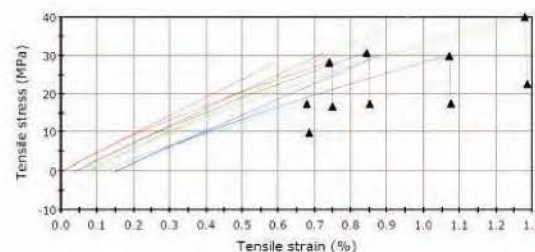


Fig. 3: Tensile of Fibrillated Coconut Fibre Composite

3. Innovative Fibre Blends and Finishes for Cotton Textiles (Flagship Programme)

Spinning Tertiary Blended Yarn: Three component blended yarns were produced using cotton, bamboo viscose and PLA fibres. The 2.5% span length of cotton fibre was 30 mm and fineness was 3.3 Mic. The length of bamboo and PLA fibres was 38 mm with a fineness of 1.4D. Two blend ratios were selected for making cotton-rich blend namely, 60/20/20 and 40/30/30. The fibres were blended in blow room and taken through the processes of carding, drawing, roving and finally spinning. The fibres were spun into yarns using compact ring spinning machine to a count of 40s with a TM of 4.0. The yarn test results are given in Table 1.



Table 1: Yarn Test Results for Cotton/ Bamboo/PLA Blends

Sr. No.	Yarn property	Norms	Cotton/bamboo/PLA 60/20/20	Cotton/bamboo/PLA 40/30/30
1	Count	40.0	40.6 Ne	39.3 Ne
2	Strength	50.0	52 lb	43.7 lb
3	CSP	2000	2109	1717
4	U%	10.5	11.5	11.8
5	Twist per inch		26.3	25.8

Weaving Cotton/bamboo Viscose Yarns: One hundred percent cotton, 65/35 cotton/bamboo and 100% bamboo yarns of 30s Ne were produced using compact ring spinning technology. The yarns were then woven into plain weave design with a sample loom. The grey GSM of fabrics produced was 144 with 82 ends per inch and 72 picks per inch. Another set of fabrics with 72 ends and 72 picks per inch was also produced.

Testing of Commercial Sportswear Garments: Number of sports apparel were procured from the market and tested for moisture management properties. The results (Table 2) clearly shows that cotton apparel is poor in terms of moisture management. Hence there is a need to develop cotton fabrics with better moisture management properties. With Cotton-rich/PLA blended fabric we are able to achieve an Overall Moisture Management Capability (OMMC) value of 0.47.

Table 2: Test Results for Commercial Sportswear Garments

Commercial Sample	Polyester (1)	Polyester (2)	Polyester (3)	Cotton
Wetting Time Top (sec)	3.8	6.1	3.1	4.3
Wetting Time Bottom (sec)	4.0	6.5	3.1	4.6
Top Absorption Rate (%/sec)	30.3	53.5	36.0	32.1
Bottom Absorption Rate (%/sec)	36.0	69.0	48.4	26.1
Top Max Wetted Radius (mm)	25	25	30	21.25
Bottom Max Wetted Radius (mm)	25	25	30	21.25
Top Spreading Speed (mm/sec)	3.9	3.4	6.5	3.5
Bottom Spreading Speed (mm/sec)	3.9	3.5	6.5	3.4
Accumulative one-way transport index (%)	157.3	170.7	180.0	53.9
Overall Moisture Management Capability	0.528	0.602	0.612	0.357
OMMC Grade	3	4	5	2

Chemical Processing of Cotton/Bamboo Viscose Fabrics: Blended Fabrics were subjected to pre-processing by chemical and enzymatic methods. 100% grey bamboo, 100% cotton & 65/35 cotton / bamboo were desized and the Whiteness Index (CIE) was measured. Whiteness Index of 100% bamboo (42.41) was more than that of 100% cotton (0.66) & 65/35 cotton/bamboo (13.72). After desizing, 100% bamboo, 100% cotton & 65 / 35 cotton/bamboo fabric samples were scoured together and bleached by two methods viz. using

NaOH & Bioscour enzyme and by using H₂O₂. A small difference in the whiteness of enzymatically scoured (61) and alkali scoured sample (64) was observed. Enzymatically scoured sample gave better softness than the alkaline scoured sample. Incorporation of bamboo fibre increased the softness and whiteness of blended material. Dyeing trials of blended sample using Reactive HE resulted in uniform dyeing of the fabric. Table 3 gives the colour characteristics of dyed samples using Reactive Green HE dye.

Table 3: Colour Characteristics of Cotton/Bamboo Dyed Fabric Samples

Fabric	L*	a*	b*	c*	K/S
100 % Cotton	37.26	-14.57	-7.20	16.25	9.68
65/35 blend	35.53	-14.45	-6.64	15.91	10.77
100% Bamboo	31.31	-14.68	-4.95	15.50	14.26

K/S of 100 % cotton	K/S of 65 % cotton (Theoretically)	K/S of 100% Bamboo	K/S of 35% Bamboo (Theoretically)	K/S of 65/35 cotton /Bamboo blend (Theoretically)
9.68	6.29	14.26	4.99	11.28

*K/S = Colour Strength; L = lightness/darkness; a = reddish/greenish; b = bluish/yellowish; c = Chroma

From the above values it is understood that dyeing of Cotton/Bamboo blended fabric occurs as per the ratio. K/S of 65/35 cotton /Bamboo blend theoretical value is approximately equal to the actual value in the dyed fabric ($\Delta E < 0.5$)

Thermo-gravimetric Analysis of Cotton / Bamboo Fabrics: Thermo-gravimetric curves of cotton /bamboo fabric show three distinct zones (Fig. 4). An initial zone (below 100°C) of slight weight loss is due to evaporation of water. The second zone of 300-250°C is the zone of rapid weight loss due the thermal decomposition of cellulose followed by curvature formation probably due the formation and evaporation of volatile compounds. Finally the

decomposition rate decreases gradually to a constant weight representing carbonization. The bamboo-cotton fabric was also subjected to thermo-gravimetric analysis. The initial gradual weight loss was due to moisture evaporation which was comparatively slower than cotton and bamboo fibres and extended up to 150°C. The second weight loss started at 250°C and it remained slow and steady up to 300°C then fell rapidly up to 350°C. This was due to the thermal decomposition of cellulose where about 75% weight loss was observed. Eventually, evaporation of gases and carbonization led to a constant weight.

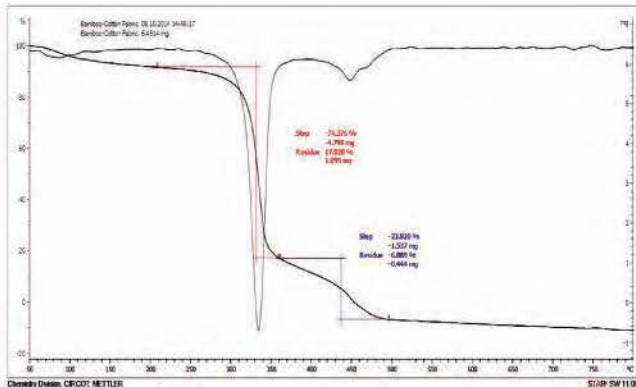


Fig. 4: TGA Curve of Cotton/Bamboo Fabric

FTIR Analysis of Cotton-Bamboo Blended Fabric: FTIR analysis of samples was carried out as per the standard procedure. The presence of broad band at $3200-3500\text{ cm}^{-1}$ in cotton and bamboo fibres and bamboo-cotton fabric is attributed to stretching frequency of hydroxyl groups of cellulose molecule. The presence of peaks at $2875, 2965\text{ cm}^{-1}$ in cotton and bamboo fibres and at 2899 cm^{-1} bamboo-cotton fabric correspond to C-H stretching frequencies of the $-\text{CH}_2$ and $-\text{CH}_3$ groups of molecules. Rests of the peaks are almost similar in all three samples (Fig. 5).

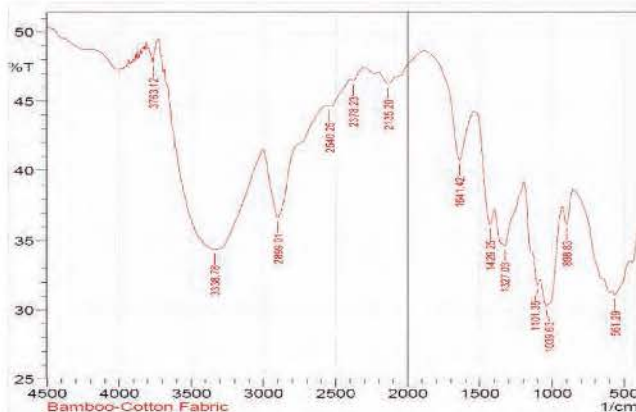


Figure 5. FTIR Graph of Cotton/Bamboo Fabric

Blend Analysis of Three Component Yarn: Blend composition of Bamboo/Cotton/PLA tertiary yarn was carried out. The composition results were in agreement with the blending ratio maintained in blowroom while mixing the fibres. The blend ratio

identified by solubility analysis was 60/21/19 percent for cotton/bamboo/PLA fibres respectively.

4. Composite from Fibrous Waste Materials

A Novel Composite Material has been developed using un-shredded waste newspaper and the polyester resin through hand lay-up method. Three types of composites have been prepared with different fibre content ranging between 28 to 48 per cent. Physical properties of the composite materials are shown in Table 4. The tensile strength analysis of the composite material reveals that the tensile strength and tensile modulus increase with fibre content. It has been observed that at 25% fibre content, composite material shows tensile strength of 45.3 MPa and modulus of 4.19 GPa. The composite material with 48 per cent (w/w) fibre content has 70 MPa tensile strength and 6 GPa modulus along the fibre direction. The physical property of the polyester resin show a tensile strength and the tensile modulus of the resin is 25 MPa and 0.93 GPa respectively

Table 4: Physical Properties of Composite Materials

Fibre %	Tensile Stress at break MPa (m/c direction)	Tensile Modulus GPa (m/c direction)	Tensile Stress at break Mpa {Cross-Direction}	Tensile Modulus Gpa {Cross-Direction}
25	45.3	4.19	29.2	3.05
33	58.8	5.00	24.1	2.9
48	69.8	5.95	18	2.5

5. Snake Bite Protective Textile

Cotton was wrapped over 420 D Nylon 6 filament using ring spinning method. To set the twist permanently the steaming process for core spun yarn was carried out at $90-95^\circ\text{C}$ for 20 min. Single yarn strength was tested on Instron testing machine. Normal nylon yarn strength was found to be around 13.55 g/d and its elongation percentage 5.6% and for core spun yarn it was found to be around 16.22 g/d and its elongation

percentage 8.2%. The core spun yarn were woven into fabric with an EPI (ends per inch) of 36 and 24 PPI (Picks per inch) with 355 GSM.

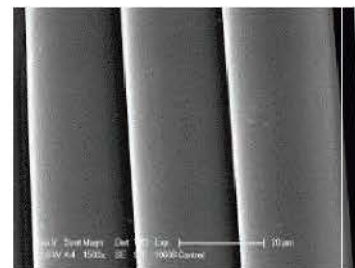
Nylon 6 multifilament (840 denier) was woven into a plain weave fabric with 18 ends per inch and 18 picks per inch with 372 GSM linear density. The woven fabric was treated with a Dielectric Barrier Discharge Plasma (DBD) in helium/oxygen gas medium, with different treatment periods of 15, 30 and 60 seconds. The treated fabrics were then analysed for changes in surface characteristics using SEM and KES-FB4 surface tester.

Surface Roughness Properties: Table 5 shows the results of measurement of surface properties with the KES-FB4 surface tester. It indicated that the Geometrical Roughness (SMD) of the plasma treated fabric was higher compared to the untreated fabric by 11.5%. The SMD and MIU (coefficient of friction) were found to increase with the treatment duration from 15 to 30 Seconds, however, beyond that, up to 60 Seconds, no significant difference was noted. Based on the result, He+O₂ for 30 Seconds time exposure was selected for further studies.

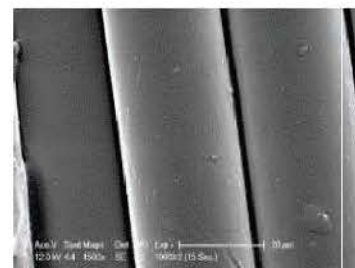
Table 5: Surface Properties of Control and Plasma Treated Nylon Fabrics

Samples	MIU (coefficient of friction)	MMD (variation in the coefficient of friction)	SMD (Geometrical Roughness) (µm)
Control nylon 6	0.200	0.0304	15.8
Plasma treated for 15 s nylon 6	0.218	0.0328	16.2
Plasma treated for 30 s nylon 6	0.238	0.0366	17.4
Plasma treated for 60 s nylon 6	0.225	0.0351	17.2

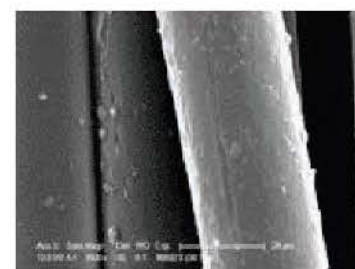
Scanning Electron Microscope (SEM): The SEM micrographs are presented in Fig. 6. The study also confirmed the above results that the plasma treated fabrics showed a higher surface roughness compared to the control fabric, and the same increased with increasing the plasma treatment time from 15 to 30 seconds.



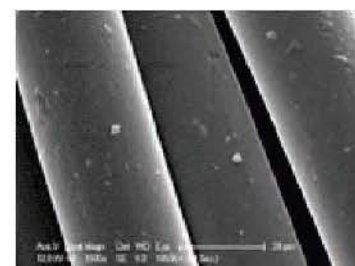
(a)



(b)



(c)



(d)

Fig. 6: SEM of Control (a) and Plasma Treated Nylon Fabrics of 15 s (b), 30 s (c), and 60 s (d)

Peel Strength and Puncture Resistance: The Peel strength of the rubber coated fabrics was studied using IS: 7016 Part V method and the results are presented in Table 6. As per an earlier literature, EPDM (ethylene-propylene-diene rubbers) synthetic rubber does not work well with the RFL, and leads to a low peel strength, when compared to the natural rubber coated fabric. However, in this experiment, due to high surface roughness of the plasma treated fabric, the peel strength was found to increase by 75% compared to the only RFL treated fabric.

In the case of the fabric coated with the natural rubber, the peel strength was at the maximum, i.e., (Inseparable by the test IS: 7016 Part V), compared to the RFL treated control fabric. This may be ascribed to the mechanical and the adhesion theory of bond formation occurring during the rubber coating process. Plasma etches the surface of the nylon 6 fabric, thus increasing its surface roughness. There is no difference found in the puncture resistances of the rubber coated fabric in both the cases of Plasma- RFL and only RFL treated fabric (Table 6).

Table 6: RFL add-on percentage and peel strength of control and plasma treated nylon fabrics

Type of Sample	RFL add-on (%)	Peel Strength (Kg/5 cm)	
		Natural Rubber	Synthetic Rubber
Control nylon 6 fabric	10.8	7.0	4.0
30 s plasma treated Nylon fabric	12.0	Inseparable	7.0

CORE AREA III

CHARACTERISATION—COTTON AND OTHER NATURAL FIBRES, YARNS AND TEXTILES

1. Evaluation of Quality of Standard Varieties of Indian Cottons

Four samples of *G. arboreum* viz. AKA.5, AKA.7, AKA.8 and AKH.8401 and four samples of *G.*

hirsutum viz. PKV Rajat, AKH.081, AKH.8828 and DHY.286 were evaluated for fibre quality and spinnability. Mean fibre length, mature fibre percentage, 2.5% span length, uniformity ratio, uniformity index, fiber fineness, micronaire value, bundle strength at 3.2 mm gauge length were obtained by using the HVI and the quality parameters were also measured in the Advanced Fibre Information System (AFIS) is presented in the Table 7.

Table 7: Fibre Quality Parameters

Variety	PKV -Rajat	AKH.081	AKH.8828	DHY.286
Place	Akola	Akola	Akola	Akola
Mean Length (mm)	24.0	24.7	23.6	25.2
Micronaire value	4.2	4.2	3.8	3.8
Fineness (millitex)	165.3	165.3	149.6	149.6



Variety	PKV-Rajat	AKH.081	AKH.8828	DHY.286
Mature Fibre (%)	74	72	64	66
2.5% Span Length (mm)	26.7	27.4	26.2	28.0
Uniformity Ratio (%)	49	48	49	51
Bundle Tenacity (g/t)	19.6	18.7	22.2	23.8
Colour Rd%	69.3	72.8	75.9	75.3
Colour + b	10.6	10.6	10.7	10.0
Colour Grade	43.1	32.1	22.1	66
UHML	27.1	26.7	27.3	27.7
UI (%)	81	79	81	82
Strength (g/t)	23.0	23.8	28.1	29.3

2. Objective Fabric Handle Model for Indian Market

Shirting fabrics available in the Indian market were collected and studied for the low stress mechanical properties, primary handle value and total handle value. All of the 67 fabrics studied were ranked based on the stiffness (Koshy) values of Kawabata instrument. A pairwise comparison method was used for ranking the fabrics. In a paired-comparison task, respondents are presented with pairs selected from the set of available alternatives and are instructed to select the more preferred alternative from each pair. With n items, there are $n(n-1)/2$ pairs of items. In case of 67 samples, there are $67 \times 66 / 2 = 2211$ pairs to be assessed. Ten samples were selected such that it covered the complete range of stiffness values. Then 10 consumers were

asked to rank the fabric using paired comparison method. The ranks are calculated from the consumer data sheets and consolidated results of the 10 consumers are given at Table 8

A Spearman's correlation was run to determine the relationship between 10 consumer ranks and one equipment rank values. There is a strong, positive monotonic correlation between consumer ranks and equipment rank for stiffness ($r = 0.84$ to 0.98 , $n = 10$, $p < .01$). Hence it can be concluded that stiffness parameter evaluated by Kawabata equipment is able to give the values similar to Indian consumer perception on stiffness and hence the values can be used for cotton, polyester and polyester cotton fabrics used in the making of shirting in Indian market..

Table 8: Ranks of Fabrics for Stiffness

Sample No	Blend	Koshi	Kawa_R	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
110	PC	10.71	3	2	2	4	3	3	2	3	2	2	2
112	Cotton	9.88	4	4	4	5	4	4	5	4	5	7	5
118	Cotton	11.41	2	6	3	2	2	2	3	2	3	3	3
129	PC	6.05	7	8	8	9	8	7	8	8	8	8	8
130	PC	13.81	1	1	1	1	1	1	1	1	1	1	1
140	Polyester	2.22	10	9	9	10	9	10	10	9	8	9	9
148	PC	8.64	5	3	6	6	7	6	5	6	5	4	6
158	Cotton	4.91	8	7	7	7	5	7	7	7	7	5	7
162	Polyester	3.44	9	10	10	8	10	8	9	10	10	9	10
166	PC	7.44	6	5	5	3	6	5	5	5	6	6	4

Kawa_R - Rank arrived based on equipment ranking of stiffness,- C1 Cosumer No.1, Koshi Stiffness

3. Survey on the Contamination Status of Indian Cottons

The contamination status of the Indian Cottons was studied by conducting a survey in a couple of spinning mills in Tamil Nadu with detailed questionnaire for collection of the primary data. The parameters considered for the measure of the contamination were in line with the 16 major contamination items being surveyed by the International Textile Manufacturers Federation

(ITMF), namely fabrics made of woven plastic, plastic film, jute/hessian, cotton, strings made of woven plastic, plastic film, jute/hessian, cotton, organic matter (leaves, feathers, paper, leather etc.), inorganic matter sand dust, rust, metal/wire, grease/oil, rubber, stamp colour, tar. Apart from these 16 contaminants, the stickiness of the cotton was also included.

The findings as per the preliminary survey show that:

1. The contaminants found in the cotton bales

- include Jute thread, Nylon, Plastic films and stones
- The surveyed mills did not have any equipment for identification or removal of contaminants. Contaminants are removed manually
 - The level of Contamination was found to be insignificant in the surveyed mills

CORE AREA IV

CHEMICAL AND BIOCHEMICAL PROCESSING AND BIOMASS AND BY-PRODUCT UTILISATION

1. Use of Plant Extracts for Dyeing and Imparting Ultraviolet Protective and Antibacterial Properties to Cotton Textiles

A simple process for eco-friendly durable UV protective finishing of cotton textiles using plant extracts of dried fruits of Harda (*Terminalia chebula*), Beheda (*Terminalia bellerica*) and rinds of pomegranate (*Punica granatum*) was developed at CIRCOT.

Swatches of scoured and bleached plain weave cotton fabric having very poor UV protection (UPF only 5) were separately treated with aqueous extracts of the above plant materials at room temperature (about 27°C) for 30 min with continuous shaking. These swatches were then removed from the treatment bath, squeezed and put into the solution of alum previously neutralized with alkali and the treatment continued for another 30 min at room temperature with continuous stirring. Treated fabrics were then taken out from the bath, washed well with water and air dried. All cotton samples thus finished showed excellent UV protection (UPF ratings were 50+) and had a light yellow colour.

Washing durability of the finished fabrics was tested by subjecting them to accelerated

washing as per ISO 105 C10-2006 (E) Test no. B (2); with each wash being equivalent to five home washes. It was found that even after the end of 10 wash cycles (equivalent to 50 home launderings) all fabrics retained the excellent UV protection (UPF rating 50+). Colouration produced on the fabrics was also fast to washing as K/S (colour strength) values of the washed samples remained almost unchanged.

2. Fire Retardant Finishing of Cotton Fabric using Herbal Extract

To understand the reason behind the observed fire retardancy mass spectroscopy of the BPS has been carried out. TOF-SIMS of BPS showed the presence of H, C, N, O, OH-, F-, Cl-, Po2-, PO3-, KCl-, KF-, Cl2, etc. and the positive TOF SIMS showed the presence of Mg+, K+, Mn+, Fe+ ions. Therefore flame retardancy (more amount of char formation, higher LOI value) of the cellulosic cotton fabric might be attributed with the free metal ions present in the BPS and in addition presence of salts like, potassium chloride, potassium fluoride, calcium chloride, phosphate, phosphate, etc. are also helping to provide fire retardancy of the BPS treated fabric. SEM (Fig. 7) was performed on the residues of the treated fabrics after flammability tests. It showed an intact char structure of the closed cells containing many small pockets of gases. It was found that BPS works as additive intumescent flame retardant, when heated it swells and form a protective thick honeycomb like coating on the underlying heated polymeric substrate, thereby it preventing the flow of volatile liquids or vapours into the flame. The coating protects the remaining polymer from thermal decomposition and enhanced more amount of insulated char formation. On the other hand the control fabric showed poor char structure without any closed cells but with prominent channels through which volatile gas or polymer decomposition product can escape.

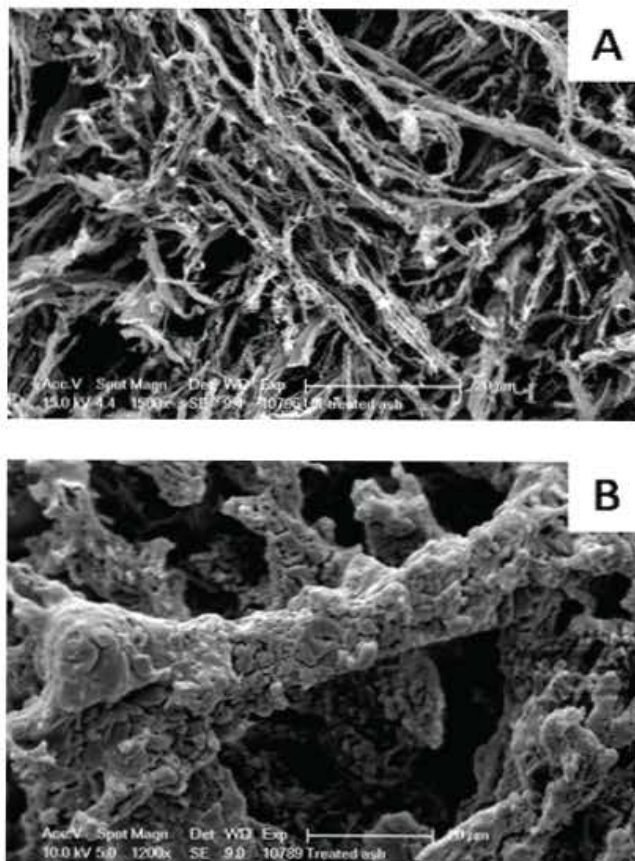


Fig 7: SEM of Residual Mass of Control (A) and BPS Treated (B) Fabric

To improve the fire retardant property and also for stopping the observed after-glow, mordanted fabric has been treated with the Mixed formulation of BPS and chemical A. It showed oxygen index value of 42 and also afterglow has been stopped. As a result char length observed 1.5 cm after vertical flammability test. TG curves also proved the improved thermal stability of the treated fabric. For improving the fastness property, mixed formulation of BPS, chemical A, citric acid and catalyst at elevated temperature showed promising results. The treated fabric showed oxygen index of 44 and after one ISO No.2 wash it showed oxygen index of 27 and after second ISO 2 wash it showed oxygen index of 25 whereas the control fabric showed oxygen index of 18. Dry cleaning fastness of the treated fabric showed oxygen index of 33.

Scale up trial of the two differently constructed cotton fabrics (half meter each) have been taken in bowl and also in laboratory jigger with the same formulation. Treated fabric showed same results of char length and oxygen index as observed from the laboratory test samples. To improve the attractiveness of the treated fabric, two different colour reactive dyed samples also have been mordanted and treated with the mixed formulation of BPS at elevated temperature in Jigger machine. It also showed oxygen index of 42 and char length of 1.5cm.

3. Regeneration of Waste Polymerized Frying Cottonseed oil and its Utilization

The degradation of oil during frying occurs due to heat, air and moisture resulting in polymerization, oxidation and hydrolysis which facilitate the formation of undesirable polar compounds. Regeneration of fried oil by selective removal of undesirable polar compounds has been sought by the Industry for many years.

Three adsorbents (namely silica gel, aluminium oxide and activated charcoal) and their ten combinations were used to test ability to regenerate thermally polymerized cottonseed oil. These adsorbents were packed in columns and the thermally polymerized frying oil was passed through the column. The physicochemical characteristics of the processed oil, including TPM, oxidation products, FFA, colour and viscosity were studied in detail to enable the selection of the most effective adsorbent combination that could further improve the quality of the used cottonseed oil. A tertiary combination (25% w/w) consisting of 1:1 ratio of binary adsorbent blends (denoted by SG and ALO) with 4% activated charcoal emerged as the best adsorbent combination for improving oil quality. The results are shown in Table 9. This combination could bring down FFA, peroxide and viscosity of treated oil well within the permissible limit. By using this combination about 600 ml polymerized cottonseed oil was purified for frying purpose.

Table 9: Regeneration of Thermally Polymerized Cottonseed Oil with Tertiary Adsorbents

Samples	FFA (%)	Viscosity (cpat 30 c)	Peroxide value (mEq/Kg)	p-anisidine value
Fresh oil	0.15	63.0	4	2.49
Polymerised oil	4.01	109.60	30	110.51
Filtration*	0.20	62.50	6	1.27
Filtration**	3.99	85.00	22	3.66

* First filtration with fresh adsorbent bed

** Second time filtration with one time used adsorbent bed

Table 10: Evaluation of Quality Parameters of Fresh and Filtered Cottonseed Oil after Frying (Consecutive 3 Cycles)

Samples	FFA (%)		Sensory test					
	Before frying	After frying	1	2	3	4	5	6
Fresh oil	0.15	1.21	Very good	Very good	Very good	Very good	Very good	Very good
Filtered oil	0.20	1.29	Very good	Very good	Very good	Very good	Very good	Very good

Purified cottonseed oil was used for french frying and quality parameters of fried oils were evaluated. The results are given in Table 10. After three consecutive cycles of frying, the FFA value increased beyond the permissible limit of edible oil. The subjective sensory test of fried french was also carried and it was found to be at par with fresh product fried in fresh oil. A simple and efficient process for regeneration of fried cottonseed oil for reuse using a combination of adsorbents (aluminium oxide + silica gel + activated charcoal) through column chromatography with 80% oil recovery has been developed at CIRCOT. This technology could be used effectively for purification of waste cottonseed oil for reuse or for

other applications like biofuel preparation.

4. Low Temperature Technology for Preparation of Absorbent Cotton for Decentralized Sector

Absorbent cotton is used for absorbing human body fluids and finds its major application in hospitals. Important chemical processes involved in the preparation of absorbent cotton are scouring and bleaching. Conventionally, scouring of raw cotton fibre is done using sodium hydroxide at 115°C under 15 psi pressure in the kier machine and the bleaching is carried out using hydrogen peroxide at 95°C. These processes are energy intensive and not eco-friendly due to effluent related issues.

A process for the preparation of absorbent cotton at low temperature has been developed using binary enzyme combination and activated hydrogen peroxide bleaching techniques. The process consists of treating the raw cotton with a combination of enzymes at 65°C instead of conventional sodium hydroxide treatment at high temperature and pressure. The enzyme scoured cotton is then subjected to activated peroxide bleaching at 65°C to remove the residual colour. The absorbent cotton produced through the developed process satisfies the IP standards. The absorbency of the cotton fibre is less than 10 seconds, and the sulphated ash also lesser than 0.5%. Most of the absorbent cotton industries in our country are small and medium scale in nature. Hence, the development of low temperature process for the preparation of absorbent cotton will benefit them in terms of reduced energy cost.

5. Multifunctional Durable Finishing of Apparel Grade Cotton Fabrics with Nano ZnO

In order to Synthesis nano ZnO in situ, swelling of cotton fibres was attempted with the help of ionic liquids.

Synthesis of Ionic Liquids: Methylimidazolium Hydrogen Sulphate [MIM]⁺[HSO₄]⁻ was synthesized by mixing 1-methylimidazole with concentrated H₂SO₄ (98%) at 0°C and stirred for 2 h at room temperature. Then, the liquid was washed with EtOAc three times and dried at 80°C in vacuum. 1-Methylimidazolium hydrogen sulfate was obtained in quantitative yield.



Scheme 1

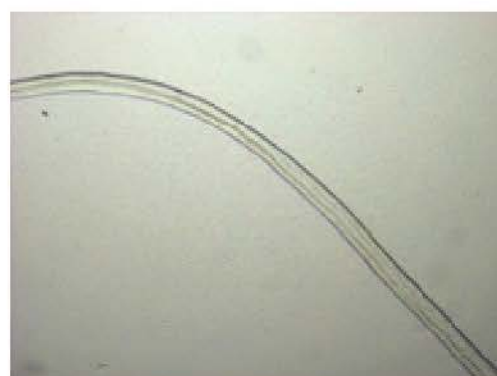
Butyl-3-methylimidazolium Chloride [BMIM]⁺[Cl]⁻: Synthesis of [BMIM]⁺[Cl]⁻ involved the treatment of 1-methylimidazole with 1-chlorobutane in a 1:1.1 mole ratio. The reaction occurred at approximately 60°C. The 1-butyl-3-methylimidazolium chloride thus obtained was washed with ethyl acetate.



Dry Cotton Fibre

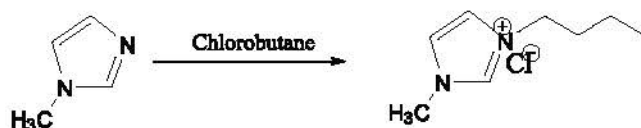


Aqueous Swelling



Ionic Liquid Swelling

Fig. 8: Optical Microscope Photographs of Cotton Fibre

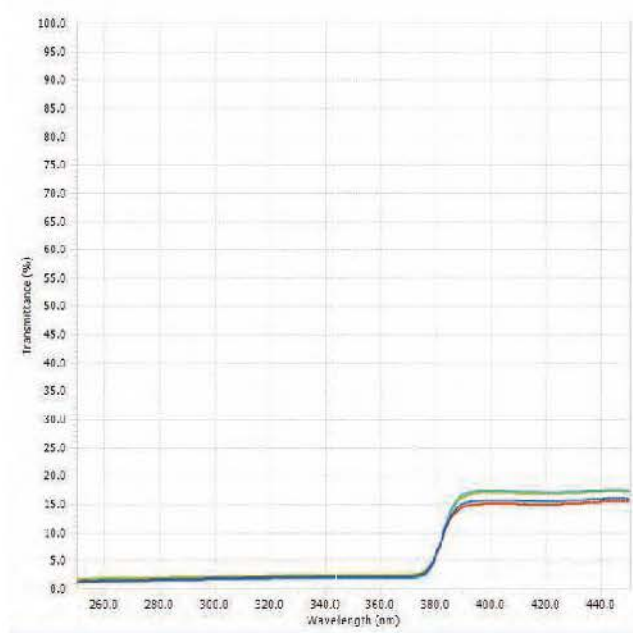


Scheme 2

Swelling Studies of Cotton Fibres: To establish mechanism of improvement of fixation of ZnO on cotton textiles due to addition of ionic liquid in the exhaustion bath, swelling studies of cotton fibres was carried out using optical microscope (Fig. 8). Average diameters of dry cotton fibre, aqueous swelled and swelled in ionic liquid was calculated and the swelling was found to be 1.2 and 1.5 respectively.

Optimization of Treatment Conditions for Better Exhaustion: To get improved fixation of ZnO using ionic liquid, the conditions were optimized. The UV spectra of treated cotton textiles is presented below in Fig. 9.

Without Ionic Liquid Exhaustion



Exhaustion with the help of Ionic liquid

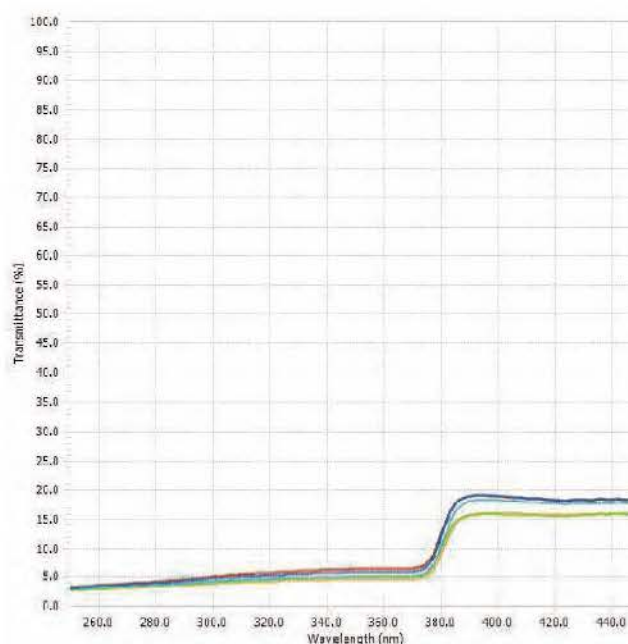


Fig. 9: UV Spectra of Treated Cotton Textiles

6. Nano-scale Surface Modification of Textiles using Plasma for its Application in Dyeing, Finishing and Composite

The effect of plasma on cotton textiles dyed with different classes of dyes was studied. 100% cotton fabric samples were dyed in lab with direct dye, reactive dye and vat dye (1% shade) and also with natural dye manjith (5% shade). The colour parameters- K/S and L*, a*, b* values of these dyed samples were measured on reflectance spectrophotometer. Each dyed sample was treated with plasma of Helium and oxygen mixture (in the ratio of 6:1) for 1, 2, 4 and 8 min. Colour parameters of all samples after plasma treatment were again measured.

Effect of plasma could be clearly seen in natural dye. There was a significant loss in colour strength; it was reduced by 22% just after one minute of plasma treatment. Colour strength was further reduced by 33% and 57% after two and four min plasma treatment but did not reduce any further



after 8 min of plasma treatment. Redness (a*) values also decreased from 22.6 to 13.6 but yellowness (b*) values increased from 13.9 to 21.5. Another interesting observation was that after keeping the samples for five days, K/S values and a* values of plasma treated samples improved and yellowness (b*) values decreased.

The loss in colour strength was not very significant for vat and reactive dyes. Samples dyed with vat dye showed gradual loss in colour strength in the treatments from 1 to 8 min, there was a loss in colour strength of 6%, 12% and 23.5% after plasma treatment for one, four and eight min respectively and both redness and yellowness values declined slightly from 46.2 to 43.5 and 10.4 to 7.0 respectively after the treatment. Samples dyed with reactive dye showed a gradual loss in colour strength i.e. 13%, 17%, and 21% for treatment time of 1, 2 and 4 min treatment time but no further loss was observed in 8 min treated sample. Redness values showed a slight 4-5% loss and yellowness values also depicted a slight reduction.

7. Bioenriched Compost from Cotton Plant Residues

An accelerated process for the preparation of compost from cotton stalk has been developed. Using CIRCOT microbial consortia it is possible to save 15 and 30 days for the preparation of compost from wet and dry cotton stalks respectively. The compost from cotton stalks is enriched with nutrients and plant growth promoting microorganisms. Compared to FYM, the NPK content (%) is higher in cotton stalk compost, whereas, the cost of production of cotton compost is similar to that of FYM. The field evaluation experiments showed that compost from cotton stalks is on par with FYM on growth and yield of cotton and requires half the quantity of FYM for application in the field. Prolonged storing up to one year does not lead to any deterioration in its quality.

Considering the less availability of FYM, compost from cotton stalks is a viable solution for soil fertility

management. This technology can be an effective way of on-farm management of cotton crop waste while at the same time yielding an additional income to farmers. It also help in reduction in environmental pollution that may arise due to burning of cotton stalks in the field.

CORE AREA V

ENTREPRENEURSHIP AND HUMAN RESOURCE DEVELOPMENT

1. Impact assessment of CIRCOT-Bajaj Cotton Pre cleaner

A total of 25 ginning factories in and around Adilabad and Nagpur region were surveyed for impact assessment of CIRCOT-Bajaj Pre-cleaner, an inclined pre-cleaner for cleaning of seed cotton before ginning to improve the ginning performance and the technology, which was commercialized in association with Bajaj Steel Industries. In order to conduct the *Ex-post* impact assessment of the technology a detailed questionnaire was prepared, which covered the basic industrial information, technological information and quality related information to capture the ginning performance, trash content, maintenance cost of the ginning factories and the quality of the fibre. The salient findings of the study are:

1. Cleaning efficiency with respect to kawadi was found to be 40 per cent
2. The cleaning efficiency with respect to trash content was around 15 per cent
3. The determinants of the adoption show that improvements in the grade of lint and bale value and in TMC rating were the major factors influencing the adoption of the pre-cleaners in the ginning factories.

2. Technical Assistance Programme (Cotton TAP) to strengthen cotton value chain in Cotton-4 Countries (Benin, Burkina Faso, Chad and Mali), Malawi, Nigeria and Uganda in Africa

Technical Assistance Programme (TAP) for development of cotton sector in African countries is being implemented as per the Second Africa-India Forum Summit (AIFS). The Cotton TAP being conducted by CIRCOT is aimed at providing development support for the cotton sector in the C-4 countries (Benin, Burkina Faso, Mali and Chad), Nigeria, Uganda and Malawi. The country-specific problems related to processing and value addition prevailing to a great extent in these countries are understood and measures to mitigate them are being implemented under this programme. CIRCOT is handling three activities namely B1, B2 and B6.

B2 Activity: In Country Training Programme on "Post-harvest Management and Value Addition of Crop Residue"

CIRCOT conducted "In- country training programme on Post-harvest Management and Value Addition of Crop Residue" at Uganda and Malawi to increase the critical mass of government R&D, production and extension professionals with enhanced capacity for post-harvest management and utilization of crop residues. Dr. P. G. Patil, Director, Er. A. K. Bharimalla, Senior Scientist and Er. V. G. Arude, Scientist from CIRCOT, Mumbai conducted and coordinated the programme at Uganda and Malawi.

- A group of 25 professionals from Uganda and 21 professionals from Malawi with diverse background belonging to different organizations viz. government and private sector, policy makers, production technologists, scientists, entrepreneurs were imparted training on November 12-16, 2014 at Cotton Development Organization, Kampala, Uganda and during November 17-19, 2014 at

Bvumbwe Agricultural Research Station, Blantyre, Malawi.

- "In-country training programme on Post-harvest Management of Cotton and Value Addition to Cottonseed and Crop Residues" was held on March 12, 2015 at Bohicon, Benin. A group of 25 professionals from different organizations engaged in development of cotton sector viz., ginneries, government and private sector, policy makers, production technologists, scientists and entrepreneurs attended the training programme.

B6 Activity: Setting up of Regional Knowledge Cluster-cum-Training Centre on Post-harvest and Ginning Technology

Regional Knowledge Cluster-cum-Training Centre on Post-harvest and Ginning Technology" is to be established for which a suitable site has been selected at Benin.

3. Marketing and widening the customer base of CIRCOT calibration cotton

Surabhi, a long staple cotton was processed through blow room and carding. The cleaned fibre was thoroughly blended to prepare a calibration cotton having quality parameters of 31.6 mm span length, 45.0 uniformity ratio, 3.5 micronaire with a tenacity of 24.4 grams/tex. This cotton is supplied to the trade and industry in the cotton code of HD-6. A customer database has been created for calibration cotton.

EXTERNALLY FUNDED PROJECTS

1. Jute based Biocomposites for Industry (NFBSFARA)

DREF friction spinning process (core spinning system) was used to prepare jute reinforced polypropylene composite (Fig. 10). A good distribution of reinforcement material can be achieved through this process. Nine different Jute core polypropylene wrapped yarns were

produced with varying core yarn twist level and Jute:Polypropylene proportion. The core spun yarns were converted into fabrics in both plain and twill weave and finally the fabrics were converted into 18 different composite materials using compression molding process. It was found that with increase in jute reinforcement, the composite tensile strength either increased or remained constant. The plain weave structure had a little advantage over twill weave for this type of composite material. These types of composites can be used as an alternative to plastics, especially for high strength applications.



Fig. 10: Jute Reinforced Polypropylene Composites

2. Development of gossypol-free lysine-rich cottonseed cake by solid state fermentation (NFBSFARA)

- The fungal isolates such as LF1-2F1, LF1-5F1 and SV-2F2 were identified as potential isolates detoxifying gossypol and improving lysine content in cottonseed cake.
- Solid state fermentation processes were developed using the heat and chemical sterilization with two culture combinations viz., 1. *Candida tropicalis* and *Saccharomyces*

cerevisiae and 2. *Pleurotus sajor-caju* and *S. cerevisiae* 6933. The fermented cottonseed cake showed improved nutritional qualities such as 80% reduced free gossypol, 60 % reduced total gossypol, 15 – 25% increased lysine content, 40 – 50 % improved protein content and 25 – 30 % reduced fibre content compared to untreated cottonseed cake (control).

- The fermented UDCSK stored up to three months showed no change in its quality.
- Forty percent replacement of soybean meal with P. sc + S. c 6933 fermented UDCSK showed better FCR
- Industrial trials showed fermented cottonseed cake improved nutritional properties and fermented de-oiled cake suitable for poultry feed.

3. Biodegradable Electrospun Fibre Mat for use in Packaging of Fresh Perishable Agricultural Materials (NFBSFARA)

- Porosity of the electrospun mat was calculated using the BET analyzer, SEM and adsorbent methods. The process of electrospinning was optimized for producing the electrospun mat with maximum BET area.
- The volatile gas profile of the Alphonso mango during the ripening stage was studied at three different locations viz., CIRCOT (Konkan region), TNAU (Tamilnadu) and IHR (Karnataka), and the changes in composition of the volatile gases released by mango fruit during ripening were identified (Table 11).
- The target molecules giving colorimetric response to a sensor to indicate ripening of fruit were identified.
- GC-MS data was mined to obtain the change in relative concentration of the components over time. There is reproducibility of concentration trend, (Fig 11)

Table 11: Major Components in Volatiles Released by Mango during Ripening

Structure	Compound	R.T. min	Structure	Compound	R.T. min
	3-methyl furan	0.89		Dimethyl octatriene	6.6
	α -pinene	2.8		Ethyl octanoate	7.9
	α -ocimene	3.5		Ethyl-trans-4-decenoate	15.6
	P-mentha 1,4-diene	4.6		Ethyl decanoate	16.4
	Tetramethylcyclohexadiene	5.7		Caryophyllene	17.5

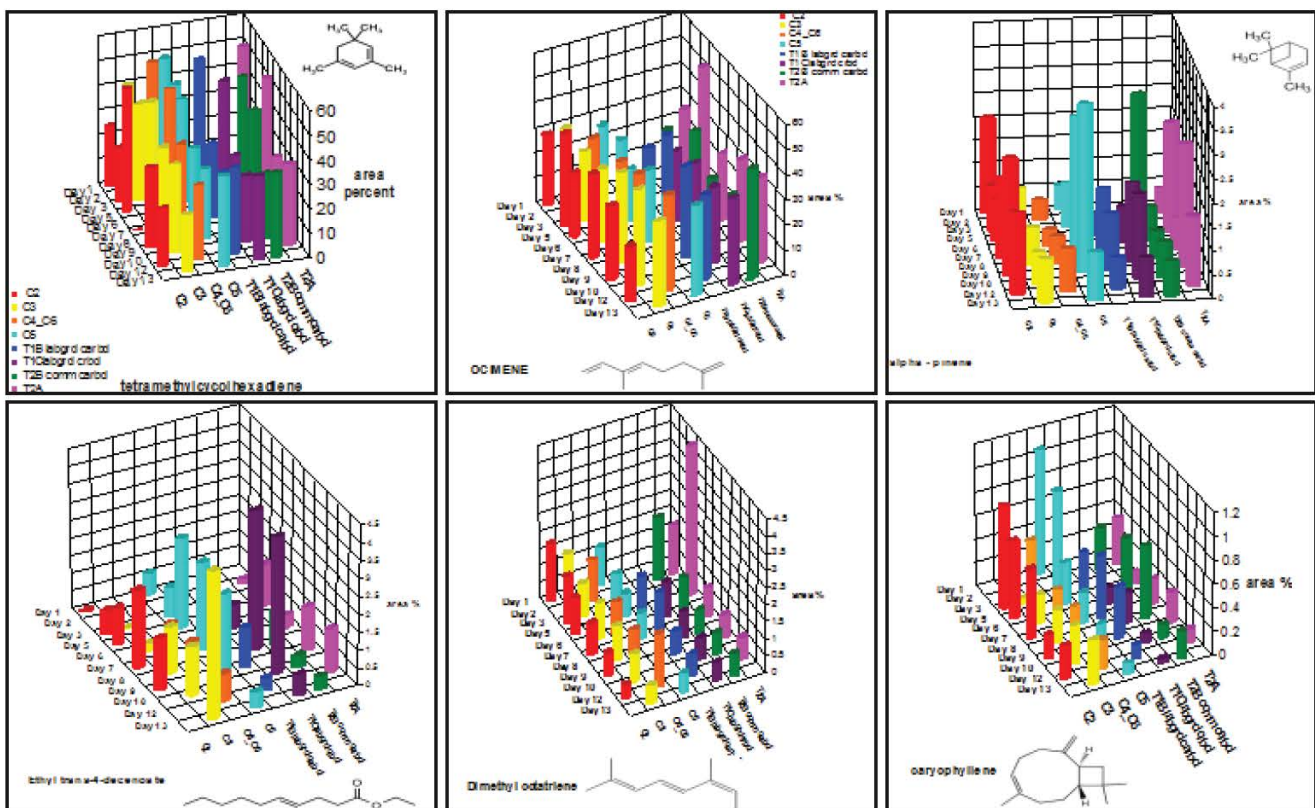


Fig 11. Relative Concentration of Volatile Component over 13 days across Control and Carbide presence Groups of Ripening Mangoes



- i) A rise from the initial to a peak in the first 3 days and then a fall for tetramethyl cyclohexadiene,
 - ii) a gradual rise from initial to a peak at day 7 8, and then a fall for α -pinene, ocimene, ethyl trans-4-decenoate,
 - iii) a gradual decrease from an initial peak to 10-20% of initial concentration for dimethyl octatriene, p-mentha-1,4-diene, caryophyllene and ethyl decanoate
 - iv) a gradual decrease from an initial peak, with a spike at day 8-9, for ethyl octanoate
 - v) a gradual increase and plateauing in concentration for 3-methyl furan, which is an isoprene oxidative degradation product from the total volatiles released among the control groups.
- Calorimetric sensor has been developed to identify the ripening of the mango based on the volatile gases released by the fruit and its performance has been evaluated.

4. Cotton Picking Machinery for Small Scale Cotton Production Systems (TMC MM 1.7)

Machine and hand picked cotton samples were collected from Guntur, AP. M/s. John Deere picker, specially developed for Indian cotton farms was employed for picking of cotton. The samples were analysed for fibre attributes and trash content. Analysis of results shows that the machine picked cotton contained around 12-22% trash content compared to 2-4% trash content in the hand picked cotton. It is observed that the leaf content is around 50-80% of the total trash content found in the most of machine picked cotton samples.

HVI parameters revealed that the cotton samples possessed low strength and fineness measured in terms of Micronaire values. Moreover, the test results did not yield any trend and gave wide variations from sample to sample for all the major

fibre parameters including staple length (UHML – 26.5-30.5mm). It was concluded that the erratic behaviour of the samples might possibly be due to sowing of hybrids in narrow spacing system.

A field cleaner consisting of two-stage sling off action cleaning is designed for on field cleaning of cotton harvested using stripper type picker developed by ICAR-CICR, Nagpur. The designed cleaner was 600mm wide and 1200 mm wide with a height of 1300 mm. It is proposed to mount the cleaner on a trolley propelled by a tractor. Machine harvested cotton would be fed at the top of the cleaner and the cleaned cotton diverted to the storage box attached at the side of the tractor.

5. Agro Technique for High Density Planting System and Surgical Cotton Varieties (TMC MM 1.4)

Out of 23 cotton samples received from CICR, Nagpur, 20 samples were selected for the preparation of absorbent/surgical cotton based on fibre length and micronaire values. Absorbent cotton was prepared from all 20 samples by using the single stage chemical process developed by CIRCOT. Performance evaluation of absorbent cotton thus prepared showed good absorbency and their properties were as per IP/BIS standards

Twelve cotton samples received earlier from Sirsa which were found suitable for absorbent cotton preparation by chemical method were evaluated for preparation of absorbent/surgical cotton using microbial process developed by CIRCOT. These microbially processed samples could not meet the criteria for absorbency though they could satisfy the water holding capacity and ash parameters prescribed by IP/BIS standard for absorbent / surgical cotton.

6. Electrospinning Geometry Optimization for Preparation of Core-Sheath Nanofibres and Conversion of Nanofibres into Yarns (DST)

A friction spinning collector for the electrospinning setup has been designed and fabricated. The parameters for the production of nanofibres has been optimised. The Fig. 12 shows the total configuration of the setup in vertical manner having solid copper rollers for better electrical conductivity. The two copper rollers rotate in the same direction and are kept very close to each other. The gap between these copper rollers accommodates a nylon filament on which the nanofibers formed on the rollers will be transferred due to friction. The core filament feeder is kept at the top and yarn collection mechanism is kept in the bottom. The controller consists of speed controls for both copper rollers and yarn collection mechanism.

Nylon filament is being used as core while cellulose acetate is used as sheath (nanofibres). The gap between copper rollers is maintained at 10 thou and speed is being varied between 500 and 1500 rpm. Fig. 13 shows the scanning electron micrographs of friction spun core-sheath yarn in the fabricated system at CIRCOT, Mumbai. Figures 2a and 2c shows the longitudinal and cross section views of neat nylon filament and figures 2b and 2d shows the longitudinal and cross section views of friction spun core-sheath yarn (nylon as core and cellulose acetate as sheath). A review was done by DST in University of Mumbai and the Expert Advisory Group on 'Industrial and Analytical Instrumentation' suggested for optimization of entire process, patenting of technology and technology transfer to the industry partner.

The Industry partner in the project M/s. Physics Instruments Co., Chennai visited our lab and has showed interest to proceed further to validate the technology. A MoU will be signed after filing a patent on this invention.



Fig. 12: Friction Spinning Collector and Power Supply

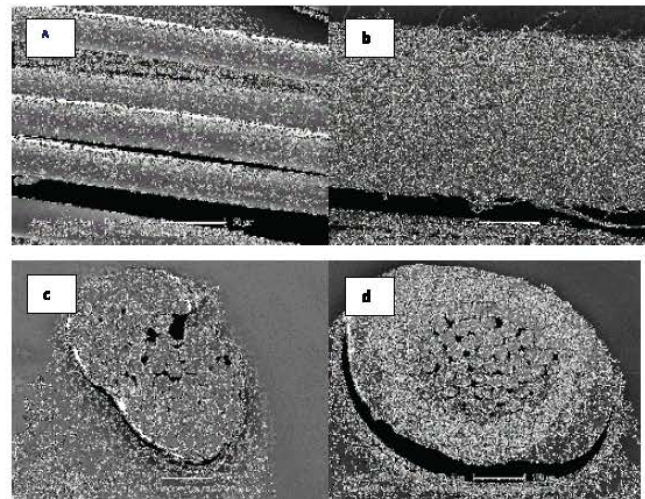


Fig. 13: Scanning Electron Micrographs of Nylon Yarn a), Cellulose acetate Friction Spun on Nylon Core (b) and the same in Cross sectional views (c & d respectively).

Consortia Research Project (CRP) on Natural Fibres

The aim of this project is to exploit the available natural fibres and their by-products by using high-end technologies to fuel the growth of fibre sector in India; To identify and isolate newer fibrous raw materials for value addition and thereby provide enhanced income to all the stakeholders in the value chain.

**The major objectives are:**

- a) To enhance the indigenous availability of a few commercially viable demand driven natural fibres
- b) To recover quality fibres from biomass of natural fibre system in an economic scale
- c) To prepare novel products from natural fibre blends to cater to Apparel, Home textile and Technical textile sectors
- d) To derive fine chemicals and energy from by products of natural fibre system
- e) To assess the environmental impact of production and processing of natural fibres

Expected Output

- Increased fibre production of Ramie, Flax, Sisal and Sunnhemp for industrial use
- High productive, energy-efficient, cleaner and environment-friendly fibre Extraction Technologies
- Protective (snake-bite resistant and pesticide resistance fabric), functional apparels, Poly house and Weed control fabrics
- Moulded, Laminated/coated products, Carry Bags and Packaging materials
- High value compounds and energy from natural biomass Environment impact assessment through
- Life Cycle Analysis for jute and cotton

Platform Project in a Nutshell

Core Area	5 Core Areas
No. of Projects	25 projects
Nodal Centre	Central Institute for Research on Cotton Technology, Mumbai
Lead Centres (6)	CIRCOT, CICR, CRIJAF, NIRJAFT, CSWRI, IHR
Co-operating Centres (14)	1. GBPUA&T; 2. CSKHPKV; 3. SKUAST; 4. AAU; 5. MPKV, RAHURI; 6. UAS, DHARWAD; 7. ZENEITH RUBBERS; 8. INDIAN PLYWOOD INDUSTRIES R&T INST; 9. IARI; 10. NRC, YAK; 11. TNAU; 12. ANGRAU; 13. CPCRI, 14. DBSKKV Dapoli.
Project Duration	3 years (2014-2017)
Total Budget	Rs. 120.00 Crore



The institute is engaged in developing newer technologies in the area of post-harvest processing of cotton, eco-friendly finishing of textiles, better utilization of cotton stalks and refinement of the already developed technologies. Technologies developed are protected through intellectual property rights management. Assessment, popularization and commercial adoption of viable technologies are carried out through periodically

conducted demonstrations, industrial trials, awareness meets, exhibitions and seminars.

Intellectual Property Management:

The Institute Technology Management Unit (ITMU), is involved in the protection of the intellectual property and commercialization of the technologies developed in the institute.

Patents

S. No	Title	Application No. (Date of application)	Inventors
1	A novel process for gossypol reduction and nutritive quality improvement in cottonseed cake for its use in non-ruminants	1477/MUM/2014 (28/04/2014)	Dr. V. Mageshwaran Dr. (Smt.) A A Kathe
2	RFL (Resorcinol Formaldehyde Latex)-free process for textile based rubber composite	1509/MUM/2014 (30/04/2014)	Sh. G. Krishna Prasad, Dr. S. K. Chattopadhyay, Dr. S.K. Chakraborty, Sh. A.M. Vohra, Sh. Ashok Kumar Bharimalla
3	Composite Made from waste paper & the method of producing the same	1723/MUM2014 (23/05/2014)	Sh. Sekhar Das, Sh. Manik Bhowmick, Sh. Santanu Basak
4	Electrospinning apparatus with friction spinning collector for production of core-sheath Nano yarn	295/MUM/2015 (29/01/2015)	Dr. N. Vigneshwaran, Sh. A. Arputharaj Dr. Kartick Samanta Sh. Manik Bhowmik

MoU signed during the year

S. No.	Purpose	Stakeholders
1	Collaborative Project on Development of Protective Textiles for Agricultural Workers	Zenith Industrial Rubber Products Pvt. Ltd., Mumbai, Maharashtra



S. No.	Purpose	Stakeholders
2	Textile Reinforced Rubber Composite Sheets	Zenith Industrial Rubber Products Pvt. Ltd., Mumbai, Maharashtra
3	Scale up and Industrial Evaluation Trial on Degossypolization of De-oiled Cottonseed Cake	Kallam Agro Products Oils (P) Ltd., Guntur, Andhra Pradesh
4	Scale up and Industrial Evaluation Trial on Degossypolization of Cottonseed Cake	Sri Bagyalakshmi Refinery (P) Ltd., Tirupur, Tamil Nadu
5	Non-Disclosure Agreement for Consultancy in Characterization of Nanocellulose Sample	ITC Ltd., Kolkata, West Bengal
6	Consultancy for Nanofinish using ZnO and Chitosan and their Characterization	Prof. Russel Timothy, National Institute of Fashion Technology, Chennai, Tamilnadu
7	Development and Commercial Supply of the New DR Ginning Machine (hinged blade assembly) and Self-grooving Rubber Roller	Millennium Technologies Pvt. Ltd, Kerala



MoU with M/s Zenith Industrial Rubber Products Pvt. Ltd., Mumbai



MoU with Prof. R. Timothy, NIFT, Chennai

Technology Assessment and Transfer

Awareness Meets and Demonstrations

- An Awareness-cum-Demonstration programme on preparation of bio-enriched compost from cotton plant residues was organised on farmer's field at village Shahpur Begu in Sirsa District of Haryana State on February 21, 2015. In all, 48 invited farmers from nearby districts of Haryana and Rajasthan participated in the programme. The farmers were made aware of the methodology of compost preparation, its nutritional aspects, application of compost to cotton crop, its beneficial impact on soil health improvement and its utility as to how it could help in containing pests and diseases. The farmers were also given a hands-on practical demonstration of compost preparation on large scale. All the farmers showed keen interest in demonstration and willingness to prepare compost on cooperative basis in the region. Sh. Rajaram Kadvasra, a progressive farmer and secretary of Kisan Club, Sirsa who prepared and used the compost last year shared his experiences with other farmers.
- An on-farm awareness cum training programme on clean cotton picking was organized on the cotton field of Sh. Rajaram, a progressive farmer at Begu village in Sirsa district (Haryana) on October 10, 2014 and November 1, 2014. The cotton pickers along with cotton picking aids viz. headgears, sheets, bags and tarpaulins, etc. were provided to the farmers and were explained about harvesting trash and contaminant free cotton, its benefits and the importance of proper storage and transportation. An exhibition of commonly found contaminants in cotton was arranged for the farmers.
- Demonstration cum awareness program (Farmer's Day) on "Banana fibre extraction machine and yarn making machine" was organized at ICAR Research Complex for NEH region, Barapani, Meghalaya on August 1, 2014.
- Field Demonstration-cum-awareness workshop on "Supply Chain Management (SCM) for utilization of Cotton Stalk for Value Added Products" was conducted by GTC, Nagpur on June 28, 2014 at Dhotra village in Amravati, for the establishment of supply chain management of cotton stalks for industrial



Demonstrating the preparation of Bio-enriched compost from cotton plant residues at Sirsa



applications in association with Agro Plus Foundation, Self-Help Group of Cotton Growers, Nagpur, International Society for Cotton Research & Development (ISCRD), Nagpur.

- Field demonstration-cum-awareness workshop on "Utilization of cotton stalk for value added products" was conducted by GTC, Nagpur on June 13, 2014 at Sakarla village in Parseoni, Dist. Nagpur with the association of NGOs, (Self-Help Group of Cotton Growers, Nagpur; Agro Plus Foundation, Nagpur; International Society for Cotton Research & Development (ISCRD), Nagpur). The workshop aimed to create awareness among farming community about the value addition to the cotton stalks through either composting or through preparation of briquettes or pellets. Live demonstration for preparation of compost using cotton stalks was also shown to the participants by the experts from CIRCOT.

Participation In Exhibitions

ICAR-CIRCOT participated in many exhibitions and agricultural fairs organised in different parts of the country through the Technology Transfer Division, BPD and other Regional Units. Large number of farmers and other stakeholders benefitted from the exhibition. List of these exhibitions is listed below.

1. NAIP Agribusiness Conclave in Delhi on May 18-19, 2014.
2. Krishi Mahotsav at Vyara, Tapi district, Gujarat on June 6-7, 2014. The exhibition was inaugurated by Hon'ble Chief Minister of Gujarat, Smt. Anandiben Patel.
3. Rashtriya Kisan Mela on Citrus organised by ICAR-National Research Centre for Citrus (NRCC), Nagpur during October 30-31, 2014.

4. 6th Agro Vision Exhibition was organized at Nagpur from December 3 - 7, 2014. The exhibition was inaugurated by the Hon'ble Chief Minister of Maharashtra, Sh. Devendra Fadnis. Sh. Nitin Jairam Gadkari, Cabinet Minister (Road Transport and Highways, Shipping) visited the CIRCOT Stall and appreciated the work.



Sh. Nitin Gadkari, Hon'ble Union Minister for Road Transport and Highways & Shipping at CIRCOT Stall

5. 102nd Indian Science Congress held at Mumbai University from January 3-7, 2015. ICAR-CIRCOT has displayed its exhibits in the ICAR stall. Sh. Harshvardhan, Union Minister of Science and Technology, inaugurated the 'Pride of India' exhibition and visited the stall. Many senior dignitaries from DRDO, Central government, Maharashtra government, industries, students from colleges and schools, farmers from interior Maharashtra visited the stall and showed interest in the institute's technologies and

training programs. ICAR Stall won the Best Design pavilion Award for its attractive and informative display on all facets of agriculture.



ICAR Stall at Indian Science Congress, Mumbai

7. 12th Agricultural Science Congress 2015 held at Kamal, Haryana from February 2-7, 2015.



Dr. K Narayana Gowda, Former Vice Chancellor, University of Agricultural Sciences, Bangalore, Karnataka at the ICAR-CIRCOT Stall

6. Farm to Finish Expo 2015- ICAR-CIRCOT Regional unit Coimbatore participated and exhibited CIRCOT Technologies in "Farm to Finish Expo 2015" organized by SIMA held at CODISSIA trade fair complex, Coimbatore from January 9-12, 2015.



Dr. K. Selvaraju, Secretary General, SIMA Coimbatore at ICAR-CIRCOT stall

7. Science Expo 2015 at Nehru Science Centre, Worli, Mumbai from February 4-7, 2015.



Dr. Ratan Kumar Sinha, Chairman, Atomic Energy Commission; Dr. S.M. Khened, Director, Nehru Science Centre at ICAR-CIRCOT Stall



4. TRAINING AND CAPACITY BUILDING

Training and Capacity Building is a continuous process that enhances the learning, human potential and performance of personnel in their work related area, which contribute to sustainable development of an organization. This chapter summarizes various trainings undergone by the staff

of the Institute as well as the trainings imparted to the stakeholders (both national and international). As per the directives of the Council, Dr. N. Vigneshwaran, Sr. Scientist has been identified as the Nodal Officer of HRD for CIRCOT.

Capacity Building of Institute Employees

S. No.	Name	Training details	Organisers & Period
1.	Er. A. K. Bharimalla	MDP programme on Harnessing Intellectual Property for Strategic Competitive and Collaborative Advantage	IIM, Ahmedabad June 20-22, 2014
2.	Dr. K.K. Samanta	Application of Electronics in Agriculture and Environment	C-DAC, Kolkata June 16-27, 2014
3.	Dr. S. K. Dey Dr. P. K. Mandhyan	Refresher Course on Agricultural Research Management for directly recruited Senior / Principal Scientists	NAARM, Hyderabad June 4-26, 2014
4.	Smt. N. M. Deshmukh	Administration related special Training Programme	ISTM, New Delhi June 9-20, 2014
5.	Sh. P. V. Jadhav	Administration related special Training Programme	ISTM, New Delhi Jun 30 – Jul 11, 2014
6.	Administrative Staff of CIRCOT (28)	MIS/FMS Training for ICAR-CIRCOT Personnel	IBM, New Delhi Sept 16, 2014
7.	Dr. N. Shanmugam Dr. R.D. Nagarkar Sh. Sunil Kumar	Reservation Policy of Government of India	IPA, Bengaluru Oct 16-18, 2014
8.	Dr. S. Venkatakrisnan	Model Training Programme on value addition through Product Diversification on Jute & Allied Fibres	NIRJAFT, Kolkata Nov 10 – 17, 2014
9.	Dr. P.K Mandhyan Sh. G. Krishna Prasad	NABL Training on Laboratory Quality Management Systems and Internal Audit as per IS/ISO/IEC 17025	BIS, Mumbai Feb. 18 - 21, 2015
10.	Dr. M.V.Vivekanandan	Training Programme on Office automation using Oracle ERP	IASRI, New Delhi March 9 – 13, 2015

Trainings Imparted

Training is an important mandate of the institute aiming to provide skilled man power to the ginning industry and impart knowledge among farmers on value addition to the cotton biomass so as to improve their remuneration. The institute conducts regular training programmes on cotton quality evaluation for farmers, personnel from cotton trade and industry. The Ginning Training Centre at Nagpur conducts training courses for gin fitters and other workers in ginning industry on technologies in ginning for production of clean quality cotton, maintenance of various ginning and allied machines apart from solving technical problems that arise in the ginning industry. The Institute also organises customized special training programmes to personnel sponsored from the industry on

specific topics as per the demand.

International Training Programme under Cotton TAP for African Countries

Training programme on "Post-harvest Management of Cotton and Value Addition to Cottonseed and Crop Residues" was organised under Cotton Technical Assistance Programme (TAP) for development of cotton sector in African countries. It was implemented as per Second Africa-India Forum Summit (AIFS). The stakeholders of the training include government and private sector, policy makers, production technologists, scientists and entrepreneurs. Dr. P. G. Patil, Director, Er. A. K. Bharimalla, Senior Scientist and Er. V. G. Arude, Scientist from CIRCOT, Mumbai conducted and coordinated the programme.

In country training programmes organised in Africa under Cotton TAP

Country	Duration	No. of Participants	Venue	Experts
Uganda	November 12-16, 2015	25	Cotton Development Organization, Kampala	Dr. P. G. Patil Er. V. G. Arude Er. A. K. Bharimalla
Malawi	November 17-19, 2015	21	Bvumbwe Agricultural Research Station, Blantyre	Dr. P. G. Patil Er. V. G. Arude Er. A. K. Bharimalla
Benin	March 10-14, 2015	25	National Agricultural Research Institute of Benin, Bohicon	Dr. P. G. Patil Er. A. K. Bharimalla



CIRCOT Experts at INRAB, Benin



Visit to Cottonseed Godown in Malawi



CIRCOT Experts with Mr. Samuel Baker Kuckel Vice Chancellor, Busitema University, Uganda



CIRCOT Experts at Cotton Development Organisation, Uganda



CIRCOT Experts with Director General, INRAB Benin

National Trainings

ICAR Short Course on "Application of Electrospun Nanofibres in Crop Health & Post-Harvest Technology" was organized during September 15-24, 2014 by ICAR-CIRCOT, Mumbai. 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.

A Five day training programme on 'Cottonseed: Scientific processing and Value-addition' was conducted during November 10-14, 2014. The training focused on scientific processing and diversified uses of cottonseed, value addition to cottonseed for economic prosperity and to impart knowledge of analytical methods for cottonseed analysis. Trainees from Maharashtra, Gujarat and Tamilnadu participated in the programme.

A training programme on 'Basics of

Nanotechnology and its Application' was organized from December 8 - 12, 2014. The programme was inaugurated by Sh. R. Rajagopal (IAS), Additional Secretary, DARE & Secretary, ICAR. The objectives of the training programme was to impart basic knowledge on nanotechnology, hands-on training in preparation and characterization of nanomaterials and demonstrate their application in textiles, composites and agriculture. Twelve participants from Gujarat, Andhra Pradesh, Karnataka, Tamil Nadu and Maharashtra attended this training programme.

A five day training on 'Cotton Spinning' was organized during January 5-9, 2015. The main objective of the programme was to update the knowledge and skills of trainees on the aspects of cotton quality evaluation, ginning, basics of spinning technology and machineries, new and advanced spinning systems, post spinning operations, cost and financial analysis of spinning industry, both in theory and practical mode and to

keep abreast about the latest techniques and development in the spinning processes. Participants from private industry, National Textile Corporation and ICAR institute, attended this training programme.

A three day training programme on 'Advances in Microscopy' was conducted during January 19-21, 2015. This self-sponsored training programme was attended by ten participants from diversified background, viz., students, faculties, scientists & industry personnel (Karnataka, Tamil Nadu, Himachal Pradesh, Assam and Maharashtra). Hands-on training was provided in the fields of polarized, fluorescence, atomic force and scanning electron microscopy.

A training programme on the 'Chemical Characterization of Textile Materials & Auxiliaries' was organised at ICAR-CIRCOT, Mumbai from February 23-27, 2015. The objective of the programme was to acquaint the trainees with basic and advanced chemical and spectroscopic methods for the characterization of dyed & finished fabrics and to provide hands on experience on various analytical techniques. Twelve participants

attended the training programme.

A Training programme on 'Advances in Textile Characterization' was organized at the institute during March 16-20, 2015. There were nine participants from various organisations viz. University of Agricultural Sciences, Dharwad, Anna University, Chennai, M/s. Ajit Seeds, Aurungabad, Cotton Research Station, Nanded and Institute of Chemical Technology, Mumbai. The objective of the training programme was to impart theoretical knowledge and practical skills on textile characterization using advanced instrumentation.

Tribal Sub Plan (TSP) Programme

A one day training cum awareness program on utilization of cotton stalks for value added products and operation of small gins for tribal farmers under tribal sub plan (TSP) was conducted on March 29, 2015 at Boarda village, Tah. Ramtek, Nagpur by GTC, CIRCOT, Nagpur. The program was presided over by Dr. M.S. Kairon, former Director, CICR, Nagpur as chief guest and about one hundred and ten farmers attended the program.



Participation of tribal farmers in training cum awareness program at Boarda Village, Tah. Ramtek, Nagpur



Besides the ICAR Short Course and the six special trainings organised during the year 2014-15, other routine trainings were also organised. The training activities are organised at HQ Mumbai & in Ginning Training Centre at Nagpur.

List of Skill Development and Capacity Building programmes organised during 2014-15

S.No	Name of Training	Venue	Date	Trainees from
1.	Quality Evaluation of Cotton	Mumbai	July 21-25, 2014	Gujarat, Maharashtra and Madhya Pradesh
2.	Basics of Nanotechnology and its application	Mumbai	June 9-13, 2014	M/s. Rashtriya Chemicals & Fertilizers Ltd. Mumbai
3.	Double Roller Ginning Technology and quality evaluation of cotton	GTC, Nagpur	June 16-20, 2014	Maharashtra, Andhra Pradesh & M.P
4.	Double Roller Ginning Technology	GTC, Nagpur	July 14-19, 2014	Maharashtra, Andhra Pradesh & M.P
5.	ICAR Short Course on Application of Electrospun Nanofibres in Crop Health & Post-harvest Technology	Mumbai	September 15-24, 2014	Scientist & Asst. Professor from ICAR & SAU
6.	Quality Evaluation of Cotton	Mumbai	September 8-12, 2014	Gujarat, Maharashtra & M.P.
7.	Instrumental and Manual Cotton Classing	GTC, Nagpur	August 18-23, 2014	M/s. White Gold Cotton Testing Laboratory, Ahmedabad
8.	Cotton Processing, Classing and Marketing	GTC, Nagpur	September 1-6, 2014	Maharashtra and M.P.
9.	Double Roller Ginning Technology	GTC, Nagpur	September 15-20, 2014	M/s. Manjeet Cotton Pvt. Ltd.
10.	Double Roller Ginning and Cotton Quality Evaluation	GTC, Nagpur	Sept 29 – Oct 4, 2014	Ginners and Traders from Maharashtra
11.	Double Roller Ginning and Cotton Quality Evaluation	GTC, Nagpur	Nov 10-15, 2014	Ginners and Traders from Maharashtra
12.	Cottonseed: Scientific Processing and Value Addition	Mumbai	November 10-14, 2014	Maharashtra, Gujarat and Tamilnadu
13.	Post-Harvest Management of Cotton and Value addition to cottonseed and crop residues	Kampala, Uganda	November 12-16, 2014	Stakeholders of cotton sector in Uganda
14.	Post-Harvest Management of Cotton and Value addition to cottonseed and crop residues	Blantyre, Malawi	November 17-19, 2014	Stakeholders of cotton sector in Malawi

15.	Basics of Nanotechnology and its application	Mumbai	December 8-12, 2014	Gujarat, Andhra Pradesh., Karnataka, T.N. & Maharashtra
16.	Training on Cotton Spinning	Mumbai	January 5-9, 2015	Private industry, NTC & ICAR scientist
17.	Advances in Microscopy	Mumbai	January 19-21, 2015	Karnataka, T.N., Himachal, Assam and Maharashtra
18.	Cotton quality evaluation and By-product utilization	GTC, Nagpur	January 27-31, 2015	Farmers from Jalna (Maharashtra)
19.	Quality Evaluation of Cotton	Mumbai	February 9-13, 2015	CCI, Spinning Industry and Farmers
20.	Chemical Characterization of Textile Material and Auxillaries	Mumbai	February 23-27, 2015	Students, Faculty and Private industry
21.	Advances in Textile Characterizations	Mumbai	March 16-20, 2015	SAU's, Private industry
22.	Post-Harvest Management of Cotton and Value addition to cottonseed and crop residues	Bohicon, Benin	March 10-14, 2015	Stakeholders of cotton sector at Benin



Training on Advances in Textile Characterization



Chemical Characterization of Textile Material & Auxillaries



Training on Basics of Nano Technology



Training on Advances in Microscopy



Education

The University of Mumbai has accorded permanent recognition to CIRCOT for guiding students leading to M.Sc. (by research) in subjects: Physics, Biophysics, Microbiology and Organic Chemistry and Ph.D. in Physics and Microbiology.

CIRCOT has signed MoU with educational institutions to promote research and teaching in the sphere of cotton science and technology. The MoU helps in carrying out joint research work and

creates an opportunity for perusing post graduate & doctoral degree programmes. ICAR-CIRCOT has signed MoU with following educational institutions.

1. VJTI, Mumbai.
2. Dr. BSKKV, Dapoli.
3. UAS, Raichur
4. SNDT, Mumbai
5. ICT, Mumbai

List of Ph.D Students on Rolls

Name of Student (Research Guide)	Year of Admission	Research Topic
Mrs. Soniya Shetty (Dr. R.H. Balasubramanya)	2008	Anaerobic retting of coconut fibres to produce textile grade fibres.
Mr. Vijay .Mayekar (Dr. R.P. Nachane)	2010	Study of pilling behaviour of textile fabrics.
Mrs. Sangeeta M. Chavan (Dr. N. Vigneshwaran)	2012	Effect of silver, zinc oxide and titania nanoparticles on nitrogen fixing, phosphate solubilizing and biofilm forming bacteria found in soil ecosystems.
Ms. Komal Saraf (Dr. N. Vigneshwaran)	2012	Preparation of nanofibre mats of alginate and pullulan by electro spinning and its application as nanosensor for detection of food spoilage
Ms. Siddhi Juikar (Dr. N. Vigneshwaran)	2012	Microbial production and Characterization of Nano-Lignin and its application
Ms. Seema Agarwal (Dr. N. Vigneshwaran)	2014	Increasing efficacy of microbial fuel cell using modified electrodes and complex carbohydrates for microbial electricity generation
Ms. Priyanka Bagde (Dr. N. Vigneshwaran)	2014	Immobilization of antimicrobial peptides on nanocellulose for potential use in active food packaging

5. LINKAGES AND COLLABORATION

ICAR - CIRCOT



The Quality Evaluation Units of the institute are situated within the agricultural universities or in other ICAR institutes and these serve as extension wings of the institute. The institute actively participates in the AICCIP meetings and provides feed-back to the breeders for improvement of cotton varieties. The five quality evaluation units together with the Ginning Training Centre (GTC) at Nagpur and the Business Planning and Development (BPD) and Transfer of Technology Division (TTD) at the headquarters promote the technologies developed by the Institute and serve as windows for the technology transfer activities.

The institute is engaged in developing newer technologies and processes in the area of post-harvest cotton processing, eco-friendly finishing of textiles, better utilization of by-products of cotton and refinement of already developed technologies. The institute maintains linkages with various organizations at national and international level to develop technologies and also to cater to the needs of the stakeholders. The technology assessment and the technology transfer are also enhanced through the linkages with the stakeholders.

Area of Collaboration	Institution
All India Coordinated Research Project on Cotton	: CICR, Nagpur; SAU's
Technology Mission on Cotton	: CICR, Nagpur
Research & Education in the field of Cotton Science & Technology	: ICT, Mumbai; DBSKKV, Dapoli; VJTI, Mumbai; SNDT University, Mumbai, UAS, Raichur
Electrospinning	: IIT Madras
Development of Composites	: NIRJAFT, Kolkata
Cotton Technical Assistance Programme (TAP)	: CICR, Nagpur; IL&FS; Directorate of Cotton Development
Nanotechnology	: CPRI, Shimla; CIFE, Mumbai; NIFT, Mumbai; Rashtriya Chemical Fertilizers (RCF), Mumbai



National Level Linkages

ICAR Institutes	Textile Research Association	Universities	Govt. Departments
NGOs	Textile Mills	CCI	Bureau of Indian Standards

International Linkages

ICAC	CFC	UNDP
ICEF	World Bank	Technical Assistance Programme (TAP)
CDO, Uganda	Ministry of Agriculture & Food Security, Malawi	INRAB, Benin

Consultancy and Commercial Testing Services

The Institute maintains a liaison with private organizations and entrepreneurs to meet their needs and also to generate revenue for the

Institute. The technologies developed and consultancies offered by the Institute during the current year are presented below:

Consultancies

S. No.	Title of Consultancy	Name of the Coordinating Scientist	Name of the Organization to which consultancy was given
1	Consultancy for Technical Specification of Ginning and Pressing machinery	Dr. P. G. Patil	M/s. The Vasant Co-op. Shetkari Ginning and Pressing Factory Ltd. Yawatmal (M.S)

S. No.	Title of Consultancy	Name of the Coordinating Scientist	Name of the Organization to which consultancy was given
2	Analysis of Textile auxiliaries	Sh. A Arputharaj	M/s. United Alacrity (India) P Ltd. SIDCO Industrial Estate, Ambattur, Chennai (TN)
3	Analysis of White Cotton Seed	Dr.(Mrs.) Sujata Saxena	M/s. Arian Engineering (P) Ltd., 224, Aakansha Plot No, 2 Press complex, Zone - I, M.P. Nagar, Bhopal (M.P)
4	Bending and Surface analysis work and incorporation of data of Knitted and woven fabric on Kawabata System	Dr.(Mrs.) Sheela Raj	M/s. Hindustan Unilever Ltd., B.D Sawant Marg, Chakala, Andheri (East), Mumbai (M.S)
5	Study of effect of Fabric Conditioners on Usage	Dr.(Mrs.) Sheela Raj	M/s. WIPRO Enterprises Ltd., WIPRO Consumer Cares and Lighting, Dattakanneli Surjapur Road. Bangalore (Kar.)
6	Study of Shear Properties of Fabric	Dr.(Mrs.) Sheela Raj	M/s. Hindustan Unilever Ltd., B.D Sawant Marg, Chakala, Andheri (East), Mumbai (M.S)
7	Design and Machinery for automatic Cotton Ginning Plant	Dr. P. G. Patil Er. A. K. Bharimalla V. G. Arude Dr. S. K. Shukla	M/s. Bajaj Steel Industries Ltd., Imambada Road, Nagpur (M.S)
8	Study of Hand Properties of Chiffon Fabrics	Dr.(Mrs.) Sheela Raj	M/s. Aditya Birla Nuvo Ltd., Rayon Div 200, B-wing, Ground Floor, Ahura Centre, Mahakali caves road, Andheri (East) Mumbai (M.S)
9	Study of Different finishes on Fabric hand	Dr. (Mrs.) Sheela Raj	Banasthali University, (Rajasthan)
10	Consultancy for Nanofinish using ZnO and Chitosan & their characterization	Dr. N. Vigneshwaran	National Institute of Fashion Technology (NIFT), Ministry of Textile, Govt. Of India, Rajiv Gandhi Salai, Taramani, Chennai (TN)



Commercial Testing

CIRCOT is one of the world's renowned cotton testing laboratories and it is the only referral laboratory in the country for testing cotton textiles. It also has the accreditation from National Accreditation Board for Testing and Calibration Laboratories (NABL), since 1999. CIRCOT has the facilities for conducting over 120 tests on different textile materials and cotton by-products. These

facilities are open to all the textiles mills, government departments and marketing sectors.

Twenty-one thousand four hundred and sixty-six samples were tested during the year at the Headquarters and other quality evaluation units at Coimbatore, Guntur, Sirsa, Surat, Dharwad, and Ginning Training Centre at Nagpur. The total revenue generated through commercial testing was around Rs. 33.48 lakh as shown in table below:

Number of Samples Tested and Revenue Generated

Place	No. of Samples Tested	Revenue Generation in Rs.
HQ	8775	2129293.00
Guntur	1514	101029.00
Coimbatore	2723	370259.00
Nagpur	5206	334752.00
Sirsa	1499	170561.00
Surat	288	29800.00
Dharwad	1461	212450.00
Total	21466	3348144.00

List of the test and Clientele

Test	Clientele
Atomic Absorption Spectroscopy	North Mumbai Welfare Society High School, Mumbai
Atomic Force Microscopy	ICAR-CIFE, Mumbai; K B P College, Vashi; NIRJAFT, Kolkata
Cellulose yield	M/s. Gimatex Industries, Wardha
Free and total gossypol	Directorate on Poultry, Hyderabad; M/s. Abhay Cotex, Jalna; C P Aquaculture Pvt. Ltd., Chennai
Lignin	Bapuji Institute of Engineering & Technology, Navi Mumbai

Test	Clientele
LOI	M/s. Delkon Textiles Pvt. Ltd., Faridabad; Sh. Vaishnav Institute, Indore
Lypholization	M/s. Chromco Speciality, Thane; M/s. R N Laboratories, Surat
Moisture Regain	VJTI, Mumbai
Oil Content, Protein, Linters	M/s. Nagarwala Enterprises, Mumbai
Oil, protein, hull, Kernel	M/s. Mc Larens, Mumbai
Protein, lysine, free and total gossypol	M/s. Clean Cotton Impex, Tirupur
Scanning Electron Microscope	Babasaheb Ambedkar Tech University, Raigarh; M/s. Baerlocher India Additives Pvt. Ltd., Dewas, Indore; Bharti Vidyapeeth College of Pharmacy, Navi Mumbai; Birla Institute of Technology and Science, Goa; Birla Institute of Technology and Science, Pilani; Bombay College of Pharmacy, Mumbai; M/s. Coro Chem, Mumbai; H K College of Pharmacy, Mumbai; M/s. Hindustan Unilever Ltd. Mumbai; M/s. Indoco Remedies Ltd., Navi Mumbai; M/s. Intertek, Mumbai; M/s. IPCA Laboratories Ltd., Mumbai; M/s. Johnson & Johnson, Mumbai; Khalsa College, Mumbai; M/s. Loreal India Pvt. Ltd., Mumbai; ICT, Mumbai; M/s. Sarex Chemicals, Mumbai; M/s. Watson Pharma Pvt. Ltd., Ambemath
SEM, FTIR, XRD	Institute of Science, Mumbai
Surface Tension	M/s. Croda (I) Co. Pvt. Ltd., Navi Mumbai; M/s. Dura Colour, Ahmedabad; M/s. Janak Enterprises, Ahmedabad
TGA, SEM, AFM	ICT, Mumbai
Trash, Cellulose, Moisture	M/s. Bajaj Steel Ind. Ltd., Nagpur
UPF	M/s. Asha Soni, Bhiwani; DKTE, Ichalkaranji; Technological Inst. of Textile & Sciences, Bhiwani
UPF, SEM FTIR Lignin	VJTI , Mumbai
XRD	CHM College, Physics Department, Ulhasnagar, Thane

Best Design Pavilion Award – Indian Science Congress

The institute's stall at the ICAR Pavilion won the Best Design Pavilion Award for its attractive & informative display at Indian Science Congress 2015 held at Mumbai.

Rajbhasha Award

ICAR-CIRCOT was awarded 'Rajbhasha' second award for outstanding implementation of Official Language Hindi in the category of 'small offices' of Government of India from Aashirwad, a Literary, Socio-cultural organization on its 23rd Aashirwad Rajbhasha Award function at Mumbai on October 31, 2014.



Individual Awards / Fellowship / Prizes

- Dr. N. Vigneshwaran, Senior Scientist, received the NASI-SCOPUS (ELSEVIER) Young Scientist Award – 2014 in the field of Agriculture for his contribution in the field of biological production of nanomaterials, nanofinishing of cotton textiles to impart novel functionalities and developing an energy efficient nanocellulose production technology. He received the award from Dr. Jitendra Singh, Hon'ble Union Minister of Science and Technology on September 8, 2014.





- Dr. P.G. Patil, Director (Acting) was conferred the honour of Fellow of Textile Association Award by Textile Association of India during the 70th All India Textile Conference held at Nagpur on January 17, 2015.
- Dr. Kartick K. Samanta, Scientist received the BEST oral presentation award for the research paper on "Hydrophobic Finishing of Cotton Textiles using Atmospheric Pressure Plasma" in International Conference on Natural Fibres held from August 1-3, 2014 at Kolkata which was inaugurated by Hon'ble President of India, Sh. Pranab Mukherjee.
- Sh. Sunil Kumar, Administrative Officer, CIRCOT Mumbai was awarded 'Raj Bhasha Samman

award' for his excellent contribution in implementing and propogating Hindi in the institute.



The institute participated in the ICAR Zonal Sports Meet held at Jodhpur from November 20 – 24, 2014. The following were the winners in various categories:

Name of the Winner	Event	Prize
Smt. S.P. Paiyala	Table Tennis - Doubles	
Smt. V.N. Walzade		
Smt. S.P. Paiyala	Table Tennis - Single	
Smt. S.P. Paiyala	Badminton - Doubles	
Smt. H.R. Pednekar		
Dr. R.D. Nagarkar		
Sh. P.V. Jadhav		
Sh. M.G. Ambare		
Sh. H.S. Koli		
Sh. M.M. Kadam		
Smt. H.R. Pednekar	200 m	Silver
Smt. Kiran Joshi	Chess	
Smt. H.R. Pednekar	100 m	Bronze
Smt. H.R. Pednekar	Chess	
Smt. V.N. Walzade	Long Jump	
Smt. S.P. Paiyala	Javelin Throw	



Annual Report

Annual Report of the Central Institute for Research on Cotton Technology for the Year 2013-2014.

Research Publications

1. Ambare, M.G., Nagarkar, R. D., Shaikh, A. J. and Balasubramanya, R.H. - "Biochemical Softening of Cotton Plant Stalk for Production of Pulp and Paper". *Journal of Cotton Research & Development*. Vol. 29 (1), pp.154-158, 2015. [NAAS Rating 3.41]
2. Arude, V. G., Manojkumar, T. S., Shukla, S. K. - "Axial Flow Pre-cleaner for on Farm Cleaning of Cotton". *Agricultural Mechanization in Asia, Africa and Latin America*. Vol. 45 (3) pp. 37-43, 2014. [NAAS rating: 6.06]
3. Basak, S., Samanta, K. K., Chattopadhyay, S. K. and Narkar, R. S. - "Self extinguishable ligno cellulosic fabric made by banana pseudostem sap". *Current Science*, Vol.108 (3), pp. 372-383, 2015. [NAAS rating: 6.83]
4. Basak, S., Samanta, K. K., Chattopadhyay, S. K., Das, S., Dsouza, C., Shaikh, A. - "Flame Retardant and Antimicrobial Ligno-cellulosic Fabric using Sodium Metasilicate Nonahydrate". *Journal of Scientific and Industrial Research*, Vol. 73, pp. 601-606, 2014. [NAAS Rating 6.51]
5. Basak, S., Samanta, K. K., Chattopadhyay, S. K., Narkar, R., Mahangade, R. and Hadge, G. B. - "Flame Resistant Cellulosic Substrate using Banana Pseudostem Sap". *Polish Journal of Chemical Technology*, Vol 17(1), pp. 123-133, 2015. [Thomson Reuter Impact Factor 0.47]
6. C.Sundaramoorthy, Girish K.Jha, Suresh Pal and V.C.Mathur. - "Price Transmission along Cotton Value Chain". *Agricultural Economic Research Review*, Vol. 27 (2), pp 177-186. DOI: 10.5958/0974-0279.2014.00022.6., 2014. [NAAS Rating: 5.78]
7. Das, S., Chattopadhyay, S. K. and Basak, S. - "Application of SVM for predicting tensile characteristics of cotton ring yarn". *Manmade Textile in India*, Vol-XLII. (8), pp.287-291, 2014. [NAAS Rating: 3.32]
8. Guruprasad R. and Behera, B. K. - "Predicting bending rigidity of woven fabrics by neuro genetic hybrid modeling". *Fibers and Polymers*, Vol.15 (5), pp. 1099-1105, 2014. [NAAS Rating: 7.11]
9. Guruprasad, R., Behera, B. K. - "Comparative Analysis of Soft Computing Model in Prediction of Bending Rigidity of Cotton Woven Fabrics". *Journal of the Institution of Engineers (India): Series E*, 1-8, December 2014. - Online publication
10. Guruprasad, R., Vivekanandan, M.V., Arputharaj, A., Saxena, S. and Chattopadhyay, S.K. - "Development of cotton rich/polylactic acid fibre blend knitted fabrics for sports textiles". *Journal of Industrial Textiles*, DOI: 10.1177/1528083714555779, October 2014. [NAAS Rating: 7.2] - Online publication
11. Kadam, V., Chattopadhyay, S. K., Bharimalla, A. K., and Venugopal, B. - "Mechanical Characterization of Brown and Green Coconut Husk". *Journal of Natural Fibres*, Vol.11 (4) pp. 322-332, 2014. [NAAS Rating 6.56] - Online publication
12. Lallan Ram, Dinesh Kumar, Vigneshwaran, N. and Archana Khewle - "Comparative performance of nano-composite film and LDPE packaging for extending shelf-life of fresh Nagpur mandarin segments". *Indian Journal of Horticulture*, Vol. 71 (1), pp. 87-91, 2014. [NAAS Rating: 6.11]
13. Mageshwaran, V., Shaikh Asim, Kambli, N. D., Kathe, A. A. and Patil, P. G. - "Gossypol Detoxification in Various Cottonseed Extractions by Fungal Cultures During Solid State



- Fermentation". Cotton Research Journal, Vol. 5 (2), pp.132-136, 2014. [NAAS Rating 2.27]
14. Mageshwaran V., Inmann F.III. and Holmes L.D. – "Growth Kinetics of Bacillus Subtilis in Lignocellulosic Carbon Sources". International Journal of Microbiology Research, Vol. 6(2), pp. 570-574. 2015. [NAAS Rating 3.91]
 15. Mageshwaran, V., Nishant D Kambli, Kathe, A. A. and R.H. Balasubramanya – "An Eco-friendly anaerobic method for preparation of cellulose powder from soybean hulls". Asian Journal of Microbiology, Biotechnology & Environmental Sciences, Vol 17 (1), pp.189-192. 2015. [NAAS Rating 3.07]
 16. Mandhyan, P. K., Nachane, R. P., N, Shanmugam., Dey, S. K., Banerjee, S. and Pawar, B. R. – "Inverse Relaxation in yarn and Fabrics". Indian Journal of Applied Research, Vol. 5 (3), 2015.
 17. Manojkumar, T.S., Arude, V.G. and Shukla, S. K. - "An auto-groover machine for making helical grooves on rollers used in roller ginning machines". Agricultural Mechanization in Asia, Africa and Latin America (AMA), Vol 45(4), 69 73, 2014. [NAAS Rating 6.06]
 18. Nagarkar, R. D., Shaikh, A. J., Ambare, M.G. and Balasubramanya. R.H. – "Impact of Anaerobic Treatment on the Chemical Composition of Cotton Plant Stalk". Journal of Cotton Research & Development, 29 (1), 147-153, 2015. [NAAS Rating 3.41]
 19. Patil, P.G., Nagarkar, R. D., Saxena, S. and Ambare, M.G. - "Role of Ginning on the Quantity and Quality of Linters". Cotton Research Journal, Vol. 5 (2), pp.155-157, 2014. [NAAS Rating 2.27]
 20. Sundarmoorthy, C., Jha, G. K., Pal, S. and Mathur, V. C.- "Market Integration and Volatility of Edible Oil Sector in India". Journal of Indian Society of Agricultural Statistics, Vol.68 (1), 2014. [NAAS Rating: 5.50]
 21. Sundarmoorthy, C., Mathur, V. C. and Jha, G. K – "Performance of India's cotton based textile trade: A Constant Market Share Analysis". Journal of Cotton Research & Development, Vol. 28 (2), 2014. [NAAS Score – 3.41]
- ### Popular Article
1. Savadekar, N.R., Karande, V.S., Vigneshwaran, N., Kadam, P.G. and Mhaske, S.T. - Preparation of Cotton Linter Nanowhiskers by High-pressure Homogenization Process and its Application in Thermoplastic Starch, Applied Nanoscience, 1-10, 1, 2014
 2. Guruprasad, R., Chattopadhyay, S.K., Jadhav, R.K. and More, C.M. -. Cotton Blended Yarns - A Review of Present Status, Fibre2fashion.com, July 2014
- ### Books and Book Chapters
- #### Book
- "Cotton Sector in Africa - Volume 1". Authored by: Dr. P. G. Patil, Dr. P. S. Deshmukh, C. Sundarmoorthy, T. Reddij, Er. A. K. Bharimalla, Sh.. V. G. Arude, Dr. S. K. Shukla, Dr. N, Shanmugam and Published by ICAR-CIRCOT, March, 2015.
- ### Book Chapters
1. Vigneshwaran, N., Prasad Satyamurthy, and Prateek Jain. "Biological Production of Nanocellulose and Potential Application in Agricultural and Forest Product Industry", in: Nanotechnology for Sustainable Manufacturing, Edited by David Rickerby, pp. 79–92, Published by CRC Press 2014. [Print ISBN: 978-1-4822-1482-6, eBook ISBN: 978-1-4822 1483-3]. DOI: 10.1201/b17046-6.
 2. Saxena, S., and Raja, A. S. M. (2014). "Natural

Dyes: Sources, Chemistry, Application and Sustainability Issues" (in) Roadmap to Sustainable Textiles and Clothing (pp. 37-80). Springer Singapore.

3. K K Samanta, S Basak and S K Chattopadhyay (2014) "Environment-Friendly Textile Processing Using Plasma and UV Treatment" (in) Roadmap to Sustainable Textiles and Clothing - Eco-friendly Raw Materials, Technologies and Processing Methods. pp. 161-201, (ISBN 978-981-287-065-0) Springer (Singapore) 2014
4. K K Samanta, S Basak and S K Chattopadhyay (2014) "Eco-friendly Coloration and Functionalization of Textile Using Plant Extracts" (in) Roadmap to Sustainable Textiles and Clothing - Environmental and Social Aspects of Textiles and Clothing Supply Chain. pp. 263-287, (ISBN 978-981-287-109-1) Springer (Singapore) 2014
5. A.S.M.Raja and G. Thilagavathi. 2014. "Development of Combined Dyeing and antimicrobial Finishing of Textile Materials Using Natural Dyes from Leaves of Deciduous Plants" (in) A Value Chain in Natural Dyes, pp. 269-276. Published by BS Publication (ISBN: 978-93-83635 00-9).

Reference Manual (Training Manual)

1. Training Manual on Cotton Spinning
2. Application of Electro spun Nanofibres in Crop Health and Post-Harvest Technology
3. Training Manual on Cottonseed : Scientific Processing and Value Addition
4. Training Manual on Chemical Characterization of Textile Materials
5. Training Manual on Advances in Textile Characterization
6. Training Manual on Advances in Microscopy

7. Training Manual on Basics of Nanotechnology and its Application

Status Report / Brochure/ Bulletins

1. A Status Report on Cotton Blended Yarns
2. Technological Report on Standard Indian Cottons - 2012-13 Session
3. Cotton Technological Report (2013-2014) - AICRP on Cotton

Leaflet

1. CIRCOT Leaflet No.124 - CIRCOT Study on Cotton Bale Press (Energy Consumption and Cost Economics)
4. CIRCOT Leaflet No. 125 - Electrospinning facility at ICAR-CIRCOT

e-Publication

1. Bi-Monthly e-Newsletter of ICAR CIRCOT (June July 2014 & Aug-Sept. 2014)
2. Monthly e-Newsletter (October 2014 – March 2015)

Conference Proceedings

1. Patil, P. G. – "Recent Advances in Cotton Ginning Technology in India" presented at the 6th Meeting of the Asian Cotton Research and Development Network during June 18-20, 2014 at Dhaka, Bangladesh.
2. Chattopadhyay, S. K. - "Employment Opportunities in Textile R & D Sector" presented paper in IFS Seminar on 'Textile Education & Employment Opportunities' Organised by CIRCOT and Indian Fibre Society (IFS) on November 29, 2014 at Mumbai.
3. Chattopadhyay, S. K., Venugopal, Bindu. - "Towards Accounting Unexplained Factors of Cotton Quality in Determining Yarn Quality and

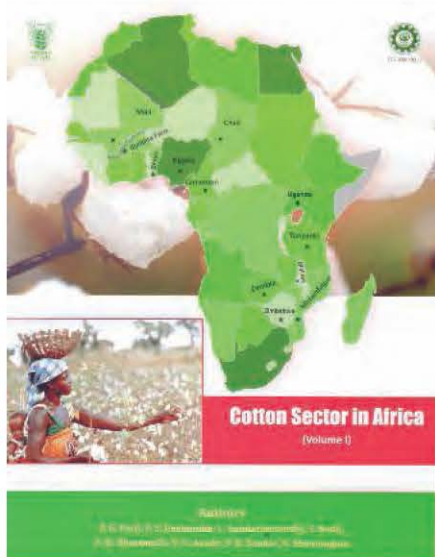


- Spinning Process Efficiency" paper presented and published in Book of Papers Souvenir Cotton India 2014, Cotton Association of India, held on November 24-26, 2014 at Mumbai.
4. Kale, H. S., Gotmare, V.D. & R, Guruprasad. - "Novel Use of Bamboo - Tencel Yarns in Development of Compression Bandages" poster presented in International Conference on Technical Textiles and Nonwovens on November 6-8, 2014 at IIT Delhi.
 5. Krishna Prasad. - "Effect of Plasma Treatment on Peel Strength of Rubber Coated Nylon Fabric" paper presented in International Conference on Technical Textiles and Nonwoven (ICTN 2014) on November 6-8, 2014 at IIT Delhi.
 6. Mageshwaran, V. - 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 during AICOSCA Annual Meeting.
 7. Prabu, G.T.V., Arputharaj, A., Krishna Prasad, G., Vivekanandan, M. V., and Vigneshwaran, N. - "Development of Moisture Management Cotton Textiles Using Electrospinning" Oral paper presented at International Conference on Emerging Trends in Traditional and Technical Textiles (ICEET) 2014) held during April 11-12, 2014 at NIT Jalandhar (Punjab).
 8. Samanta, K. K. - "Hydrophobic Finishing of Cotton Textile using Atmospheric Pressure Plasma" presented research paper in the International Conference on Natural Fibres held, during August 1-3, 2014 at Kolkata.
 9. Samanta, K. K. - "Production and Applications of Electrospun Nanofibres and Yarn" presented a Paper in the 'National Seminar on Manufacture, Characterization and Applications of Technical yarns' held on July 4, 2014, at DKTE Institute of Textile and Engineering, Ichalkaranji, Maharashtra.
 10. Sujata, S. and Mahangade, R.R. - "Utilisation of Pomegranate by-products for Dying of Cotton Textiles" National Seminar cum Exhibition held on December 5-7, 2014 at Solapur.
 11. Dey, S.K. and Chattopadhyay, S.K. - "Engineering of Ramie in Blends with Natural Fibre." made an oral paper presentation in International Conference on Emerging Trends in Traditional and Technical Textiles on 11-12 April, 2014 at National Institute of Technology (NIT), Jalandhar (Punjab) and in International Conference on Natural Fibres at Hotel Grand, Kolkata on August 1-3, 2014.
 12. Dey, S.K. and Chattopadhyay, S.K. - "A Combined Technology Package For Extraction of Pineapple Leaf Fibre - An Agrowaste, Utilization of Biomass and for Application in Textiles." made an oral paper presentation in International Conference on Emerging Trends in Traditional and Technical Textiles (ICETT 2014) on 11-12 April, 2014 at National Institute of Technology (NIT), Jalandhar (Punjab).
 13. Prasad, V., Bharimalla, A. K., Kadam, R. P., Nagarkar, R. D., Narkar, R. S. and Vigneshwaran, N. - "Development of High Performance Nanocellulose Reinforced Polyethylene Composite " paper presented (Oral) in International Conference on Emerging Trends in Traditional and Technical Textiles (ICETT 2014) on April 11-12, 2014 at National Institute of Technology (NIT), Jalandhar (Punjab)
 14. Vishnu Vardhini K.J., Murugan, R., Surjit, R. and Senthilkumar T, - "Development of Palmyra/Polyester Nonwovens for Automotive Interiors" in Second International Conference on Industrial Textiles – Products, Applications and Prospects organized by Department of Textile Technology, PSG College of Technology, Coimbatore on August 22-23, 2014 at Coimbatore.

Invited Lectures

1. Dr. Vigneshwaran, N. delivered an Invited talk - "Nanocellulose: Energy efficient production & its application" at Bioprocessing INDIA-2014- Panacea to Bioenergy, Nutrition & Healthcare jointly organized by ICT & IITB held on December 17-20, 2014 at Mumbai.

2. Dr. C. Sundaramoorthy delivered a lecture on "Challenges faced in Data Analysis" in the Short term Training Programme on "Data Analytics through Statistical Software SPSS" organized at CIFE, Mumbai on March 27, 2015.





8. IRC, RAC and IMC Meetings

Institute Research Council (IRC) Meeting

The One Hundred and Fourteenth Annual Institute Research Council Meeting was held on April 26, 2014 to discuss the Proceedings of the XX Research Advisory Council Meeting held on March 21 & 22, 2014, publication in NASS Rated Journals (6.0 and above), XII Plan – Research Areas, New Research Project Proposals, Review of Expenditure under Contingency and Equipment for 2014-15, Scientists Time Allocation in Research Projects and Final Project Report of completed projects.

A Half-yearly IRC meeting was held on December 22 and 23, 2014 to discuss the progress of research from April – September 2014. Dr. P.G. Patil, Director (Acting) was In the Chair and Dr. S. Sreenivasan and Dr. A.J. Shaikh former Directors were subject experts in the meeting.

Institute Management Committee Meeting (IMC)

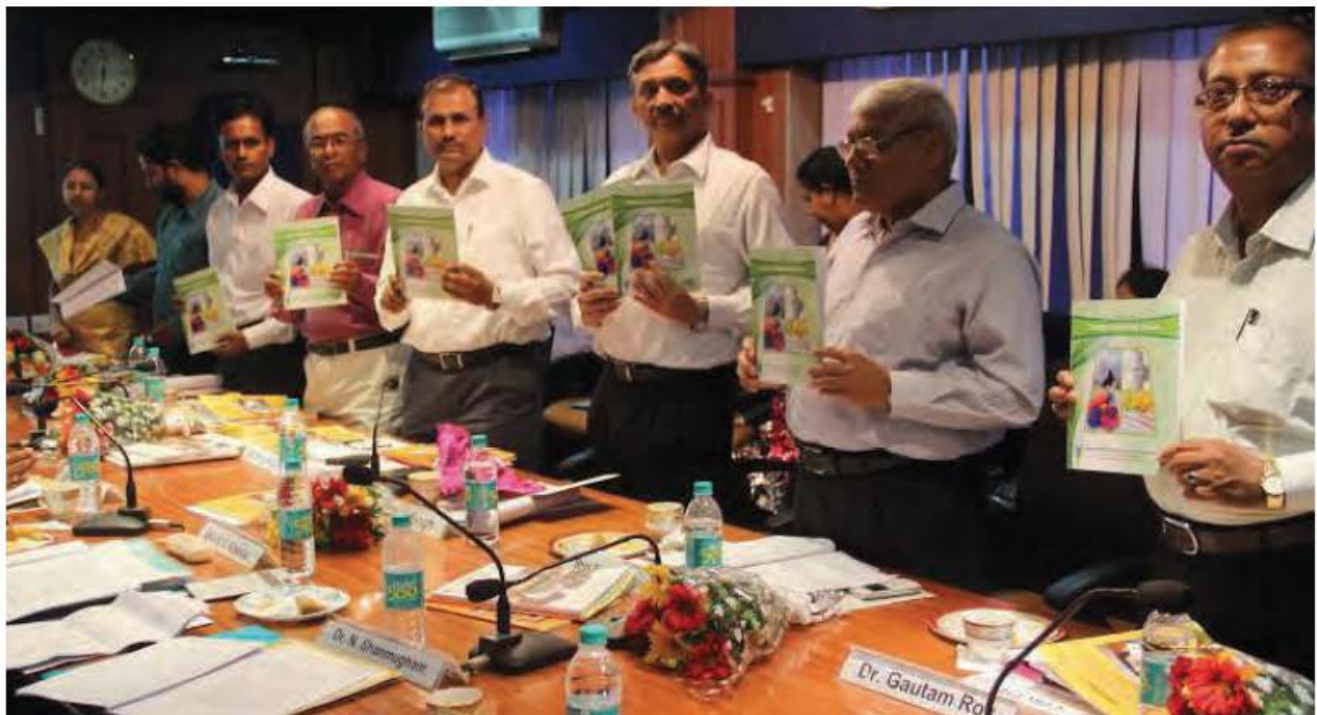
The Seventy-fifth meeting of the Institute Management Committee was held on August 25, 2014. Confirmation of the minutes of the previous meeting and action taken on the recommendations of the previous meeting were discussed. Core area-wise progress of Research in various core areas were presented by Director. Apart from this, review of expenditure upto 21-8-2014, ATR on the settlement of audit para, etc. were taken up. A presentation on a Novel Method for Gossypol Reduction and Nutritive Quality Improvement of Cottonseed Cake for use in Non-ruminants Feed was made by Dr. V. Mageshwaran, Scientist. Dr. K.K. Singh, ADG (PE), ICAR Inaugurated the Exhibition cum Visitors' Room. During the meeting, Dr. K.K. Singh released the Annual Report for 2013-14 and a book-let on Status Paper on Cotton Blended Yarns. Dr. B.R. Patil, Principal Scientist (Cotton) released the final Report of the BPD NAIP report.



Dr. K.K. Singh, ADG (PE) releasing the Institute's Annual Report for 2013-14



Dr. K.K. Singh, ADG (PE), Dr. P. G. Patil, Director and other IMC Members while Inaugurating the Exhibition cum Visitors' Room



Dr. K.K. Singh, ADG (PE) releasing the Book-let on Status Paper on Cotton Blended Yarns

9. PARTICIPATION IN CONFERENCES & SEMINARS



ICAR - CIRCOT

CONFERENCES

S. No.	Name of Conference	Organized by, Venue (Date)	Participants
1.	International Conference on Emerging Trends in Traditional and Technical Textiles	Dept. of Textile Technology, NIT, Jalandhar (April 11 -12, 2014)	Dr. Virendra Prasad Sh. A. Arputharaj Dr. S. K. Dey
2.	International Conference on Natural Fibres	Indian Natural Fibre Society, Kolkata (August 01-03, 2014)	Dr. K. K. Samanta
3.	Second International Conference on Industrial Textiles – Products, Applications and Prospects INDUTECH 2014	Dept. of Textile Tech. and Dept. of Automobile Engg. PSG College of Tech., Coimbatore (August 22-23, 2014)	Sh. G. Krishna Prasad Dr. T. Senthilkumar
4.	8th Asian Textile Conference (ATEXCON)	Confederation of Indian Textile Industry, Mumbai (September 22-23, 2014)	Dr.(Smt.) Sujata Saxena Dr. K. K. Samanta
5.	International Conference on Technical Textiles and Nonwovens (ICTN 2014)	Indian Institute of Technology, New Delhi (November 6-8, 2014)	Sh. G. Krishna Prasad
6.	TAI Conference on "Indian Textiles - The Way Forward"	Textile Association Mumbai. (November 14, 2014)	Dr. S. K. Chattopadhyay Dr. S. K. Dey Dr. N. Shanmugam
7.	International Conference on "India" Opportunities for Global Investment in Textiles	M/ s. Diagonal Consulting India, Ahmedabad. (December 10-12, 2014)	Dr. S. K. Chattopadhyay Dr.(Smt.) Sujata Saxena Dr. N. Shanmugam
8.	102 nd Session of Indian Science Congress	University of Mumbai, Mumbai (January 37, 2015)	Dr. P.G. Patil Dr. N. Vigneshwaran
9.	12 th International and 70th All India Textile Conference	Textile Association (India)- Vidarbha unit, Nagpur (January 17-18, 2015)	Dr. S. K. Shukla Dr. V. Mageshwaran Miss Varsha Satankar
10.	Conference on "Innovations for Sustainable Textile Production... Connecting the Dots"	The Society of Dyers and Colourists EC, Mumbai. (February 20, 2015)	Dr. P. G. Patil

SEMINARS / SYMPOSIA

S. No	Seminar/ Symposia	Organized by, Venue (Date)	Participants
1.	National Seminar on Manufacture, Characterization and Applications of Technical Yarns	DKTE Institute of Textile and Engineering, Ichalkaranji (July 4, 2014)	Dr. K. K. Samanta
2.	Seminar on "Emerging Technology Trends in Research & Development"	IIT -B, Mumbai (August 6, 2014)	Dr. Virendra Prasad Sh. A. Arputharaj
3.	National Symposium on "Plant Disease Management for Food Security"	Association of Plant Pathologist, Nagpur (November 9 -11, 2014)	Dr. P.G. Patil Dr. S. K. Shukla
4.	National Seminar-cum-Exhibition	Society for Advancement of Research on Pomegranate Solapur (December 5-7, 2014)	Dr. (Smt.) Sujata Saxena Dr. R. R. Mahangade
5.	One Day Seminar on "Environmental Pollution, Restoration and Management"	Dept. of Chemical Engg. Anna University. Chennai (December 16, 2014)	Dr. T. Senthilkumar
6.	A seminar on Bioreactors - Scale up and Data Processing	Spinco Biotech & Applikon Biotechnology, Mumbai (March 4, 2015)	Dr.(Smt.) N. M. Ashtaputre Ms. C. P. D' Souza
7.	Seminar on "Rashtriya Sangoshthi: Rashtra Ke Badalte Parivesh mein Abhiyantriki Anusandhan evam vikas ke naye Aayaam"	Institute Seminar Committee, CIAE, Bhopal (July 28, 2014)	Dr. S. K. Shukla Er. V. G. Arude

**MEETINGS / WORKSHOPS**

S. No.	Meetings/Workshop	Organized by, Venue (Date)	Participants
1.	Awareness Programme on Reference Material Producer Accreditation (Based on ISO Guide:34:2009)"	NABL, Mumbai (May 28, 2014)	Dr. N. Shanmugam Dr. P. K. Mandhyan
2.	6th Meeting of the Asian Cotton Research and Development Network	Cotton Development Board & Ministry of Agrl. Bangladesh, Dhaka, (June 18-20, 2014)	Dr. P. G. Patil
3.	Sixteenth Meeting of Physical Methods of Test Sectional Committee (TX 01) of Bureau of Indian Standards	Bureau of Indian Standards, Mumbai (October 9, 2014)	Dr. P.G. Patil
4.	23rd Meeting of ICAR Regional Committee (No. VII)	Indian Council Agricultural Research, Raipur (October 17-18, 2014)	Dr. P. G. Patil Dr. S.K.Shukla
5.	Workshop on "Open Access to Agricultural Knowledge for Inclusive Growth and Development"	NAARM, Hyderabad (October 29-30, 2014)	Er. A. K. Bharimalla
6.	Workshop on "Training Needs Assessment for HRD Nodal Officers of ICAR"	NAARM, Hyderabad (February 26, 2015)	Dr. N. Vigneshwaran
7.	Meeting cum Workshop of PME In-Charges of ICAR Institutes	NAARM, IFPRI & NAAS, New Delhi (February 23, 2015)	Dr. (Smt.) Sujata Saxena

MEETING OF ZONAL INSTITUTE TECHNOLOGY MANAGEMENT COMMITTEE (ZITMC), WEST ZONE

A meeting of the Zonal Institute Technology Management Committee (ZITMC), West Zone was held on June 2, 2014 in Dr. V. Sundaram Committee Room of CIRCOT, Mumbai. The meeting was chaired by Dr. P. G. Patil, Director, CIRCOT and Chairman ZITMC, West Zone. Deliberation were made on the benefit sharing in respect of commercialization of Bt-Detection Kits technology developed by CICR, Nagpur.

SWACHH BHARAT MISSION



In consonance with the call of Hon'ble Prime Minister, CAR has geared up its countrywide

network to launch "Swachh Bharat Mission" from September 25, 2014. The mission is being launched on the concept of Mahatma Gandhi's vision, "Sanitation is more important than independence." In this context, ICAR-CIRCOT has taken up various activities like intensive cleanliness campaign covering the institute premises and activities to spread the message of cleanliness among the staff members. ICAR-CIRCOT Swachh Bharat Mission campaign started with employees taking 'Swachhta Shapath' (cleanliness oath) on October 2, 2014 during a specially organized function. The employees took pledge to dedicate 100 hours every year towards Swachh Bharat Abhiyan'. A committee consisting of ten members drawn from scientists and technical and Administrative has been constituted under the Chairmanship of Director, ICAR-CIRCOT to coordinate the activities under Swachh Bharat Mission.



SWACHH BHARAT MISSION
Activities at
CIRCOT, Mumbai

Innovation Cell Activities

- A one day brainstorming session on Scientific Processing of Cottonseed was organised by Innovation Cell of CIRCOT on November 5, 2014 at CIRCOT. Dr. V. Mageshwaran, Member Secretary, Innovation Cell introduced the topic through a power point presentation. There were twenty-six participants representing academicians, cottonseed processors, All India Cottonseed Crushers Association, etc. Dr. P.G. Patil, Director, CIRCOT gave the welcome address. Dr. S. Sreenivasan and Dr. A.J. Shaikh, former Directors chaired the session. The two hours discussion brought out researchable issues and policy issues in scientific processing of cottonseed. The researchable issues brought out were enhanced recovery of linters and oil, control of aflatoxin and free fatty acids during storage, gossypol-free edible protein, proper effluent treatment system, etc. The policy issues brought out were efforts to bring cottonseed under oilseed commodity and to increase the proportion of scientific seed crushing from 5% to 15%. The meeting was ended with Vote of thanks by Dr. Sujata Saxena, Head, CBPD.



A brainstorming session chaired by Dr. S. Sreenivasan

- A brainstorming session on Innovative Approaches to Improve Administrative Efficiency in the Office was organised on December 6, 2014 at CIRCOT. Administrative staff and Members of Innovation Cell attended



Dr. V.H. Iyer during interaction with the administrative staff

the meeting. The brainstorming session was chaired by Dr. V. H. Iyer, Dean, Management Development Programs, Welingkar Institute of Management Development and Research.

ICAR Foundation Day Celebration

The 66th Foundation Day of Indian Council of Agricultural Research was celebrated on July 16, 2014 at CIRCOT, Mumbai. Dr. R. H. Balasubramanya, Former Head, CBPD and Former Emeritus Scientist, CIRCOT, was the Chief Guest. Dr. S. K. Chattopadhyay, Director in-charge welcomed the Chief Guest and all the dignitaries and participants. A short film on the Indian Council of Agricultural Research was screened to highlight the activities of ICAR. Dr. R. H. Balasubramanya, in his Chief Guest address gave the complete history of ICAR highlighting the significant contributions made by ICAR over the years in meeting the food and grain demand of the growing population of the country. He specially gave emphasis on the ICAR's achievements in the form of green revolution, white revolution, blue revolution and horticulture.

Students from the Synthetic & Art Silk Mills Research Association (SASMIRA), the Scientific, Technical and Administrative staff of CIRCOT attended the function. An exhibition was also organised where in various technologies and products were displayed.



Welcome address by Dr. S. K. Chattopadhyay, In-charge Head, MPD

CIRCOT Foundation Day

The 1st foundation day of ICAR-CIRCOT was celebrated on December 3, 2014 in the Jubilee Hall. Dr. P.G Patil, Director inaugurated the function and highlighted the achievements of the institute in the recent past. Dr. A.V. Ukiwde, former Principal Scientist and Head, QEID was the Chief Guest for the function. Other dignitaries viz. Dr. N.B. Patil, Dr. S. Sreenivasan and Dr. A.J. Shaikh, former Directors, Sh. P.G. Oka, former Scientist and Dr. R.P. Nachane, former Head, QEID also graced the occasion. During the function, retired staff who have crossed 80 years of age were honored with shawl, memento and bouquets. An entertainment program was organized in which Sh. Ketan Gowand, Corporate Trainer enlightened the gathering on the topic Insights of Life.



Dr. A.V. Ukiwde at the Foundation day Function

National Interactive Workshop on Textile Education and Employment Opportunities

A one day National Workshop was arranged by the Institute in collaboration with Indian Fibre Society (IFS) at CIRCOT on November 26, 2014. Chief Guest of the function Dr. G. S. Nadiger, Textile and Management Consultant, Mumbai gave the inaugural address. Dr. Suresh P. Yavalkar, Deputy Director, Directorate of Technical Education, Maharashtra State was the Guest of Honour.



Dr. G. S. Nadiger inaugurating the Workshop by lighting the lamp

In the afternoon there were two technical sessions. The first session on Textile Management was chaired by Dr. S.R. Shukla, Dept. of Fibre and Textile Processing Technology, ICT, Mumbai. In this session, there were four presentations, Entrepreneurship Development by Sh. Avinash Mayekar, Home Furnishing by Ms. Hetal Laakhani, Apparel Merchandizing by Sh. Sadir Bhuta, Apparel Merchandizing by Sh. Kazi, N.S.

The second session on Textile Processing and Finishing was chaired by Dr. S. Sreenivasan, former Director, CIRCOT. In this session four papers were presented: Soft Skills / Employment Skills by Dr. Mala Pandurang and Dr. Shilpa Charankar, Sports textiles by Dr. Mrinal Choudhary, Apparel Exports by Dr. Sanjita Prasad and Textile Research by Dr. S.K.

Chattopadhyay. There was a Panel discussion on the topic Job Opportunities in Textile Sector under the Chairmanship of Dr. Ulhas Nimkar, M/s. Nimkar d Technical services Pvt. Ltd., dhane.d

Vigilance Awareness Week Celebration

Vigilance Awareness Week was celebrated at the Institute from October 27 to November 1, 2014. The staff were administered Vigilance Oath on October 27, 2014. On the concluding day, Sh. Alok Kumar, Deputy Superintendent of Police, Anti-corruption Branch, Mumbai delivered a talk on "Combating Corruption: Technology as an Enabler."

National Unity Day

National Unity day was celebrated on October 31, 2014 to mark the birth Centenary of Sh. Sardar Vallabhbhai Jhaverbhai Patel, one of the founding fathers of the Republic of India. On this day the staff took pledge to maintain the Unity and Integrity of the country.



Staff Taking Pledge to maintain the Unity and Integrity of the Country

Communal Harmony Week

Communal Harmony week was celebrated in the Institute from November 19 to 25, 2014. Staff members were administered pledge on Communal Harmony. On the concluding day, Dr. Chandrakant Puri, Chair Professor, Rajiv Gandhi Centre for Contemporary Studies, Mumbai delivered a talk on Communal Harmony to the staff

of the institute. He brought out how every individual can contribute to communal harmony. Flag Day was also celebrated on this day.



Dr. Chandrakant Puri delivering a talk on Communal Harmony

Shaheed Diwas

As per the Govt. of India directives, two minutes of silence was observed from 11.00 – 11.02 a.m. on January 30, 2015 in the memory of the martyrs who had laid down their lives for liberating the country from foreign rule.

Republic Day Celebration

The institute celebrated the 66th Republic Day at the Headquarters, Mumbai on January 26, 2015. Dr. P.G. Patil, Director hoisted the tricolor. Flag hoisting was followed by cultural programme presented by the children of the staff members.



Cultural activities by children of Staff Members



Dr. P.G. Patil, Director unfolding the tricolour

National Science day Celebration

The 25th National Science Day was celebrated by ICAR-CIRCOT with great enthusiasm on February 28, 2015. This day was celebrated every year to commemorate the invention of the Raman Effect in India by the Indian physicist, Sir Chandrasekhara Venkata Raman on the same day in the year 1928. For his great success in the field of science in India, Chandrasekhara Venkata Raman was awarded and honoured with the Nobel Prize in Physics in 1930. As a part of the science day celebration ICAR-CIRCOT organized a lecture on Food and Health by Dr. N.J. Thakor, Dean, Faculty of Agricultural Engineering, Dr. B.S.K.K.V, Dapoli on February 19, 2015.



Dr. N.J. Thakor delivering the lecture on Food and Health

In his lecture Dr. N.J. Thakor, discussed about the different kinds of food, nature of food items and stressed on the importance of food habits of people to lead a healthy life.

An Open Day was organized on February 28, 2015 during which around 75 students from the nearby schools visited the institute and explored various research facilities in the Institute like fibre and yarn testing, Mechanical Processing Division apart from Visitor's & Exhibition Room where the technologies and process developed by the institute are displayed.

In the afternoon, Dr. Ajwala and Dr. Sanjeev Shevade, Orthodontist delivered a popular lecture on "Images from the Wild" on the occasion of celebration of National Science Day at CIRCOT Mumbai. The lecture provided an insight into the biodiversity surrounding us. The lecture sensitized the impact of waste disposal especially plastics, resulting in the death of birds. Dr. Shevade conveyed the message about conservation of environment and the concept of three R's "Reduce-Recycle-Reuse" approach to save the planet.



Participation of school students on the Open Day



Dr. Sanjeev Shevade, Orthodontist and Nature Enthusiast delivered the lecturer on Images from the Wild

In-house Lectures

1. Presentation on the Orientation and Attachment Training at Bannari and Institute of Technology by Sh. P. Jagajananthad on April 5, 2014.
2. Presentation on July 05, 2014 in connection with the visit of Dr. P.G. Patil to Dhaka, Bangladesh for the 6th Meeting of the Asian Cotton Research & Development Network hosted by Cotton Development Board, Bangladesh from June 18–20, 2014.
3. Lecture on Sustainable Culture of Innovation by Dr. M.D. Eli, Professor (Textile Chemistry),

Institute of Chemical Technology (ICT), Mumbai on July 07, 2014.

4. Deputation Report on International Training on "Post Harvest Technology of Cotton and By Produce Utilization" under Cotton Technical Assistance Program at Uganda and Malawi by Dr. P.G. Patil, Director (Acting) on January 8, 2015.

5. Road Safety and Improvement on Road Safety by Sh. M.K. Mahtre, Assistant Deputy Controller of Civil Defence, Area I, Mumbai on January 17, 2015 as part of the 26th National Road Safety Week from January 11–17, 2015.



Mr. V. S. Bidwe, Senior Asst. Deputy Controller of Civil Defence, Mumbai addressing the audience on Road Safety

6. Human Disabilities v/s Motivation for Society Upliftment by Dr. R.P. Kachru, former ADG (PE), ICAR



Dr. R.P. Kachru, former ADG (PE) delivering lectured

11. DISTINGUISHED VISITORS

ICAR - CIRCOT



Delegates from Ethiopia

A delegation from Ethiopia Institute of Agricultural Research (EIAR), accompanied by the officials from Nirmal Seeds, Maharashtra visited the institute on July 12, 2014. They showed keen interest in garment technology, gossypol free cottonseed cake preparation and application of nano technology in agriculture.

Visit of Afghanistan Delegates

Afghanistan delegation led by Dr. M. S. Kairon, former Director CICR, Nagpur, comprising of two ginnerers and six cotton extension officers visited, CIRCOT, Mumbai on November 24, 2014. The delegates showed interest in the utilization of cotton stalks for manufacture of briquettes, pellets and also in scientific processing of cottonseed. The delegation earlier visited, GTC of CIRCOT, Nagpur on Nov 19, 2014.



Dr. P. G. Patil and Dr. M. S. Kairon with Afghanistan Delegation



Joint Secretary, Ministry of Textiles

Mr. Sujit Gulati, Joint Secretary, Ministry of Textiles visited CIRCOT on June 19, 2014. The institute activities were briefed to him and he was explained about the preparation and uses of nanocellulose and demonstrated the application of plasma technology for improving the functional properties of cotton materials.



Secretary, DARE and DG, ICAR

Hon'ble Dr. S. Ayyappan, Secretary, DARE & Director General, ICAR, interacting with the scientist during his visit to CIRCOT on October 21, 2014. He appreciated the developments in the Institute.



Secretary, ICAR

Sh. R. Rajagopal (IAS), Additional Secretary, DARE & Secretary, ICAR, visited CIRCOT on December 8, 2014 and inaugurated the training programme on Basics of Nanotechnology and its Application. He had an interaction with the Scientists and emphasized on future focus of the Institute, scope for industry related projects & technology transfer. He launched the ICAR-CIRCOT's renewed website and released a book on "Basics of Nanotechnology and its Application".



DDG (Engg.), ICAR, New Delhi

Dr. K. Alagusundaram, DDG (Engg.), ICAR, New Delhi visited QEU Coimbatore



Other Distinguished Visitors during the year

Dr. C. D. Mayee

Former Chairman, ASRB and
President, ISCI

Dr. B. M. Khadi

Director of Research
University of Agricultural Sciences,
Dharwad, Karnataka

Dr. Vijay Mehta

Former Vice-Chancellor
DBSKKV
Dapoli, Maharashtra

Dr. B. S. Bisht

Director
Birla Institute of Applied Sciences (BIAS)
Bhimtal, Uttarakhand

Dr. A. K. Krishna Kumar

Executive Director
IL&FS, New Delhi

Dr. Milan Sharma

Assistant Vice-President
IL&FS Cluster Development Initiatives Ltd.
New Delhi

Dr. V. Subramaniam

Former QRT Chairman



12. INFRASTRUCTURAL FACILITIES

Pilot Plant for Production of Nanocellulose

ICAR-CIRCOT has developed and patented an energy efficient chemo-mechanical and bio-mechanical process for nanocellulose production. A pilot plant is being established at the Institute having a production capacity of 10 kg per day at the estimated cost of Rs. 4.00 crores from ICAR through NAIP/BPDU. This pilot plant is unique as it can handle diversified cellulosic biomass as raw material. Compact design of machineries' sequence are capable of modifying process routes as per the requirement.



Dr. S. Ayyapan, DG, ICAR at Nano Cellulose Pilot Plant

Electrospinning Laboratory

The electrospinning laboratory and characterization facility has been created under the NFBSFARA sponsored project entitled "Biodegradable Electrospun Fibre Mat for use in Packaging of Fresh Perishable Agricultural Material". The facility consists of multi-phase electrospinning machine, high voltage setup, BET analyser and high speed camera. The BET analyser is used to measure the specific surface area of

nano materials by nitrogen multilayer adsorption. The fabricated multi-phase electrospinning machine has multi-axial arrangements with different nozzle geometry, angle change and automated linear motion stages and multiple parallel needles to increase the production of electrospun mat by enhancing the electrical field distribution and even solution feeding to all the needles.



Electrospinning Laboratory Facility



BET Surface Area analyser Facility



Multiphase Electro Spinning Setup

New Research Facility / Equipment



Muffle Furnace (Labotech model)



Fluidized Bed Reactor with Steam Generator



Exhibition cum Visitors' Room

An exhibition cum visitors' room facility was created at ICAR-CIRCOT, Mumbai, premises to display the exhibits on the research achievements of the institute for the benefit of visiting dignitaries. It also serve the educational purpose for the students.

The room is well equipped with audio visual facility and a reception area. It was inaugurated by Dr. K. K. Singh, ADG (PE), ICAR, New Delhi on August 25, 2014 in the presence of Dr. P. G. Patil, Director and the members of the Institute Management Committee (IMC).



Library

The institute library has been progressively upgrading its holdings of books, journals and electronic resources to provide state-of-the-art information related to research work and projects undertaken by the Institute scientists. It contains the latest information on Cotton fibre & fabric testing and finishing, cellulose composites, non-woven technical textiles and allied textile technology. Latest information on allied patents, standards and technical manuals is also available for reference.

The library has acquired the membership of ASTM & AATCC Association and JCCC- CeRA (36, 987 journals from 11,428 publishers). There are online databases on BIS standards (Textiles), ASTM



standards (Textiles), AATCC Test Methods, EBSCO World Textiles and Indian statistical portal Indiastat.com

Annual Performance Evaluation Report of RFD for the year 2013-14

S. No.	Objectives	Weight	Actions	Success Indicators	Unit	Weight	Target / Criteria Value					Achievements	Performance	
							Excellent 100%	Very Good 90%	Good 80%	Fair 70%	Poor 60%		Raw Score	Weighted score
1	Development of post-harvest technologies and machinery for better utilization of cotton, other textile fibres and their by-products.	40	Development of process protocols for cotton and blended textiles	Process protocols developed	Number	22	7	6	5	4	3	7	100	22
			Development of value added products	Value added products developed	Number	18	5	4	3	2	1	5	100	18
2	Quality evaluation of Indian cottons and their value added products	25	Evaluation of breeders' samples as per CIRCOT norms	Breeders' samples evaluated	Number	15	8500	8000	7750	7500	7250	15259	100	15
			commercial samples	1 samples evaluated	Number	10	6500	6000	5750	5500	5250	11886	100	10
3	Technology transfer, training, consultancy and IPR management	24	Patent/commercialisation/partnership	Patent specifications filed/MOU signed/Renewed	Number	8	7	6	5	4	3	8	100	8
			Training to industry personnel	Training programmes conducted on ginning & fibre technology	Number	8	15	14	12	10	8	15	100	8
			Demonstration of Technologies	Demonstration/exhibitions/awareness meets organised/ Participated	Number	8	13	12	11	10	9	20	100	8

4	Efficient Functioning of the RFD System	3	Timely submission of Draft RFD (2013-14) for approval	On-time submission	Date	2	15/05/2013	16/05/2013	17/05/2013	20/05/2013	21/05/2013	10/5/2013	100	2
			Timely submission of Results for RFD (2012-13)	On-time submission	Date	1	01/05/2013	02/05/2013	05/05/2013	06/05/2013	07/05/2013	26/4/2013	100	1
5	Administrative Reforms	4	Implement ISO 9001 as per the approved action plan.	% Implementation	%	2	100	95	90	85	80	80	0	0
			Prepare an action plan for Innovation	On time submission	Date	2	30/07/2013	10/08/2013	20/08/2013	30/08/2013	10/09/2013	26/7/2013	100	2
5	Administrative Reforms	4	Implement ISO 9001 as per the approved action plan.	% Implementation	%	2	100	95	90	85	80	80	0	0
			Prepare an action plan for Innovation	On time submission	Date	2	30/07/2013	10/08/2013	20/08/2013	30/08/2013	10/09/2013	26/7/2013	100	2
6	Improving Internal Efficiency /responsiveness / service delivery of Ministry / Department	4	Implementation of Sevottam	Independent Audit of Implementation of Citizen's Charter	%	2	100	95	90	85	80	100	100	2
				Independent Audit of implementation of public grievance redressal system	%	2	100	95	90	85	80	100	100	2
Total Composite Score: 98 %														
Rating : Excellent														



LIST OF ONGOING PROJECTS

S. No.	Project Title	Duration	Core Area	Investigators
1	Evaluation of Engineering and Economic Performance of High Capacity Rotary Knife Roller Gin for Indian Cottons and Optimization of Machine and Process Parameters for Efficient Ginning	October 2012 - September 2015	Pre-Ginning and Ginning	Er. V. G. Arude (PI) Dr. S. K. Shukla
2	Investigations on the Factors Leading to Roller Shaft Break-up in DR Gins	December 2014 - November 2016	Pre-Ginning and Ginning	Ms. Varsha Satankar (PI) Dr. P. G. Patil Dr. S. K. Shukla Er. V. G. Arude
3	Development of Innovative Fibre Blends and Finishes for Improved Functionality of Cotton Textiles	April 2012 – March 2017	Mechanical Processing, Technical Textiles and Composites	Dr. R. Guruprasad (PI) Dr. S. K. Chattopadhyay Er. G.T.V. Prabu Er. G. Krishna Prasad Dr. T. Senthil Kumar Dr. P.K. Mandhyan Dr. (Smt.) Sujata Saxena Sh. A. Arputharaj Dr. Virendra Prasad Sh. Santanu Basak Dr. N. Vigneshwaran
4	Quality Assessment and Performance Improvement of Indian Cottons	April 2012 - March 2017	Characterisation – Cotton and other Natural Fibres, Yarns and Textiles	Dr. P. K. Mandhyan (PI) Dr. S. K. Dey Dr. N. Shanmugam
5	Development of Objective Fabric Handle Model for Indian Market	April 2012 - March 2015	Characterisation – Cotton and other Natural Fibres, Yarns and Textiles	Dr. N. Shanmugam (PI)
6	Survey on the Contamination Status in Indian Cotton	May 2014 - April 2016	Characterisation – Cotton and other Natural Fibres, Yarns and Textiles	Dr. C. Sundaramoorthy (PI) Dr. P. G. Patil Dr. P. K. Mandhyan
7	Functional finishing of Cotton Textiles through Nano and Plasma Technology	November 2013 - October 2015	Chemical and Biological Processing and Biomass and By-product Utilisation	Sh. A. Arputharaj (PI)

**EXTERNALLY FUNDED PROJECTS**

Project Title	Duration	Funding Agency	Investigators
Development of Cotton Picking Machinery for Small Scale Cotton Production System	Apr 2013 - Mar 2017	TMC: MM 1.7	Dr. S. K. Shukla Sh. V.G. Arude
Agro techniques for High Density Planting System and Surgical Cotton Varieties: Evaluating Promising Genotypes for Yield and Surgical / Absorbent Properties	June 2013 - Mar 2017	TMC : MM 1.4	Dr. (Smt.) Sujata Saxena Sh. Shekhar Das Dr. R. D. Nagarkar Sh. R. S. Prabhudesai Dr. N. Ashtaputre
Jute Based Bio Composite for Industry	Apr 2012 - Mar 2015	NFBSFARA	Er. Manik Bhowmick (PI) Dr. R. Guruprasad Dr. T. Senthilkumar
Biodegradable Electrospun Fibre Mat for Use in Packaging of Fresh Perishable Agricultural Material	Apr 2013 - Mar 2015	NFBSFARA	Sh. G.T.V. Prabu (PI) Dr. N.Vigneshwaran Dr. R. Guruprasad Dr. Virendra Prasad Dr. C. Sundaramoorthy
Technical Assistance Programme (TAP) to Strengthen Cotton Value Chain in Cotton 4 Countries (Benin, Burkina Faso, Chad & Mali) and Malawi, Nigeria and Uganda in Africa	Apr 2012 - Mar 2016	Ministry of External Affairs, Gol	Dr. P. G. Patil (PI) Er. Ashok Kumar Bharimalla Dr. S. K. Shukla Sh. V. G. Arude, Dr. C. Sundaramoorthy, Dr. (Smt.) Jyoti Nath

PERSONNEL

STAFF AT THE HEADQUARTERS

SCIENTIFIC STAFF

Name	Designation	Discipline
Dr. P. G. Patil, <i>M.Tech. (PHE), Ph.D. (Engg.), F.T.A.</i>	Director (Acting)	Agricultural Structures & Process Engineering
Dr. S. K. Chattopadhyay, <i>M.Tech. (Text. Engg.), Ph.D. (Tech), F.T.A., F.T.I. (Manchester)</i>	Principal Scientist	Textile Manufacture
Dr. (Smt.) Sujata Saxena, <i>M.Sc., Ph.D.</i>	Senior Scientist	Organic Chemistry
Dr. N. Shanmugam, <i>M. Tech., MIE, D.T.T., Ph.D. (Tech)</i>	Senior Scientist	Textile Manufacture
Dr. A.S.M. Raja, <i>M.Sc., Ph.D.</i>	Senior Scientist	Textile Chemistry
Dr. S. K. Dey, <i>M.Tech. (Text. Engg.), Ph.D. (Engg.)</i>	Senior Scientist	Physics
Dr. N. Vigneshwaran, <i>M.Sc. (Agri.), M.B.A., Ph.D.</i>	Senior Scientist	Agricultural Microbiology
Er. Ashok Kumar Bharimalla, <i>M. Tech.</i>	Senior Scientist	Composite
Dr. P.K. Mandhyan, <i>M.Sc., Ph.D., A.T.A</i>	Senior Scientist	Technical Textiles
Sh. Vishnu Govind Arude, <i>M. Tech.</i>	Scientist	Farm Machinery & Power
Dr. Virendra Prasad, <i>M.Sc., Ph.D.</i>	Scientist	Organic Chemistry
Dr. C. Sundaramoorthy, <i>M.Sc., Ph.D</i>	Scientist	Agricultural Economics
Er. P. S. Deshmukh, <i>M. Tech.</i>	Scientist	Farm Machinery & Power
Sh. Manik Bhowmick, <i>M. Tech.</i>	Scientist	Textile Manufacture
Sh. A. Arputharaj, <i>M.Sc., M. Tech.</i>	Scientist	Textile Chemistry
Dr. R. Guruprasad, <i>M. Tech., Ph.D.</i>	Scientist	Textile Manufacture
Sh. G.T.V. Prabu,, <i>M. Tech.</i>	Scientist	Textile Manufacture
Sh. G. Krishna Prasad, <i>M. Tech.</i>	Scientist	Textile Manufacture
Dr. T. Senthilkumar, <i>M. Tech.</i>	Scientist	Textile Manufacture
Sh. Shekhar Das, <i>M. Tech.</i>	Scientist	Textile Manufacture
Sh. Santanu Basak, <i>M. Tech.</i>	Scientist	Textile Chemistry
Sh. P. Jagajanantha, <i>M. Tech.</i>	Scientist	Textile Chemistry

**TECHNICAL STAFF****Assistant Chief Technical Officer**

- | | |
|--|--|
| 1. Dr. R.D. Nagarkar, M.Sc., Ph.D. | 9. Sh. R.K. Jadhav, M.Sc. |
| 2. Dr. (Smt.) Sheela Raj, M.Sc., Ph.D. | 10. Sh. S. Banerjee, M.Sc. |
| 3. Sh. M. Mohan, M.Sc., Dip. J. | 11. Sh. C.M. More, M.Sc. |
| 4. Sh. R.S. Prabhudesai, M.Sc., D.C.M. | 12. Sh. R.R. Chhagani, M.Sc. |
| 5. Sh. G.B. Hadge, M.Sc. | 13. Sh. H.S. Koli, M.Sc., LL.B. |
| 6. Dr. M.V. Vivekanandan, M.Sc., Ph.D. | 14. Sh. D.N. Moon, B.Sc. |
| 7. Sh. B.R. Pawar, M. Sc., LL.M. | 15. Dr. (Smt.) S.R. Kawlekar, M.Sc., P.I.M.R., Ph.D. |
| 8. Dr. (Smt.) N.M. Ashtaputre, M.Sc. | |

Senior Technical Officer

- | | |
|--|---------------------------------|
| 1. Dr. (Smt.) Sudha Tiwari, B.Sc., Ph.D. | 7. Sh. P.N. Sahane, D.I.F.T. |
| 2. Sh. S. Vancheswaran, B.Sc. | 8. Smt. Binu Sunil, M.Sc. |
| 3. Sh. T. Venugopal, B.E. | 9. Sh. D.U. Kamble, B.Sc. |
| 4. Sh. S.M. Gogate, B.Sc. | 10. Smt. N.A. Sonkusle, B.Sc. |
| 5. Smt. P.S. Nirhali, M.Sc. | 11. Smt. K.R. Joshi, M.A. |
| 6. Sh. S.V. Kokane, M.A. | 12. Smt. Bindu Venugopal, B.Sc. |

Technical Officer

- | | |
|-------------------------------------|--|
| 1. Smt. C.D. Prabha, M.Sc. | 5. Sh. V.D. Kalsekar, B.Sc. |
| 2. Kum. C.P. D' Souza, M.Sc. | 6. Sh. C.V. Shivgan, H.S.C., Cert. Wireman,
Cert. Electrician, Cert. Elec. Supr.PWD),,
Cert. M. & A.W.(Technician) |
| 3. Sh. R.S. Narkar, M.Sc., D.C.I.A. | |
| 4. Smt. P.R. Mhatre, B.Sc., M.Lib. | |

Senior Technical Assistant

- | | |
|----------------------------------|---|
| 1. Sh. N.D. Kamblil, M.Sc. | 4. Sh. D.M. Correia, S.S.C., I.T.I., N.C.T.V.T.
(Mechanic) |
| 2. Sh. M.G. Ambare, M.Sc. | 5. Smt. H.R. Pednekar, B.A., B.Lib. |
| 3. Sh. S. N. Patil, B.E. (Civil) | |

Technical Assistant

- | | |
|--|-------------------------------------|
| 1. Sh. R.P. Kadam, M.Sc. | 5. Sh. Krishna Bara, D.H.T. |
| 2. Smt. M.P. Kamble, B.A., M.Lib. | 6. Sh. D.A. Salaskar (Driver) |
| 3. Sh. A.R. Jadhav, B.Sc. | 7. Sh. S.K. Parab, Cert. Cot. Spin. |
| 4. Dr. Deepak Meena, B.A., M.Lib.,
M. Phil., Ph.D., PGDCA | |

Senior Technician

- | | |
|----------------------|--------------------|
| 1. Sh. D.M. Rajee | 5. Sh. S.V. Kokane |
| 2. Sh. R.R. Gosai | 6. Sh. M.M. Kadam |
| 3. Sh. N.K. Shaikh | 7. Sh. S.G. Phalke |
| 4. Sh. Mahabir Singh | |

Technician

- | | |
|-----------------------|--------------------|
| 1. Sh. D.G. Gole | 3. Sh. D.J. Dhodia |
| 2. Sh. Yogesh Nagpure | |

ADMINISTRATIVE STAFF

Administrative Officer	Sh. Sunil Kumar, B.A. (Hons.)
Assistant Administrative Officers	Smt. S. Koshy, B.Com. Smt. T.P. Mokal, M.A. Sh. K. Parleshwar
Assistant Finance & Accounts Officer	Jr. Accounts Officer
Sh. S.V. Kasabe, B.Com, L.L.B.	Sh. J.R. Mangale, B.Com.
Assistants	Upper Division Clerks
<ol style="list-style-type: none"> 1. Smt. V. V. Janaskar, B.Com., M.A. 2. Sh. R. K. Pallewad, B.A. 3. Smt. S. R. Shirsat, B.A. 4. Sh. N. V. Kambli 5. Smt. N. M. Deshmukh, M.A., LL.B. 6. Sh. S. D. Ambolkar 7. Sh. P. V. Jadhav 	<ol style="list-style-type: none"> 1. Smt. S. G. Parab, B. A. (Sociology), B.A. (Hindi) 2. Smt. S. P. Paiyala 3. Smt. J. R. Chavkute 4. Sh. V. M. Sable 5. Smt. B. D. Kherodkar 6. Sh. S. S. Angane 7. Sh. T.D. Dhamange, B.Com.
Lower Division Clerk	Personal Secretary
Smt. V. N. Walzade, B.A.	Smt. S. D. Dudam, M.A.
Personal Assistant	Stenographer
<ol style="list-style-type: none"> 1. Smt. T. T. D'Souza 2. Smt. U. N. Bhandari 	<ol style="list-style-type: none"> 1. Smt. R. R. Tawde, B.Com. 2. Smt. Viniya Rajesh Naik, B.A.
Skilled Supporting Staff	
<ol style="list-style-type: none"> 1. Sh. M. Z. Rathi 2. Sh. B. R. Satam 3. Sh. D. M. Chougule 4. Sh. M. K. Ghadge 5. Sh. D. B. Temgire 6. Sh. C. S. Salvi 7. Sh. K. T. Mahida 8. Sh. M. M. Katpara 9. Sh. M. A. A. Rashid 10. Sh. G. N. Mayawanshi 11. Sh. H. B. Vesmiya 12. Sh. M. J. Sumra 13. Sh. S. K. Bobate 14. Sh. P. P. Patil 15. Sh. R. G. Tak 16. Sh. R. P. Karkate 17. Sh. C. D. Acharekar 18. Sh. M. K. Prabhulkar 	<ol style="list-style-type: none"> 19. Sh. J. D. Sakpal 20. Sh. V. Murugan 21. Sh. S. D. Magar 22. Sh. S. B. Worlikar 23. Sh. S. R. Tondse 24. Sh. V. B. Poojari 25. Sh. M. N. Kamble 26. Sh. S. S. Surkule 27. Sh. S. P. Naik 28. Smt. Kamala Murugan 29. Sh. D. K. Kasar 30. Sh. S. R. Tondse 31. Sh. D.R. Gawde 32. Sh. S.M. Chandanshive 33. Sh. P.E. Gurav 34. Sh. Mahesh C. Solanki 35. Sh. R.S. Umare

**STAFF AT GINNING TRAINING CENTRE, NAGPUR****SCIENTIFIC STAFF**

Name	Designation	Agricultura Microbiologyl
Dr. Sujeet Kumar Shukla, M.Tech., Ph.D.	Senior Scientist and Officer In-Charge	Agricultural Structures and Process Engineer
Dr. (Mrs) Jyoti M. Nath, M.Sc., Ph.D.	Senior Scientist	Electronics & Instrumentation
Dr. V. Mageshwaran, M.Sc., Ph.D.	Scientist	Agricultura Microbiologyl
Ms. Varsha Satankar, M.Tech.	Scientist	Agricultural Structures and Process Engineering

TECHNICAL & ADMINISTRATIVE STAFF

Asst. Chief Technical Officer	Sh. N.V. Bansode, M.Sc.	
Sr. Technical Officer	Sh. V.L. Rangari, M.Sc Sh. U. D. Devikar, B. Sc. Sh. S.L. Bhanuse, B.Sc.	Sh. R. G. Dhakate, B.Sc Sh. S.N. Hedau, B.Sc
Sr. Technical Assistant	Sh. B.V. Shirsath, B.A., I.T.I.	
Technician	Sh. Umrao Meena	
Assistant Administrative Officer	Sh. Yogesh Ram Pathare, M.B.A.	
Assistant	Sh. S.A. Telpande, M.Com.	
Lower Division Clerk	Sh. R.G. Matel	
Stenographer (Gr. III)	Sh. R.D. Shambharkar, M.A.	
Skilled Support Staff	Sh. M.P. Tohokar Sh. A.R. Chutale Sh. J.P. Patel	Sh. R.B. Kautkar Sh. R.C. Rokde Smt. M.M. Bhanddakar

STAFF AT QUALITY EVALUATION UNIT, COIMBATORE

Chief Technical Officer	Dr. S. Venkatakrisnan, M.Sc., Ph.D., A.T.A., F.T.A.
Asst. Chief. Technical Officer	Sh. K. Thiagarajan, M.Sc.
Technical Officer	Sh. M. Bhaskar, Dip. Ref. & Air-Cond.
Skilled Supporting Staff	Sh. V. Subbaiah

STAFF AT QUALITY EVALUATION UNIT, DHARWAD

Senior Technical Officer	Sh. K. Narayanan, B.Sc.
Senior Technical Assistant	Smt. V.G. Udikeri, B.Sc.
Skilled Supporting Staff	Sh. C.J. Bagalkoti Sh. A.F. Gudadur

STAFF AT QUALITY EVALUATION UNIT, GUNTUR

Chief Technical Officer	Sh. S. Mukundan, M.Sc.
Technician	Sh. Vijay Kumar Sutar

STAFF AT QUALITY EVALUATION UNIT, SIRSA

Chief Technical Officer	Dr. Hamid Hasan, M.Sc., Ph.D.
Senior Technical Officer	Dr. Jal Singh, M.Sc., Ph.D.

STAFF AT QUALITY EVALUATION UNIT, SURAT

Senior Technical Officer	Sh. G.G. Mistry, B.Sc. Sh. M.B. Patel, B.Sc., L.L.B.
Skilled Supporting Staff	Sh. M.G. Sosa

**APPOINTMENTS**

Dr. P.G. Patil, Head, TTD took over as Acting Director w.e.f. May 7, 2014.

Ms. Varsha Satankar Joined as Scientist w.e.f. April 8, 2014

PROMOTIONS**SCIENTIFIC**

Name and Designation of Scientist	RGP to which Promoted	Date of Effect
Dr. N. Vigneshwaran, Sr. Scientist (Microbiology)	9000	10-09-2013
Sh. V. G. Arude, Scientist (Farm Machinery & Power)	9000	21-05-2013
Er. A. K. Bharimalla, Scientist (Farm Machinery & Power)	8000	14-09-2012
Dr. V. Mageshwaran, Scientist (Microbiology)	7000	04-11-2013

TECHNICAL

Name	Post and Grade to which Promoted	Effective Date of Promotion
Sh. D.U. Kamble	Sr. Technical Officer (GP Rs. 5400)	10-06-2013
Smt. Bindu Venugopal	Sr. Technical Officer (GP Rs. 5400)	05-11-2013
Sh. C.V. Shivgan	Technical Officer (GP Rs. 4600)	16-01-2013
Sh. S. K. Parab	Technical Assistant (GP Rs. 2800)	01-10-2012
Smt. N.A. Sonkusle	Sr. Technical Officer (GP Rs. 5400)	15-06-2003
Sh. C. L. Mundale	Technical Assistant (GP Rs. 2800)	01-10-2012
Sh. V. L. Rangari	Sr. Technical Officer (GP Rs. 5400)	01-01-2010
Sh. U.D. Devikar	Sr. Technical Officer (GP Rs. 5400)	01-01-2010
Sh. S.L. Bhanuse	Sr. Technical Officer (GP Rs. 5400)	01-01-2010
Smt. Hemangi R. Pednekar	Sr. Technical Assistant (GP Rs. 4200)	14-06-2014
Smt. K. R. Joshi	Sr. Technical Officer (GP Rs. 5400)	29-06-2013

PROMOTIONS UNDER MODIFIED ASSURED CAREER PROGRESSION SCHEME (MACPS)

S. No.	Name of Official, Designation & Grade Pay	Date of Joining in CIRCOT	Post In which Joined	Effective Date of MACPS
1	Smt. T. P. Mokal, Assistant Administrative Officer Rs.4600/-	23-09-1993	Assistant (Hindi)	23-09-2013
2	Shri R. D Shambharkar, Stenographer Gr.III Rs.4200/-	05-08-1993	Steno. Gr. III	05-08-2013
3.	Smt. V. V. Janaskar, Assistant, Rs.4200/-	11-11-1986	Jr. Clerk	22-07-2014
4.	Smt. S. R. Shirsat, Assistant Rs.4200/-	28-06-1984	Jr. Clerk	28-06-2014
5.	Shri R. G. Matel, LDC Rs.1900/-	15-09-1993	S.S.Gr.I	15-09-2013
6.	Shri D. B. Temgire Skilled Support Staff Rs.2000/-	05-05-1983	S.S.Gr.I	05-05-2013
7.	Shri C. J. Bagalkoti Skilled Support Staff Rs.2000/-	27-12-1884	S.S.Gr.I	27-12-2014
8.	Shri S. N. Gope Retired Skilled Support Staff Rs.2000/-	03-06-1982	S.S.Gr.I	03-06-2012
9.	Shri K. T. Mahida Skilled Support Staff Rs.2000/-	16-04-1984	S.S.Gr.I	16-04-2014
10.	Shri M. A.A. Rashid Skilled Support Staff Rs.2000/-	10-01-1983	S.S.Gr.I	10-01-2013
11.	Shri M. J. Sumra Skilled Support Staff Rs.2000/-	26-03-1984	S.S.Gr.I	26-03-2014
12.	Shri M.K. Prabhulkar Skilled Support Staff Rs.1,900/-	13-04-1993	S.S.Gr.I	13-04-2013
13.	Shri J.D. Sakpal Skilled Support Staff Rs.1,900/-	30-04-1993	S.S.Gr.I	30-04-2013
14.	Shri V. Murugan Skilled Support Staff Rs.1,900/-	15-05-1993	S.S.Gr.I	15-05-2013
15.	Shri M.G. Sosa Skilled Support Staff Rs.1,900/-	01-11-1993	S.S.Gr.I	01-11-2013
16.	Shri S. D. Magar Skilled Support Staff Rs.1900/-	21-05-1993	S.S.Gr.I	21-05-2013
17.	Shri Sunil, R. Tondase Skilled Support Staff Rs.1900/-	28-01-1994	S.S.Gr.I	28-01-2014
18.	Shri R. C. Rokade Skilled Support Staff Rs.1900/-	06-05-1994	S.S.Gr.I	06-05-2014
19.	Shri V. Subhain Skilled Support Staff Rs.1900/-	16-06-1994	S.S.Gr.I	16-06-2014
20.	Shri P. E. Gurav Skilled Support Staff Rs.1800/-	08-05-2002	S.S.Gr.I	08-05-2012

**ADMINISTRATIVE**

Name	Post and Grade to which Promoted	Effective Date of Promotion
Sh. T.D. Dhamange	UDC (GP Rs. 2400)	28-07-2014
Sh. P.V. Jadhav	Assistant (GP Rs. 4200)	28-07-2014
Sh. K. Parleshwar	Asst. Admin Officer (GP Rs. 4600)	01-08-2014
Smt. U.N. Bhandari	Personal Assistant (GP Rs. 4200)	27-10-2014
Smt. S.D. Dudam	Personal Secretary (GP Rs. 4600)	27-10-2014

DEPUTATION

Name of the Programme	Period & Place	Scientist
6 th Meeting of the Asian Cotton Research & Development Network hosted by Cotton Development Board, Bangladesh	Jun 18 –20, 2014 Dhaka, Bangladesh	Dr. P. G. Patil
In-country Training Programme on Post-Harvest Management of cotton and Value addition to Cottonseed and Crop Residues	Nov 12 –19, 2014 Uganda and Malawi	Dr. P.G. Patil Er. Ashok Kumar Bharimalla Er. V. G. Arude
In-country Training Programme on Post-Harvest Management of cotton and Value addition to Cottonseed and Crop Residues	March 10 -15, 2015 Benin	Dr. P. G. Patil Er. Ashok Kumar Bharimalla

TRANSFERS

Dr. Kartick Kumar Samanta, Scientist transferred to NIRJAFT, Kolkata w.e.f. 24-11-2014.

Dr. V. Mageshwaran, Scientist transferred from headquarters to GTC, Nagpur on 23-12-2014.

Sh. R. S. Umare, Skilled Support Staff transferred from Guntur regional unit to CIRCOT, Mumbai w.e.f. 08-01-2015.

RETIREMENTS

S. No.	Name	Designation	Date of Retirement
1.	Sh. R.M. Gurjar	Principal Scientist	31-05-2014
2.	Sh. S. Sekar	Chief Technical Officer (T-9)	31-05-2014
3.	Dr. S.J. Guhagarkar	Chief Technical Officer (T-9)	31-07-2014
4.	Sh. R.S. Pathare	Sr. Technical Officer	31-07-2014
5.	Sh. C.L. Mundale	Sr. Technician	31-09-2014
6.	Sh. A.R. Gujar	Upper Division Clerk	31-05-2014
7.	Smt. V.V. Desai	Assistant Administrative Officer	31-07-2014
8.	Sh. Venu Thanikal	Private Secretary	31-10-2014
9.	Sh. S.D. Gurav	Skilled Support Staff	31-01-2015

OBITUARY

Dr. R.R. Mahangade, Sr. Technical Officer expired on March 12, 2015.



LIST OF VARIOUS COMMITTEES IN ICAR-CIRCOT

RESEARCH ADVISORY COMMITTEE (16-01-2014 TO 15-01-2017)

Dr. P. R. Roy	Chairman
Dr. A. Wadood	Member
Dr. U. S. Sarma	Member
Dr. G. S. Nadiger	Member
Dr. (Mrs.) Niyati Bhattacharya	Member
Additional Director General (PE)	Member
Director, CIRCOT	Member
Dr. (Smt.) Sujata Saxena	Member Secretary

INSTITUTE MANAGEMENT COMMITTEE (IMC)

Dr. P.G. Patil, Director	Chairman
Dr. K.K. Singh, ADG (PE), ICAR	Member
Dr. Gautam Roy, Head, QEID, NIRJAFT, Kolkata	Member
Sh. Suresh Chandra, Chief Finance & Accounts Officer, CIFE, Mumbai	Member
Dr. Y. S. Nerkar, Ex-Vice Chancellor, MPKV, Rahuri	Member
Sh. Mani Chinnaswami, Apachi Cotton, Polachi, Tamil Nadu	Member
Director of Agriculture, Directorate of Agriculture, Pune	Member
Director of Agriculture, Directorate of Agriculture, Gujarat	Member
Dr. B.R. Patil, Principal Scientist, PAU, Akola, Maharashtra	Member
Dr. S. Manikkam, Principal Scientist, CICR Regional Station, Coimbatore	Member
Dr. Sujata Saxena, In-charge Head, CBPD	Member
Dr. (Smt.) Jyoti Mintu Nath, Sr. Scientist, GTC, CIRCOT	Member
Sh. S. V. Kasabe, AF&AO	Member
Sh. Sunil Kumar, AO	Member Secretary

QUINQUENNIAL REVIEW TEAM (QRT) 2012 -17

Dr. V. M. Mayande Hon'ble Vice-Chancellor Dr. Panjabrao Deshmukh KrishiVidyapeeth, Akola	Chairman
Dr. K. R. K. Iyer Former Director, CIRCOT, Mumbai	Member
Dr. V. Kumar Chief Scientist (Cotton), Navsari Agricultural University, Surat	Member
Dr. S. R. Shukla Professor, Textile Chemistry Institute of Chemical Technology, Mumbai	Member
Dr. A. K. Rakshit Head, Textile Manufacture Department VJTI, Mumbai	Member
Dr. P. C. Bargale Head, Division of Transfer of Technology Central Institute of Agricultural Engineering, Bhopal	Member
Dr. P.G. Patil Head, Division of Transfer of Technology CIRCOT, Mumbai	Member Secretary

PROJECT MONITORING AND EVALUATION COMMITTEE (PMC)

Dr. P.G. Patil, Director	Chairman
Dr. S.K. Chattopadhyay, In-charge Head, MPD	Member
Dr. N. Shanmugam, In-charge Head, QEID	Member
Er. A.K. Bharimalla, In-charge Head, TTD	Member
Dr. (Smt.) Sujata Saxena, In-charge Head, CBPD	Member Secretary

**PRIORITY-SETTING, MONITORING & EVALUATION (PME CELL)**

Dr.(Smt.) Sujata Saxena, In-charge Head, CBPD	Chairman
Dr. N. Shanmugam, In-charge Head, QEID	Member
Dr. A.S.M. Raja, Sr. Scientist	Member
Dr. S.K. Dey, Sr. Scientist	Member
Dr. N. Vigneshwaran, Sr. Scientist	Member
Er. V.G. Arude, Scientist	Member
Dr. C. Sundaramoorthy, Scientist	Member
Dr. R. Guruprasad, Scientist	Member
Sh. M. Mohan, ACTO	Member Secretary

RESULT FRAMEWORK DOCUMENT (RFD)

Er. V.G. Arude, Scientist	Nodal Officer
Dr. A.S.M. Raja, Sr. Scientist	Member
Dr. C. Sundaramoorthy, Scientist	Member
Sh. M. Mohan, ACTO	Member

INNOVATION CELL

Dr. P. G. Patil Director	Chairman
Dr. N. Shanmugam, In-charge Head, QEID	Member
Dr. (Smt.) Sujata Saxena, In-charge Head, CBPD	Member
Sh. V. G. Arude, Scientist	Member
Dr. A.S.M. Raja, Sr. Scientist	Member
Er. G.T.V. Prabu , Scientist	Member Secretary
Dr. R.D. Nagarkar, ACTO	Member
Sh. Sunil Kumar, AO	Member
Sh. S.V. Kasabe, AF&AO	Member

INSTITUTE TECHNOLOGY MANAGEMENT COMMITTEE

Dr. P. G. Patil, Director	Chairman
Dr. S. K. Chattopadhyay, In-charge Head, MPD	Member
Dr. Sujata Saxena, In-charge Head, CBPD	Member
Dr. N. Shanmugam, In-charge Head, QEID	Member
Dr. B. B. Nayak, PS, CIFE	Member
Sh. M. Mohan, ACTO	Member
Er. A. K. Bharimalla, Sr. Scientist	Member Secretary

INSTITUTE TECHNOLOGY MANAGEMENT UNIT

Er. A. K. Bharimalla, Sr. Scientist	Officer-in-charge
Dr. N. Vigneshwaran, Sr. Scientist	Member
Dr. P. K. Mandhyan, Sr. Scientist	Member
Sh. Manik Bhowmick, Scientist	Member
Dr. M. V. Vivekanandan, ACTO	Member
Sh. G. B. Hadge, ACTO	Member

ISO-9001:2008 MANAGEMENT COMMITTEE

Dr. P.G. Patil, Director	Chairman
Dr. S.K. Chattopadhyay, In-charge Head, MPD	Member
Dr. (Smt.) Sujata Saxena, In-charge Head, CBPD	Member
Dr. N. Shanmugam, In-charge Head, QEID	Member
Er. A.K. Bharimalla, In-charge Head, TTD	Member
Dr. A.S.M. Raja, Sr. Scientist	Member
Sh. Sunil Kumar, AO	Member
Sh. S.V. Kasabe, AF&AO	Member
Sh. M. Mohan, ACTO	Member



ICAR - CIRCOT

CITIZEN CHARTER



CITIZEN'S / CLIENT'S CHARTER

for

ICAR- Central Institute for Research on Cotton Technology
Adenwala Road, Matunga, Mumbai – 400 019
Phone : (022) 24127273/76, 24184274/75 , Fax:022-24130835
Website : <http://www.circot.res.in>



VISION

Global Excellence in Cotton Technology

MISSION

To provide scientific and managerial interventions to post-harvest processing and value addition to cotton and other natural fibres and utilization of their by-products to maximize economic, environmental and societal benefits.

Main Services / Transactions

S. No.	Services / Transaction (s)	Responsible officer
1.	Commercial Testing: Fibre, yarn, fabric, garment, spinnability, non-lint content, linter, seed, paper, chemical and biochemical tests of textile material, ECO test, SEM and XRD test etc.	Mr. S. Vancheswaran Senior Technical Officer (T6), In-charge, Test House, CIRCOT, Mumbai Phone : 022-24127273/76, 24184274/75 . Ext-456/457 E-mail : cottontest@rediffmail.com , circotest@gmail.com
2.	Imparting Training to stakeholders	1. Er. A. K. Bharimalla Sr Scientist , TTD, CIRCOT, Mumbai Phone : 022-24127273/76, 24184274/75 , Ext-467/121 E-mail : ashokbhari72@gmail.com 2. Dr. S. K Shukla Senior Scientist & Officer In-charge, GTC, Nagpur Phone:0712 2500592 , 0712 2500289 E-mail : gtc_ngp@rediffmail.com , Skshukla2000@gmail.com
3.	Supply of Calibration Cotton	Dr. N. Shanmugam, Senior Scientist & Head, QEID, CIRCOT, Mumbai Phone : 022-24127273/76, 24184274/75 Ext. : 447 E-mail : dr.shanmugam@gmail.com , circotcalbcot@rediffmail.com
4.	Consultancy and technology transfer	1. Dr. S. V. Ghadge Sr Scientist & Head, I/c TTD, CIRCOT, Mumbai 022-24127273/76, 24184274/75, Ext-467/121 E-mail : sv.ghadge@icar.gov.in 2. Er. A. K. Bharimalla Sr Scientist , TTD, CIRCOT, Mumbai 022-24127273/76, 24184274/75, Ext-467/121 E-mail : ashokbhari72@gmail.com

Public Grievance Officer:

Mr. Sunil Kumar, Administrative officer • Phone : 022-24127627 Ext-138 • E-mail : sunkr2@rediffmail.com



हमारा उद्देश्य

पारदर्शिता को बढ़ावा देने के लिए
To promote transparency

OUR MOTIVE

जवाबदेही को बढ़ावा देने के लिए
To promote accountability

सूचना का अधिकार अधिनियम, 2005 की घोषणा के अनुसरण में, निम्नलिखित अधिकारियों को इस संस्थान में जनसूचना अधिकारी, सहायक जनसूचना अधिकारी और अपील्य प्राधिकारी के रूप में नामित किया गया है।

In Pursuance of the promulgation of Right to Information Act, 2005, the following Officers are designated as CPIO, Assistant CPIO and Appellate Authority at this institute.

केन्द्रीय लोक सूचना अधिकारी

Central Public Information Officer

श्री. सुनील कुमार

प्रशासनिक अधिकारी, भा. क. अनु. प - के. क. प्रौ. अनु. सं.

Tel. : 2412 7627

2412 7273 / 76, 2418 4274 / 75

Fax No. : 2413 0835 / 2415 7239

E-mail : circot@vsnl.com

sunil.kumar@icar.gov.in

सहायक केन्द्रीय लोक सूचना अधिकारी

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Regional Quality Evaluation Units



Nagpur



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Surat



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हर कदम, हर डगर
किसानों का हमसफर
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