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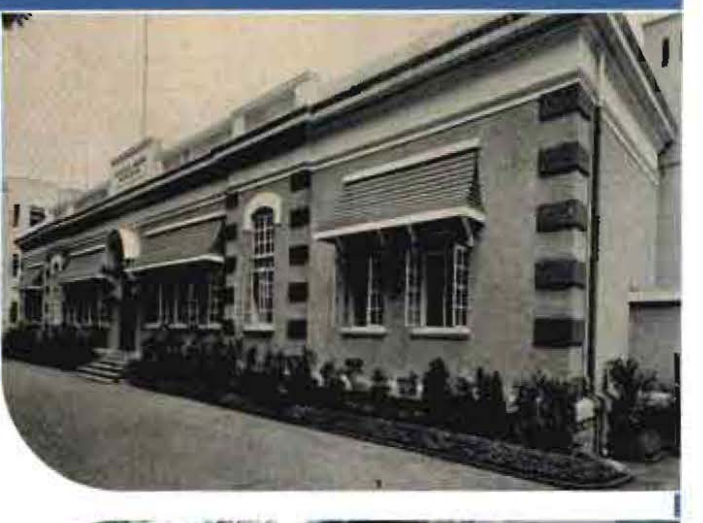

CIRCOT

Annual Report 2012 - 2013

Central Institute for Research on Cotton Technology
(Indian Council for Agricultural Research)
Adenwala Road, Matunga (East), Mumbai - 400019

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CENTRAL INSTITUTE FOR RESEARCH ON COTTON TECHNOLOGY

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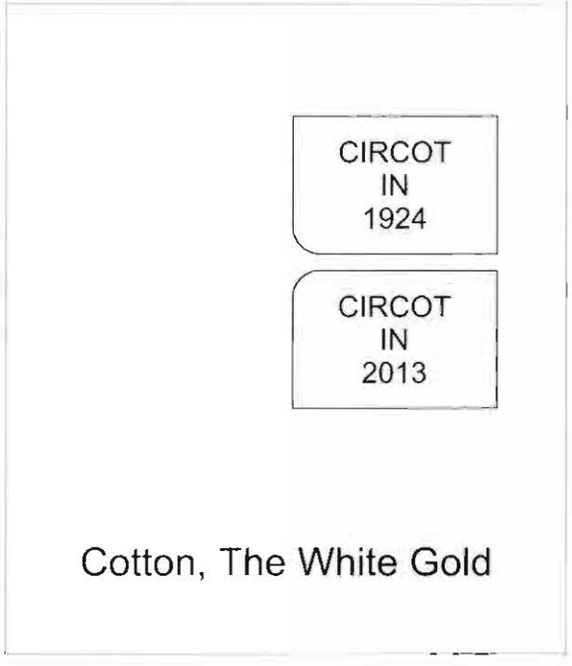

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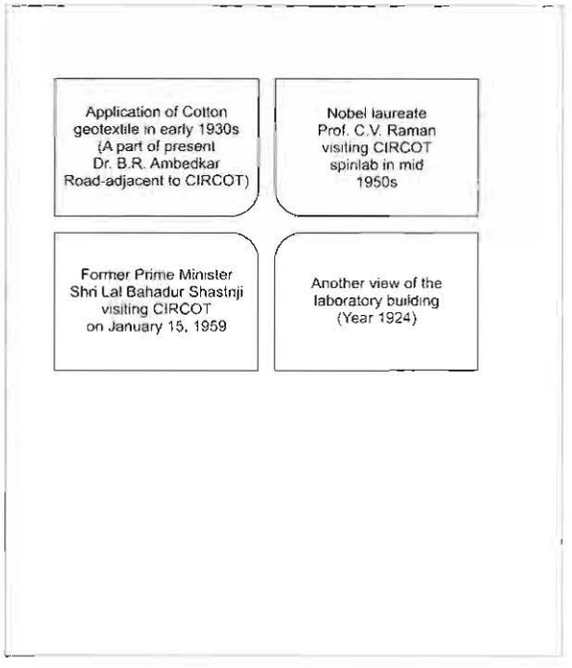

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CONTENTS

PREFACE

CIRCOT is on the threshold of tenth decade of its fruitful existence. This journey through nine decades has been productive, successful, eventful and commendable. It has been a constant endeavour at CIRCOT to carry out sustainable and high impact research which can add enormous value to the life of all, right from the farmer to the consumer. For CIRCOT, it has been a commitment to be an effective organization and carry out its research mandates to bring multifold benefit to the society and the stakeholders.

CIRCOT has been conducting research in the frontiers areas of technologies for the betterment of cotton processing and product development. In the last year, significant research progress and achievements have been made in nanotechnology and plasma processing of textiles. It is remarkable that these new technologies can provide solutions to problems like enormous use of water and its pollution with which the textile industry has been grappling for decades. The application of these efficient technologies can enhance the qualitative and quantitative worth of cotton based textiles by production of niche apparel and technical based textiles. Likewise, it is an accepted fact that, in a tropical country like India the dependence on cotton textiles is huge – across all social and economic hierarchy. We want large quantities of raw cotton to feed our addiction to weather-friendly, economical, fashionable and ecologically preferred way of draping ourselves. Such a scenario provides ample opportunities for developing sustainable as well as niche textiles for use by the masses and the classes. Apart from the apparel industry, cotton and other natural fibres are contributing in a big way in the production of technical textiles. CIRCOT is already carrying out research in using cotton in blends, especially with natural fibres; in technical application based textiles and in composites. The value addition to cotton biomass is another area in which CIRCOT is doing significant work. All the areas mentioned are technological marvels in their own right and will bring immense glory to CIRCOT in the years to come. But the most satisfying aspect is that these areas will directly and indirectly provide significant boost to the main stakeholder in the cotton value chain, which is the Indian cotton farmer. CIRCOT's focus is to make the white gold into a more profitable and sustainable agricultural produce. The expertise and knowledge available here should be channelized to develop more application areas other than apparels.

In the reported year, CIRCOT has significantly forayed into providing training (Cotton TAP) and entrepreneurship development programmes (EDP) to a good mix of international and national delegates. It was a proud moment for us to engage significantly and actively in the initiative and commitment of GOI to support the C-4 countries of Africa (Benin, Burkina Faso, Chad and Mali), Malawi, Nigeria and Uganda and host 31 esteemed delegates from these countries. The delegates underwent a comprehensive training cum-exposure programme on Post-Harvest Management of Cotton and Value Addition to crop residues, under the Cotton Technical Assistance Programme for Africa. Significantly, 22 delegates took part in the three-day 'Entrepreneurship Development Programme for Technologies on Biomass Utilization, Focus: Particle Board and Nanocellulose', conducted under the aegis of the ZTM-BPD (NAIP) unit. We eagerly look forward to conduct more such programmes in the coming years. Our regular training programmes on ginning and quality evaluation of cotton fibres were also

conducted with good participation representing almost all stakeholders in the value chain. We were also proud to host the visit of a 23-member delegation of farmers from Afghanistan and groups of progressive farmers from Amreli, Porbandar and Jabalpur. Besides, CIRCOT was privileged with the visits of Shri Tariq Anwar, the Hon'ble MoS for Agriculture and Food Processing, Dr. Anil Netravali, Professor of Fibre Science, Cornell University, USA, Shri Paul Singh Sidhu from the World Bank and Mr. Matthias Knappe, Programme Manager from International Trade Centre, Geneva. All these events provide us the satisfaction and encouragement to know that CIRCOT is an institution looked on by the various stakeholders, national and international policy makers, experts, academicians and other dignitaries in cotton technology.

No doubt, high expectations and leadership are demanded from an organization like CIRCOT with legacy and experience of 90 years and we hope to fulfill the same to the best of our abilities. We believe that more resolves and commitments for furthering the betterment of society are yet to be fulfilled. CIRCOT has a keen vision for the Indian cotton farmer and other stakeholders and zeal to realize the vision.

S.K. Chattopadhyay

Director

SALIENT ACHIEVEMENTS

Research Achievements

- Fully green composites with encouraging tensile properties have been produced using jute as reinforcement and PLA fibre as matrix in the laboratory scale. Besides, Banana fibre used as reinforcement with matrix of thermoplastic polypropylene film was found to produce composite with good tensile modulus making it suitable for applications requiring high rigidity.

- The research on application of Nano technology on cotton fabrics has proved successful in imparting Super Hydrophobicity by surface modification of cotton textiles.

- A new core SiO_2 – shell TiO_2 complex nanoparticle of 300-500 nm has been synthesized. The same was used to produce durable UV protection cotton textiles of excellent rating (UPF 50+).

- Two solid state fermentation processes have been developed using different combinations of microbial strains for detoxification of free gossypol from 0.22 to 0.04 % and total gossypol from 2.3 to 0.8% with simultaneous improvement in the lysine content. This development poses as a viable alternative protein supplement that can replace soybean meal either partly or completely, in poultry feed.

- CIRCOT has designed and fabricated indigenous atmospheric pressure plasma reactors with and without cooling system with advanced plasma characterization facilities such as mass flow controllers, digital oscilloscope with voltage and current probes, optical emission spectroscopy (OES) and gas chromatography mass spectroscopy (GC-MS) for application in textile processing.

- A new on-line RFID bale tagging system to track the bales has been developed. The technology can provide online information about the Pressmark No, Year of manufacture, Lot Number, Bale Number, Weight, Quality Parameters like Grade, Variety, Fibre Length, Micronaire, UR%, Trash and Moisture measurement.

- The segregation and refining of bulk coconut fibres into grades of fine, coarse and medium fibres have been achieved in bulk trials of 360 kgs, carried out with the CIRCOT developed Coconut Fibre Segregator Machine. Compact and dense non-woven/mat has been prepared from the segregated fine fibres.

- Successful designing and fabrication of co-axial nozzle attachments have been achieved for electro spinning of Core-sheath Nanofibres into Yarns in laboratory scale.

- A pedal driven CIRCOT-Phoenix Charkha for spinning coarse long-staple fibres from banana pseudostem at the cottage level has been developed. A multi-sheath feeder attachment to banana fibre Raspador machine has been developed. This feeder was found to increase productivity of fibre extraction by 1.5 to 2 times.

- A new process for quick composting of wet and dry agro biomass has been achieved by using aerobic microbes and CIRCOT anaerobic consortium, saving 15 and 30 days respectively with better NPK content compared to farm yard manure.

- Use of pomegranate rind powders (plant extract) as mordant followed by alum treatment produced a very good orange-red hue on scoured and bleached cotton fabrics upon dyeing with natural dye and also significantly improved UV resistance property of textiles with UPF value of 50+.

- A new process for making nanocellulose compatible with synthetic polymeric matrix like polyethylene and

polypropylene using a non ionic surfactant and/or an anionic surfactant through noncovalent bonding has been developed.

- A study has indicated that primary sources of fine dust pollution during operation in ginneries are the unclosed/uncovered gin machines, belt conveyors and pre-cleaner. About 90% fine dust are originating from ginning point of double roller (DR) gins.

- In the flagship project, Cotton-rich blended yarns of 40s count with 4 twist levels in blend ratios of 80:20, 65:35 and 50:50 with PLA fibres were produced by compact ring spinning. Lea CSP in the range of 1800-2100 has been achieved for 80:20 blend ratio.

- Seven hundred and eighty one containers of indigenous calibration cottons were supplied to the textile industry as reference materials for calibrating their modern testing instruments and generating Rs. 4,03,647 as revenue.

- Under the scope of All India Coordinated Cotton Improvement project (AICCIP) quality analysis of 3686 samples has been done of which 928 samples belong to zonal trials, while 2758 samples correspond to National Trials. The quality analysis carried out on 25 standard varieties of cotton revealed no significant change in properties in comparison to that observed at the time of release of those varieties.

- The capacity of the rotary knife roller gin was found to be six times that of the Jumbo double roller gin; the percent cut-seed during rotary ginning of cotton was found lower than that found with double roller gin.

- Fabrics with bright and dark colours were obtained when dyed with extract of tender coconut husk and use of an inorganic salt as the secondary mordant. Scale-up trials were carried out using rope dyeing machine and Rotary Pressure Vessel.

- Energy consumption of up-packing type of cotton bale press was found to lower by 40% compared to down-packing press for 15 and 25 bales/hr capacities. Operational cost was also found lower by 10%.

Technology and Business Promotion Activities

- Eighteen consultancies relating to cotton technologies were undertaken by the institute during the reported period.

- Thirty-one delegates from select African Countries – Benin, Burkina Faso, Chad, Mali, Malawi, Nigeria and Uganda underwent an International Training cum Exposure Programme on Post Harvest Management of Cotton & Value Addition to crop residues (Cotton TAP) under support from Dept. of Commerce, Ministry of Commerce & Industries (Govt. of India).

- The ZTM & BPD unit, for the first time organized a 3-day Entrepreneurship Development Programme (EDP) with 22 participants for Technologies on Biomass Utilization, Focus: Particle Board & Nanocellulose, generating a revenue of Rs. 1,76,000/-

- Fourty-two personnel underwent training at Headquarter on quality evaluation of fibres and in using sophisticated instruments like HVI and AFIS including basic statistical interpretation of data; one hundred and fifty personnel including many farmers in fourteen batches underwent training on the operation and maintenance of various ginning machines apart from training on quality evaluation of cotton; thirty-six cotton farmers from Junagadh, Gujarat participated in a training under the ATMA scheme at GTC, Nagpur.

- More than 9500 cotton samples received from trade, industry, research and educational institutes were evaluated for quality under the paid test category at CIRCOT headquarter and at regional quality evaluation units.

- Seven MoUs were signed with different clients relating to technologies and services on cotton technology.

- Nine patents on new technologies and machines developed by the institute were filed with the patent office.

- The dynamic reconstituted ZTM-BPD unit at CIRCOT generated revenue worth Rs. 25 lakhs.

Exhibition and Publicity

CIRCOT actively participated in

- **SAU-ICAR-CII Industry Meets at**
  a. Anand Agriculture University, Anand
  b. Tamil Nadu Agriculture University, Coimbatore
  c. Central Agriculture University, Imphal
  d. CCS Haryana Agriculture University, Hisar

- **Exhibition/Awareness Meet at**
  a. Farmers Awareness meet in association with CICR at Sirsa
  b. Cotton Ginners Awareness Meet on "Modernization in Ginning and Advantages of Bale Tagging with Fibre Properties" at Club City, Sirsa
  c. Exhibition and Farmers Awareness meet at MAU, Parbhani

- Capacity Building and Business Incubation meet at TBI, Trivandrum
- MAM-12 – 6th International Symposium on Macro-and Supramolecular architectures and Materials – Special Theme on Nanosystems and Applications, at Coimbatore.
- India International Textile Machinery Exhibition (ITME) 2012 at Mumbai as 'Knowledge Partner'.
- Science exhibition conducted by Don Bosco High School in collaboration with other schools at Don Bosco High School, Matunga.
- The 4th Annual Seminar and Exhibition on Post Ginning Value Addition to Cotton, arranged by MP Association of cotton processors and traders (MPACPT), at Indore
- XIth Agricultural Science Congress at Odisha University of Agriculture and Technology (OUAT), Bhubaneswar.

Accolades

- The consortium of NAIP subproject Design and Development of Rubber Dam for Watershed, was honoured with a "Certificate of Appreciation" from NAIP, which was received by Dr. S.K. Chattopadhyay, CCPI from CIRCOT, at the hands of the Hon'ble Governor of Goa, Shri Bharat Vir Wanchoo in the inaugural function of ICAR Regional Committee Meeting no.VII.

- Dr. S.K. Chattopadhyay received the Fellowship from Textile Institute (FTI), Manchester, United Kingdom.

- Dr. Kartick K. Samanta, Dr. Sujata Saxena and Er. A. Arputharaj bagged the Best Poster Award in 100th Indian Science Congress in Material Science, for their poster on Application of Plasma Technology in Textile Chemical Processing to Reduce Water Pollution.

- Dr. N. Vigneshwaran received the 1st prize in Research Meet in Biotechnology for the poster titled, Preparation and characterization of cellulose acetate electrospun mat embedded with ZnO nanoparticles and Vitamins.

- Dr. R. Guruprasad received Best paper award in Fibre technology and Trade session at the National Convention on Cotton for his paper on Indian Cotton and Needs of Spinning Industry.

- Dr. Kartick K. Samanta received Best Oral Presentation Award in First International Conference on Bio-resource and Stress Management in Crop Improvement for the presentation on Textile Chemical Processing using Plasma to Reduce Water Pollution.

- Er. Chitranayak, Dr. V. Prasad, Shri A. Yadav, Shri R.S. Prabhudesai and Shri D. N. Moon received Best poster award in Fibre Technology group at the National Convention on Cotton for their poster on Spinning Potential and Quality of Indian Cotton.

- Shri Deepak Meena bagged the first prize in Bhasan Pradiyogita (In Hindi) from the Nagar Rajbhasha Karyavayam Samiti (NARAKAS), North Mumbai Unit.

- Two Technical Officers, Shri Pradeep Mandhyan and Shri M.V. Vivekanandan have been awarded Ph.D. (Science) in Physics.

- The Institute participated in the ICAR Western Zone Sports Meet at Central Camel Research Institute, Bikaner and won First prizes in Women's Table Tennis (Singles & Doubles), Women's Carom event, Women's Chess and Second prize in 1500 m running.

- Smt. T.T. D'Souza, Personal Assistant won gold medal in 3000 m running, 3000 m walking and 400 m running in the 3rd Traingular Masters Athletics Championship 2013 and completed Half Marathon (21 Kms) at the 2nd Vasai-Virar Mayor's Marathon and DNA Womens Day Marathon.

- Dr. N. Shanmugam, Sr. Scientist visited Michigan, USA for Indo-US bilateral Workshop on Technology Commercialization.

- Dr. S.K. Shukla, Scientist underwent three-week training on Cotton Ginning at the Cotton Research Institute, Giza, Egypt.

- Dr. R. Guruprasad, Scientist underwent two-week training on Cotton Processing for Fine Quality Yarns at the Cotton Research Institute, Giza, Egypt.

Budget Utilisation and Revenue Generation

- The Institute utilized 99.99% budget (Rs. 410.49 lakhs) sanctioned by the Council under the Plan for year 2012-13.
- The revenue generation during the year was Rs. 65.33 lakhs, higher than the target of Rs. 55 lakhs set by the Council.

1
Introduction

This Eighty-ninth Annual Report of the Central Institute for Research on Cotton Technology (CIRCOT) covers the period from April 1, 2012 to March 31, 2013.

CIRCOT was established in the year 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). This name was changed to Central Institute for Research on Cotton Technology (CIRCOT) with effect from 1st April 1991.

CIRCOT has served the cotton community over the nine long decades since its inception, by reorienting itself to suit the changing needs of its stakeholders. CIRCOT has spearheaded and sustained the research and development of technologies and machineries for the postharvest processing of cotton. The Institute is widely recognized for its contribution in testing, standardization and development of test methods for different types of textile materials. Presently, CIRCOT has diversified its expertise to research in utilization of other natural fibres like Banana and Coconut for technical applications, and has also started pioneering work in nonwoven technology, natural fibre based composites. CIRCOT has forayed into field of nanotechnology, plasma technology and is researching to develop environment-friendly textile processes using these break-through technologies. CIRCOT is fully aware of its strategic role in transferring the developed technologies timely to the stakeholders. It has set up a vibrant and active Business Promotion and Development Unit which is also providing incubation facilities to potential entrepreneurs along with transferring of technology through various methods.

CIRCOT VISION AND MISSION

VISION

Global Excellence in Cotton Technology

MISSION

To provide scientific and managerial interventions to postharvest 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 postharvest 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.

Research carried out in the Last Two Years

- In the NAIP project on Synthesization and Characterization of Nanocellulose, an aerobic microbial process of nanocellulose production with 31% yield was optimized. In anaerobic process, the use of

enriched microbial consortium was found to yield 12% nanocellulose in seven days of incubation. In the enzymatic preparation, process optimization improved the yield to 11%. In chemo-mechanical preparation of cellulose nanofibrils, enzyme and zinc chloride pretreatment reduced the energy consumption by 50 and 40% respectively, while homogenization process gave 15% energy reduction. The nanocellulose prepared by enzymatic process and used as fillers in polyvinyl alcohol film doubled the tensile strength and reduced water vapour transmission rate by three times. Further, the nanocellulose used as fillers in starch film improved tensile strength by 3.5 times and reduced water vapour transmission rate by twice.

- In the NAIP project, Design and Development of Rubber Dam for Watersheds, five flexi check dams (rubber dams) were fabricated and installed at locations in odisha. These dams were evaluated for performance efficiency during the wet and dry spells. The textile-rubber composite used and the anchoring mechanism for the flexi check dams have been optimized.
- Surface property of cotton textiles was modified through the application of nano zinc oxide and silicone treatment. Improved hydrophobicity was achieved with organic fatty acid treatment on the surface modified cotton textile. Excellent (50+) UV protection value and good antibacterial property were also achieved.
- TiO2 and SiO2 nanoparticles were synthesized. The application of TiO2 nano particle on the cotton textile significantly increased the UPF value to an excellent 50+.
- In the NAIP Coconut fibre value chain project, a novel segregator machine has been developed for segregation of fine fibre from the bulk, providing value addition to the coconut fibre. Further, energy efficient disintegrator and defibering machine for extraction of fibres from brown husk and green husk have been developed.
- A pneumatic loading mechanism for the double roller gin has been developed which gives uniform ginning throughout the roller. Fibre properties like colour and nep count were found to improve compared to traditional double roller gin.
- Eighteen thousand two hundred ninety seven commercial samples were tested in last two years generating Rupees fourty seven lakhs sixteen thousand as revenue.
- Four thousand seven hundred and ninety six samples under AICCIP were evaluated and screened for fibre testing, Micro spinning and Full spinning including Standard and Trade varieties of samples in the past two years.
- The regional centers of CIRCOT tested a massive fifty one thousand eight hundred and thirty nine samples under various categories and projects.
- Seven hundred and sixty two units of Calibration Cottons were sold to the industry generating revenue of Rupees five lakhs twelve thousand seven hundred.
- In the research on microbial detoxification of gossypol in cotton seed meal, fungal isolates showed significant gossypol detoxification to the tune of 80 and 89%. Further, in optimization trials of substrate for solid state fermentation, cotton seed meal inoculated with fungal cultures showed notable reduction of total gossypol upto 60 and 50%.
- A Geographical Information System (GIS) based spatial fibre quality maps for the cotton grown in Nagpur region has been developed. The maps provide site specific information for better visualization and interpretation of data which is useful to traders, ginners, policy makers and researchers for precise planning.
- The mechanical delinting of microbial consortium pre treated cotton seeds yielded 1% additional recovery of linters. Large scale trials of microbial consortium and commercial enzyme pre-treatment of seeds enhanced oil recovery by 3-4%.
- The poly-phenols and mineral rich banana pseudostem sap has been used as cheap and eco-friendly mordant for dyeing of cotton with natural dyes. The simultaneous and post-mordanting of cotton during dyeing with berberin and turmeric dyes gave encouraging results.
- In the NAIP Banana fibre value chain project, the process of application of sap extracted from banana

pseudostem as a mordant for dyeing cotton fabric with natural dyes has been standardized. Microcrystalline cellulose (MCC) powder has been prepared from the banana fibres and it is seen that its properties were on par with commercial grade MCC.

- Survey and experimental trials of ginning and baling industries to estimate the power and energy consumption of different makes and models of bale presses and for different unit operations were done.

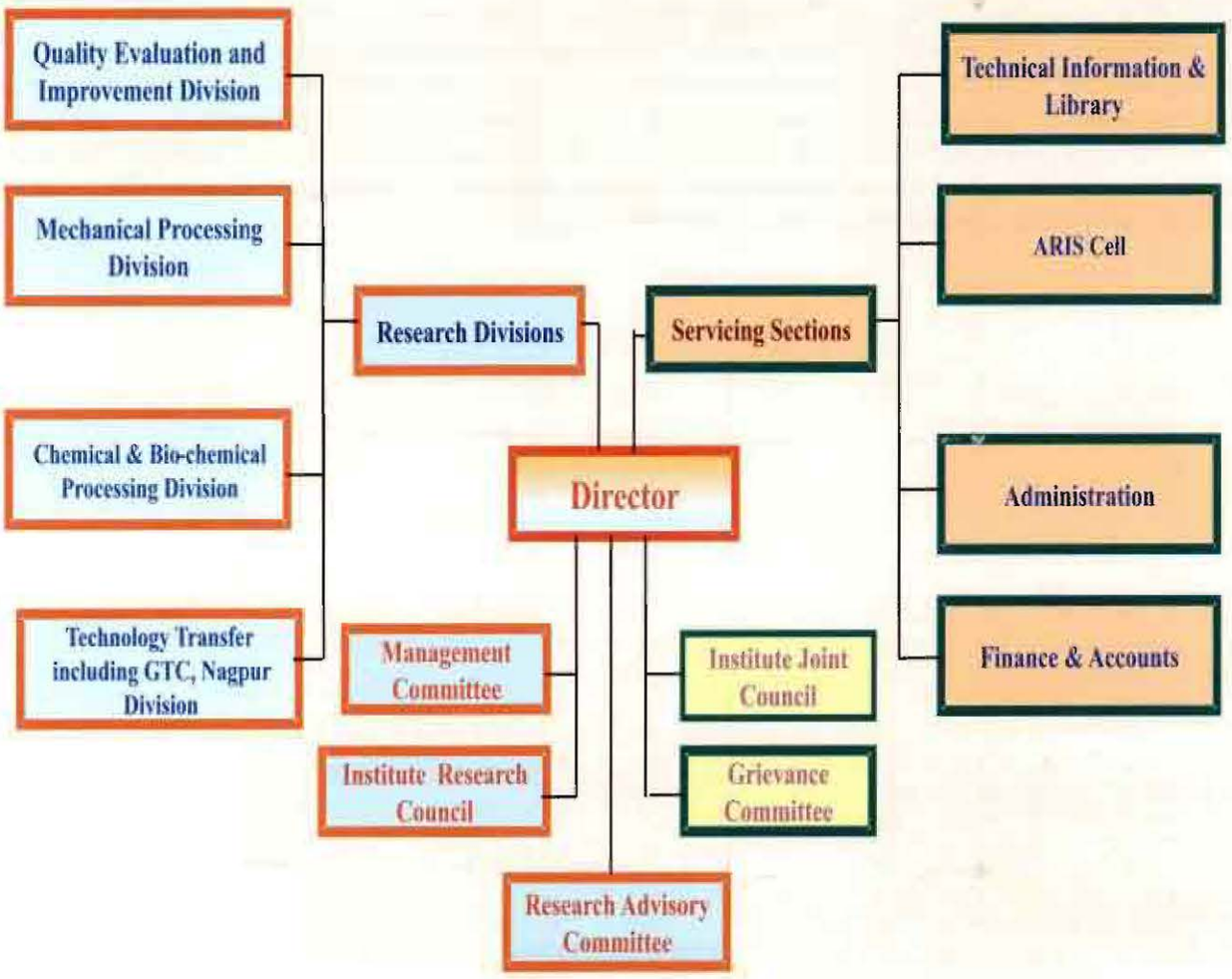
Revenue Generation

The Institute generated Rs. 65.33 lakhs through commercial testing, training and consultancy during the current year as against the target of Rs. 55.00 lakhs set by the Council.

Organization

The Director heads the organization. Research, testing and transfer of technology including human resource and entrepreneurship development activities are facilitated and monitored by the four research divisions. The four servicing stations facilitate the information services, maintaining databank of all research, testing and other activities, the administration of the human resource and the finance disbursement and audit of the institute. The Institute Management Committee (IMC), Research Advisory Committee (RAC) and Institute Research Council (IRC) monitor and keep a check on the research mandate, while the Institute Joint Council (IJC) and Grievance Committee address the complaints, if any, arising from the staff.

ORGANISATION



Expenditure and Receipts of the Institute during 2012-13

Expenditure

Sl. No.	Head of Account	Expenditure (Rs. in lakhs)	
		Non Plan	Plan
1.	Establishment Charges	1125.54	-
	OTA	0.10	-
2.	Traveling Expenses	3.85	17.00
3.	Works	7.61	190.46
4.	Other Charges including library	112.78	203.03
Total		**1249.88**	**410.49**

Receipts

Sl. No.	Head of Account	Amount (Rs. in lakhs)
1	Analytical and Testing Fees	21.77
2	Training	5.38
3	Interest on TDR & STD	38.86
4	Other receipts	38.18
Total		**104.19**

Staff Position: As on March 31, 2013

Cadre	Sanctioned	In Position
R.M.P. (Director)	1	-
Scientific	50	24
Technical	112	89
Administrative	50	40
Skilled Supporting	57	47
Total	**270**	**200**

2

SIGNIFICANT RESEARCH ACHIEVEMENTS

A brief account of core area-wise significant progress of research for the period 2012-2013 is presented below.

CORE AREA I

PREGINNING AND GINNING

Engineering Intervention for Improving Energy Efficiency in Bale Presses

The study was aimed at evaluation of power and energy consumption of different makes and models of bale presses and to suggest interventions to improve their energy efficiency. Experimental trials were carried out in commercial ginneries to find out energy consumption of up packing, down packing and conventional type of baling presses. Comparative analysis of energy consumption and cost economics of bale presses with 8, 15, and 25 bales/hr capacity was carried out and is presented in the Table 2.1.

Table 2.1: Comparative analysis of baling presses of different types and capacities

Type of Press	Particulars	Capacity (bales/hr)		
		15	25	8
Down packing	Power (HP)	75	119	50
	Energy Consumption (Unit/bale)	1.75	1.5	2.25
	Cost of operation (Rs/Bale)	195	170	246
Up packing	Power (HP)	58	80	NA
	Energy Consumption (Unit/bale)	1.0	0.9	NA
	Cost of operation (Rs/Bale)	174	157	NA
Conventional	Power (HP)	53	103	NA
	Energy Consumption (Unit/bale)	0.70	0.35	NA
	Cost of operation (Rs/Bale)	180	154	NA

Bale presses of either down or up packing with 15 bales/hr capacity were found to be more widely used in ginneries. Energy consumptions for up packing and conventional presses with 15 and 25 bales/hr capacity were found to be less by about 40 and 60-75% respectively, compared to the down packing press. The energy consumption was found to be the least for the conventional bale press and it was lesser by 15% for 25 bales/hr capacity compared to 15 bales/hr capacity. But, the energy consumption for 8 bales/hr capacity press was found to be the highest – about 30 and 50% more compared to 15 and 25 bales/hr capacity presses, respectively.

It was found from the study that as the capacity of bale press increased, the cost of baling operation per unit bale decreased. About 10% decrease in cost of operation for up packing and conventional presses was found as compared to down packing type presses with capacity of 15 and 25 bales/hr. In the up packing type presses, about 10% decrease in cost of operation was observed for bale press with capacity of 25 bales/hr, compared to 15 bales/hr. For conventional type presses about 15% decrease in cost of operation was observed for presses with capacity of 25 bales/hr as compared to press with capacity of 15 bales/hr.

The following interventions are recommended to improve the energy efficiency of bale presses:

- Horsepower (HP) requirement can be minimized by careful selection of component, sizes and combinations of unit operations while designing a bale press.
- Minimizing the idle, tying and tramping time and ensuring uniform feeding to press box will improve the energy efficiency of a baling press by about 20%.
- By engineering interventions;

(i) arresting the hydraulic ram motor of down packing press just after the pressing operation,

(ii) improving the power factor of electric motor by using suitable capacitors and by avoiding use of oversized motors,

(iii) by use of double coil and multiple motors for performing different unit operation,

(iv) maintaining the number of tramper strokes per bale between 6-8,

(v) by providing separate tramper in combination with main ram in single box with appropriate mechanism to engage and disengage with the punch of hydraulic ram for 8 bales/hr capacity press.

Design and Development of Pollution Abatement System for Collection of Flying Dusts from Ginning and Pressing Halls

Air pollution prevailing in modern Indian roller ginneries is a serious problem and responsible for major health issues to the operators and labourers working in the ginneries. Since Indian ginneries operate round the clock for 6 to 7 months, operators and workers are exposed to air pollution for a prolonged period, leading to chronic respiratory diseases, lung cancer, heart disease and damage to vital organs. This project was undertaken to study the air pollution levels in modern ginneries, and to suggest design modifications/engineering interventions so as to reduce dust levels in the ginneries. During the reported period, dust levels at different locations of six modern ginneries located at Adilabad, Kalmeswar, and Yeotmal were measured and analysed. The measured pollution levels ($\mu g/m^3$) in ginneries is presented in Table 2.2.

Table 2.2: Pollution Levels in Ginneries

Pollution levels	Gin hall	Press hall	Pala house	Pre-cleaner	Lint-cleaner	Heap	Permissible limit
PM 2.5	120-134	110-125	180-210	80-110	120-130	30-40	15
PM 10	180-230	540-620	450-510	130-160	180-220	52-62	50

Analysis of data suggests that the pollution levels in Indian ginneries, particularly for PM 2.5 are around 5-10 times higher than permissible limits. Dust particles $\leq$ 2.5 µm diameters i.e., PM 2.5 is considered as fine particles as it can be carried deep into the lungs, where they can cause severe inflammation.

The primary sources/machines that generate the fine dusts during operation were identified. It was observed that the unclosed/uncovered machinery like gin machines, belt conveyors and pre-cleaners emanated dust during their operation. Further, it was observed that more than 90% fine dust found in a gin hall originated from ginning point of double roller (DR) gins. Other sources like seed cotton feeding point and kawadi collection point have contributed less than 10% of the total fine dust content.

Fig. 2.1: Uncovered gap between autofeeders and DR gins

Fig. 2.2: Uncovered belt type lint conveyors

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

The performance of a rotary knife roller gin installed in a commercial ginnery was evaluated. The gin installation comprised of feeder box, an inclined pre-cleaner, a stick machine and a screw conveyor for seed cotton distribution to 10 rotary gin stands, followed by a cylinder, an air jet lint cleaner and a fully automatic down packing baling press. The pneumatic suction system was used for handling the lint and the seed cotton. Seeds obtained after ginning were passed through two re-claimer machines, where the un-ginned cotton was reclaimed and thereafter

recirculated for ginning. The rotary knife was fitted with six helical knives. The connected power to rotary knife roller gin was 30 HP including 25 HP for the driving roller and the rotary knife, and 5 HP for the driving cleaner and the feeder. The gin was operated at a roller speed of 200 rpm; rotary knife at 400 and feed roller speed at 16 rpm. The pressure between the gin roller and the rotary knife was maintained at 80 bar. The lint and the seed samples were collected at different stages of ginning for assessing the effect of rotary knife ginning on fibre quality and spinning performance.

The capacity of the rotary knife roller gin was found to be 425 kg lint/hr, which is about six times that of the Jumbo double roller gin. The capacity of ginning plant was found to be 25 bales/hr (1 bale = 170 kg). The power required to run the entire plant was found to be 550 KVA, with energy consumption of 28 units/bale. Cut-seed percentage at different stages of ginning was found in the range of 2.8 - 3.8% and 0.40 - 0.85% for the rotary and the double roller gin respectively. Lint samples are being evaluated with HVI, AFIS and for full spinning test. This study aims to optimise rotary knife roller gin machine and associated process parameters for efficient ginning of Indian cottons.

Fig. 2.3: Rotary Knife Roller Gin

Fig. 2.4: Rotary Knife Roller Gin Plant

CORE AREA II

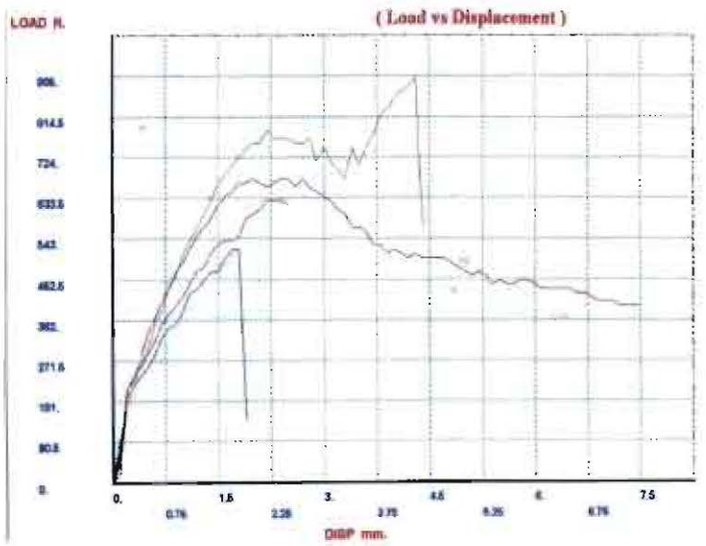
MECHANICAL PROCESSING – TECHNICAL TEXTILES AND COMPOSITES

Standardization of Compression Molding Machine Parameters for Natural Fibre Reinforced Composites for use in Construction Purposes as Wood Substitutes

Production of green composites using natural fibres like jute as the reinforcement and polylactic acid fibre as the matrix through compression molding technique has been attempted in this project. DREF friction spinning was used for the production of Jute/PLA core spun yarns in bulk quantities and was subsequently converted to a woven fabric. This fabric was used as a reinforcement to produce compression molded composite samples. DSC analysis of Jute, PLA fibres and the composite samples were done. The DSC plot of the PLA fibre was used for deciding the compression molding machine temperature. To evaluate the performance of the compression molding technique in production of composite material, scanning electron microscopy study of the Jute yarns,

PLA fibres, DREF friction spun core yarns and the composites produced were done. The PLA fibres were found cylindrical and rod shaped. It was observed from the SEM that though a major portion of the matrix material remained on the surface of the yarn, some penetrated and reached inside the yarn structure. Tensile analysis of the developed composites showed that they could be used for structural materials of building.

Coconut and Banana – the two natural fibres have very good mechanical properties. In the present study, they were tried as the reinforcement material with thermoplastic polypropylene film of 60 μm thickness. The film was used as matrix for making coconut and banana fibre composite samples. The reinforcement was 20% of the total weight of the samples. The temperature and pressure used for molding the composite were 180°C and 40 bar, respectively with 15 min compression time. The composite samples were tested for tensile properties according to ASTM standard D3039. Both the fibres were treated in a similar manner so as to prepare randomly reinforced polypropylene (PP) composite. As banana fibres are of longer length, they were initially stapled to 25 mm and used as reinforcement. From the study, it was found that the tensile modulus for banana fibre-PP composite is higher than that obtained with coconut fibre-PP composites. This can be attributed to the stiffer nature of the banana fibres compared to coconut fibres, making banana fibre-pp composite more suitable for preparing structural materials requiring high rigidity during application.



Tensile graph of Banana-polypropylene composite

Tensile graph of Coconut-polypropylene composite

Fig. 2.5: Load versus Displacement graphs of the two composites

Flagship Project

Development of Innovative Fibre Blends and Finishes for Improved Functionality of Cotton Textiles

Cotton-rich blended yarns of 40s count were produced using a compact ring spinning machine. Poly (lactic acid) fibres were blended with cotton in different proportions viz., 20, 35 and 50%. Micro spinning trials of cotton and PLA blends were undertaken through both sliver blending and fibre blending routes. From the results, it was found that fibre blending at blowroom stage gave better yarn properties. Full spinning trials were then carried out with cotton and PLA blend ratios of 80:20, 65:35 and 50:50. 40s count yarns were produced by altering machine twist at 4 different levels, and were tested for tensile and evenness properties. Lea CSP in the range of 1800-2100 has been achieved for the yarn with 80:20 blend ratio at different levels of twist. Yarn unevenness was around 12%. Twist multiplier (TM) of 3.6 and 4.0 were found suitable for knitting and weaving purposes respectively. SEM pictures of yarn cross sections could confirm better distribution of fibres in the blend. A solubility analysis was carried out to confirm the proportion of fibres in the blend.

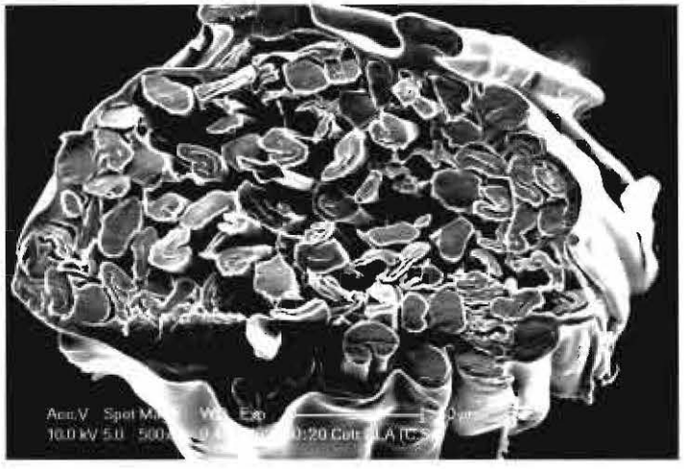


Fig 2.6 (a): Cotton/PLA 80:20

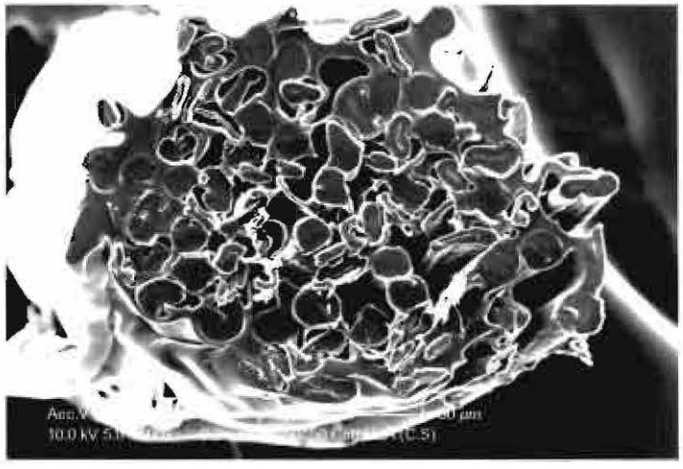


Fig. 2.6 (b): Cotton/PLA 50:50

Externally funded project under National Agricultural Innovation Project (NAIP)-Component 2

A Value chain for coconut fiber and its byproducts: manufacture of diversified products of higher value and better marketability to enhance the economic returns of farmer

a. Development of a Novel Coconut Fibre Segregator Machine

Coconut Fibre Segregator has been conceived, designed, developed and fabricated based on the mechanical characterization of coconut husk. Prior to this development, no machine was available for refining the quality of the coconut fibre. The fibres were extracted from the husk in the form of 'bulk', which is a mixture of coarse and fine fibres having variation in qualities in terms of length, fineness, maturity and strength. This unrefined 'bulk' fibres were used 'as it is' in products, thereby limiting the application areas. Hence to fill this technology gap, the Coconut Fibre Segregator Machine has been developed at CIRCOT to refine the quality of the 'bulk' and thus, to widen its utility, like in high application areas of technical textiles.

The principle of air drag and gravity has been used in the machine for quality based segregation of coconut fibres. The opening roller of the machine initially opens the fibre and throws them into a chamber, from where a high

speed blower sucks the fibre mass through a dumb bell shaped conduit. The design geometry of the conduit facilitates to capture only light fibres by the air drag force generated due to cyclone inside the chamber. The heavy fibres remain stationed in the chamber to be carried forward by a delivery conveyor. Coarse fibres which come out of the machine can be given a second passage to segregate any remaining fine fibres and get the medium quality fibres. The out turn of the segregator has been found to be 50-60 kg per hour and the efficiency is observed to be one-third of fine fibres produced out of the total bulk fibre processed.

Impact study

360 kgs of bulk coconut fibre was processed and segregated on the machine continuously. The quality grade obtained by processing fibres in this machine was, Fine fibre: 170 to 240 μ, Medium fibre: 250 to 350 μ and Coarse fibre: greater than 400 μ, that agreed with the CIRCOT developed categorization. The coarse grade fibre obtained had a Tex value 148.8; count 4.0 Ne and diameter 0.46 mm. The fine grade fibre obtained had Tex value 30.0; count 2.0 Ne and diameter 0.20 mm. Non-woven/mat prepared from the segregated fine fibres was found to have a density value (g/dm^3) of 93, and a compact structure as compared to nonwoven/mat prepared using non-segregated bulk fibre with density value of 85. The study showed that segregated fine fibres can be used in products requiring dense and compact structure.

a. Preparation of protocol for fibre gradation based on fibre fineness

Image analysis of 171 varieties from states of Karnataka, Kerala, Tamilnadu and Gujarat has been completed.

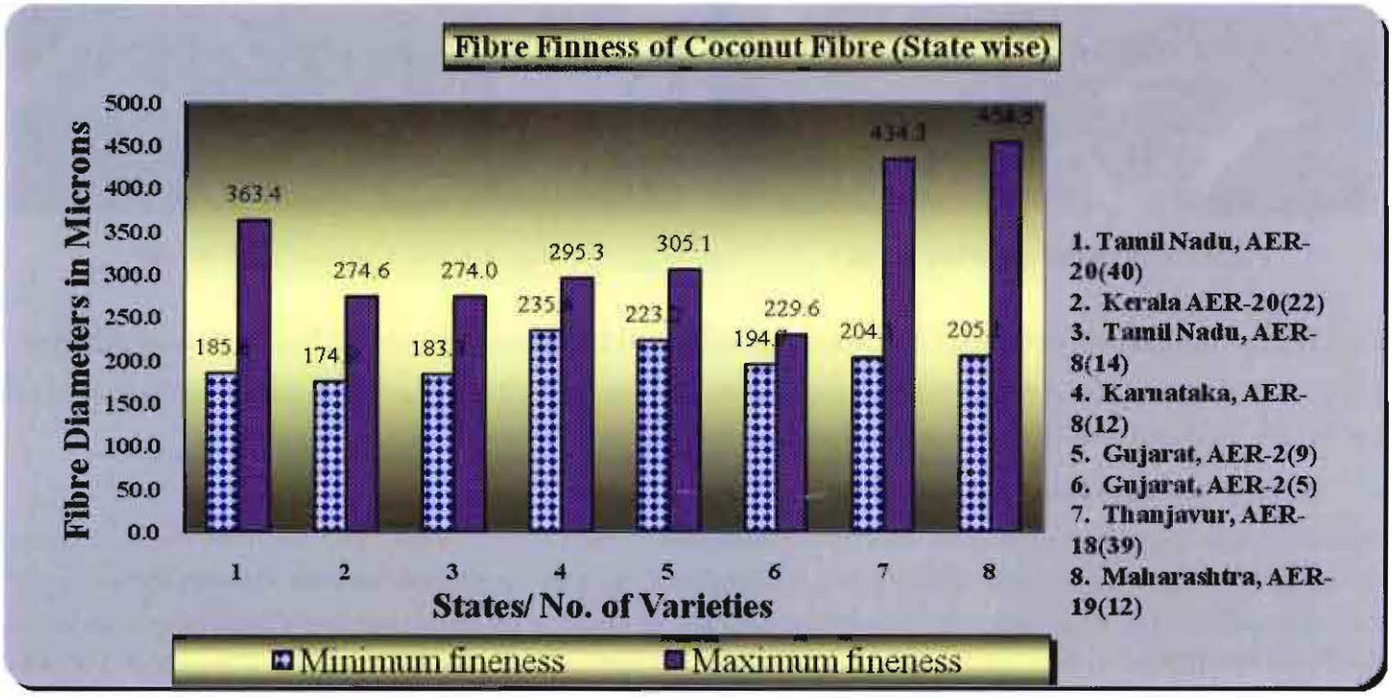


Fig. 2.7: State-wise fineness of coconut fibre

Table 2.3: State wise catagorization of Coconut Fibre

Sr. No.	Name of Ecotype	Sample	Average diameter (micron)	C.V. %
1	AER 2 (5)- Gujarat	Coarse	0.0	0.0
		Medium	0.0	0.0
		Fine	219.5	24.1
2	AER 2 (9)- Gujarat	Coarse	0.0	0.0
		Medium	280.9	26.7
		Fine	223.0	37.2
3	AER 8 (12)- Karnataka	Coarse	0.0	0.0
		Medium	268.8	23.0
		Fine	241.8	22.0
4	AER 8 (14)- Tamilnadu	Coarse	0.0	0.0
		Medium	265.5	16.0
		Fine	207.5	17.6
5	AER 20 (22) - Kerala	Coarse	0.0	0.0
		Medium	264.9	22.6
		Fine	210.2	17.2
6	AER 18 (39)- Thanjavur (TN)	Coarse	379.3	20.5
		Medium	306.1	21.2
		Fine	220.1	31.7
7	AER 20 (40)- Tamilnadu	Coarse	363.4	14.6
		Medium	276.6	20.5
		Fine	212.1	19.7
8	AER 19 (12)- Maharashtra	Coarse	396.9	19.7
		Medium	286.9	28.0
		Fine	217.0	35.3

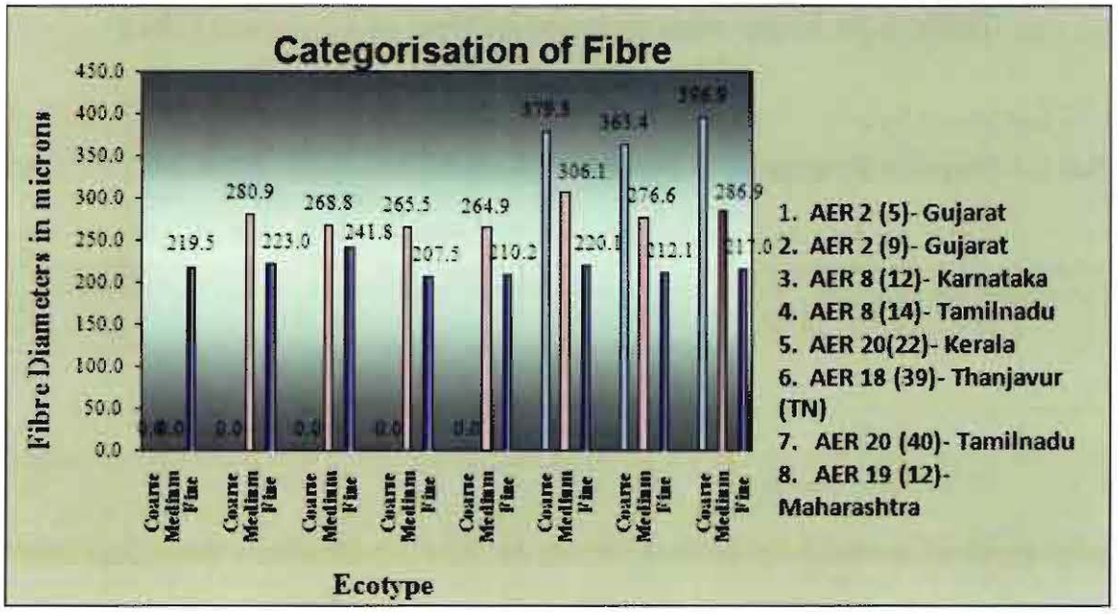


Fig. 2.8: Categorization of Fibre from different states

It was concluded from the study that:

- AER 20 (22) of Kerala and AER 8 (14) of Tamilnadu state produce fine grade of coconut fibres with minimum CV. AER 8 (14) produces good grade medium fibres also.
- AER 18 (39) and AER 20 (40) produce coarse fibres with minimum CV and Gujarat and Karnataka produces medium and fine fibres but with high CV.

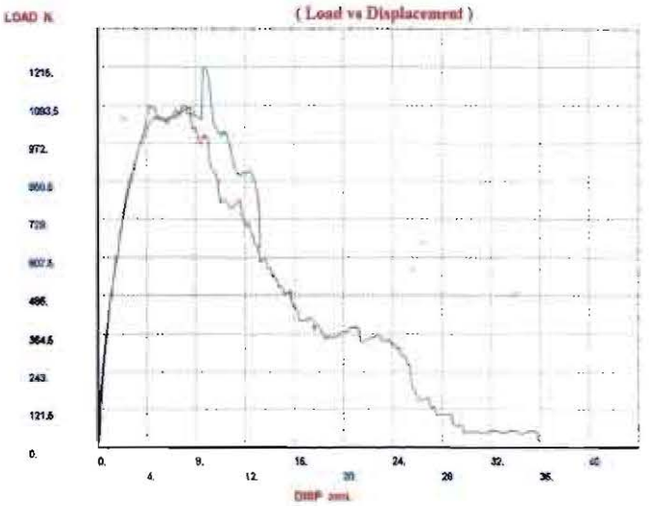
Externally funded project under National Fund for Basic, Strategic & Frontier Application Research in Agriculture, (NFBSFARA)

Jute based bio-composites for Industry

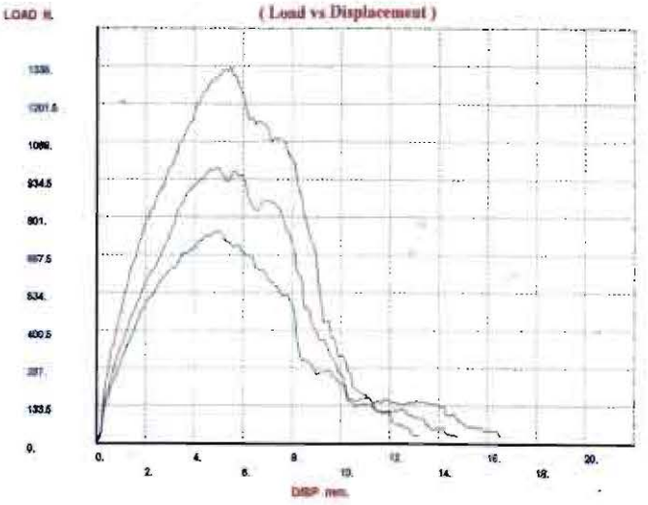
Composite materials are of high strength and low density input materials for industrial applications. Natural fibres like jute can be used as reinforcement material for preparation of composites.

For production of the composite material it is necessary to have a uniform distribution of the reinforcement material and the matrix throughout. Therefore, in the present study, a special technique of Jute-polypropylene composite preparation with DREF friction spinning machine was used. Jute yarns and polypropylene fibres were sourced from the market. Jute yarns with three polypropylene sheath percentages (namely 50, 60 and 70%) were used. These yarns were then converted into unidirectional composite samples in the compression molding machine, maintaining a temperature of 180°C and pressure of 40 bar. The composites were tested for tensile properties. From the load elongation diagrams it was seen that the composites in all three cases broke gradually indicating good compatibility between matrix and reinforcement.

Tensile graph of Jute:PP (30:70) composite



Tensile graph of Jute:PP (40:60) composite



Tensile graph of Jute:PP (50:50) composite

Fig. 2.9: Tensile graph of Jute:PP composites

Externally funded project from Department of Science and Technology (DST)

Electrospinning Geometry Optimization for Preparation of Core-sheath Nanofibres and Conversion of Nanofibres into Yarns

This is a collaborative research effort between CIRCOT Mumbai, IIT Chennai and M/s. Physics Instruments Co. Chennai. The major focuses of this project are fabrication of co-axial needle for production of core-sheath nanofibres and collectors for conversion of nanofibres into yarns. The co-axial nozzle designed and fabricated for attaching to the electrospinning apparatus (Fig. 2.10) comprises of two inlets (for two different polymers) and a common coaxial outlet. The nozzle further needs to be fitted with the syringe pump and attached to the positive charge from a high-voltage output. The assembly is evaluated for the production of core-sheath nanofibers having

cellulose acetate in the core and poly (ethylene oxide) in the sheath. The fluorescent dye, FITC is added to the core component of polymer for detection of pressure of bipartite structure nanofibers under the fluorescence microscope.

Fig 2.10: Coaxial Needle

The electrospinning was operated at 15 kV with the aluminum foil collector at a distance of 15 cm, by passing cellulose acetate solution through the core and polyethylene oxide solution through the sheath in the coaxial needle. The optical microscopic image showed the clear presence of core-sheath electrospun fibres. The size of core (cellulose acetate) was in the range of 400 - 900 nm and thickness of sheath (PEO) was in the range of 300 - 500 nm.

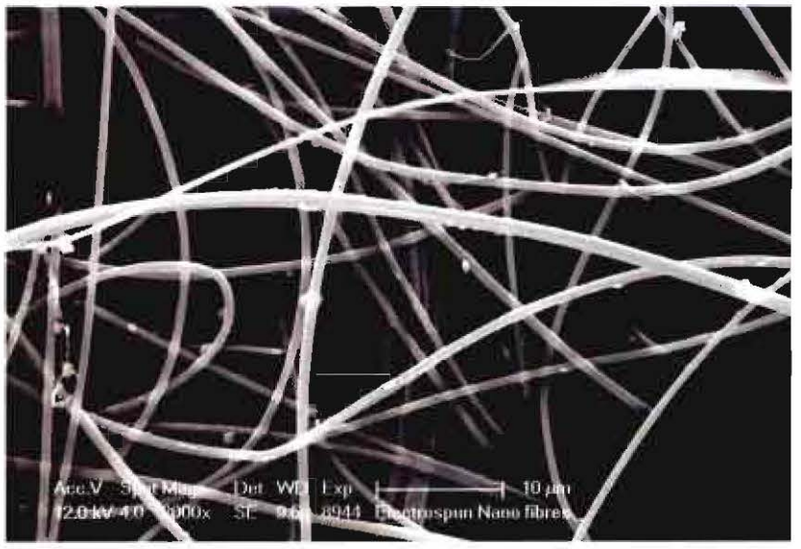


Fig 2.11: SEM Image of electrospun fibres.

CORE AREA III

CHARACTERIZATION: COTTON AND OTHER NATURAL FIBRES, YARNS AND TEXTILES

Evaluation of the Quality of Cotton Samples Received from Agricultural Trials and the All India Co-ordinated Cotton Improvement Project (AICCIP)

AICCIP was launched in April 1967. CIRCOT is primarily involved in research pertaining to quality evaluation of cotton lint, its mechanical behaviour at various stages of processing upto spinning of yarn and evaluation of its characteristics.

Process

Initial Evaluation Trials (IET) and Preliminary Varietal Trials (PVT) constitute the initial stages of breeding experiment. Cotton samples under IET or PVT are tested only for fibre quality parameters by using the High Volume Instrument (HVI). Promising strains among these trials are subjected to Advanced Trials, better known as Coordinated Varietal Trial (CVT), where samples are evaluated for spinning tests and for analysis of seed coat fragments, trash content, yarn uniformity, besides the fibre parameters.

Finally, before releasing the cotton variety/hybrid for commercial cultivation, its full spinning potential is determined by machine spinning and yarn quality assessment. This is to ensure its acceptance by textile industry once the new cotton variety is released and cultivated on a large scale.

Quality Analysis of AICCIP samples received during 2012-13

A total of 3686 samples have been reported during the period, in which 928 samples belong to AICCIP zonal trials (North Zone, Central Zone and South Zone), while 2758 cotton samples correspond to National Trials. Out of the samples of zonal trials, 225 cotton samples belong to North zone, 334 to Central zone and 369 to South zone.

The quality parameters of fiber samples were measured by using the High Volume Instrument (HVI) operated in the ICC-Mode and compared with CIRCOT Fibre Quality Breeding Norms. Assessment of spinning potential was carried out for samples of advance trials and pre-release varieties by subjecting them to full spinning tests provided the sample size was atleast 6 kg. The cotton samples belonging to preliminary varietal trial were subjected to microspinning test, if the sample size was atleast 400 grams.

From the results summerized, it was observed that approximately five percent strains out of the total evaluated were promising and could be promoted to the next higher stage of cotton breeding trial.

Promising Varieties/Hybrids

The test data of advance trial samples were grouped on the basis of staple length classification, and compared with CIRCOT norms. The following observations were made,

1. The variety FMDH-9 from Dharwad has the staple length of 20.1 mm and hence not spinnable, but can be utilized for the manufacture of absorbent/surgical cotton.

2. Among the medium staple (20.5 to 24.5 mm) varieties, AKH-2005-3 from Akola (SL- 24.6 mm, UR- 51%, MIC-5.0, Tenacity- 20.5 g/tex) was found promising as it yielded a CSP of 2122 for 16s count.

3. In the medium long (25 to 27 mm) staple group the highest strength (22.3 g/tex) was exhibited by a strain named NDZH-1938, received from Guntur.

4. Among the long staple cottons (27.5 to 32.0 mm), none of the samples was meeting the required norms for strength. However, H-133 from Bhawanipatna was found to have high elongation of 6.4%. It was also satisfying the norms for UR (52%) and MIC (4.4).

5. One variety, namely GSB-39 from Dharwad was listed in the extra-long staple category, but did not meet any of the extra-long staple CIRCOT norms for fibre properties and yarn quality. However, it was spun to 60s and 80s yarn counts.

The results obtained is depicted below in Tables 2.4 (a, b, c, d, e)

Table 2.4 (a): Short staple (SL less than 20 mm)

Store No.	Location	Variety	2.5% SL (mm)	UR (%)	MIC	Tenacity (g/tex)	E (%)	Trash (%)
131004	Dharwad	FMDH-9	20.1	52	5.2	16.5	5.2	2.12

Table 2.4 (b): Medium staple (SL between 20.5 to 24.5 mm)

Store No.	Location	Variety	2.5% SL (mm)	UR (%)	MIC	Tenacity (g/tex)	E (%)	Trash (%)
131194	Nanded	NHH-255	23.1	48	3.0	17.3	4.3	1.33
131211	Akola	AKH-9916	23.9	48	3.4	16.6	4.8	6.20
130329	Bathinda	Bihani-251	24.4	51	3.6	19.9	4.7	2.60
131003	Dharwad	MRDC-233	24.6	48	4.3	20.0	4.7	2.36
131212	Akola	AKH-2005-3	24.6	51	5.0	20.5	5.8	7.64
130844	Junagadh	CCH-2623	24.8	47	3.8	19.6	3.8	5.59
131226	Parbhani	PA-402	24.9	49	5.1	19.4	4.9	2.30

The shaded values are those that are meeting the CIRCOT norms.

Table 2.4 (c): Medium long (SL between 25 to 27 mm)

Store No.	Location	Variety	2.5% SL (mm)	UR (%)	MIC	Tenacity (g/tex)	E (%)	Trash (%)
130331	Bathinda	RAJHH-743	25.10	49	4.0	19.4	4.6	6.60
130845	Hisar	SVHH-139	25.30	52	4.8	20.4	4.7	3.14
131191	Kovilpatti	Check K-11	25.30	50	5.6	19.7	5.6	2.16
131213	Akola	BS-79	25.30	46	3.2	18.4	4.6	4.18
130077	Rahuri	V1	25.40	51	3.4	19.9	4.6	1.88
130327	Siruguppa	CCH-2623	25.40	49	3.4	21.1	4.4	2.20
130014	Faridkot	Bihani-251	25.70	51	4.4	19.9	4.9	1.54
131152	Coimbatore	CCH-2623	25.70	50	3.8	20.3	4.9	2.42
131193	Nanded	MRDC-233	26.10	48	5.3	18.4	4.5	1.14
130079	Rahuri	V3	26.30	48	3.8	19.3	4.5	2.92
131225	Parbhani	PA-528	26.30	49	4.8	18.4	4.9	1.22
131155	Coimbatore	TCH-1705	26.70	46	3.3	20.8	5.3	1.18
130330	Bathinda	CHH-1350	26.90	53	4.0	20.3	4.9	4.10
131158	Guntur	NDZH-1938	26.90	48	3.5	22.3	5.3	1.10
121948	Indore	RAHH-259	27.30	50	3.1	20.8	6.5	1.68
130078	Rahuri	V2	27.40	47	4.0	21.0	5.0	1.94

Table 2.4 (d): Long Staple (SL between 27.5 to 32.0 mm)

Store No.	Location	Variety	2.5% SL (mm)	UR (%)	MIC	Tenacity (g/tex)	E (%)	Trash (%)
130015	Kurnool	NDLH 1938	27.60	50	4.5	22.1	4.8	1.44
130892	Bhawanipatna	H-133	27.70	52	4.4	21.1	6.4	3.24
121948	Indore	RAHH-259	27.30	50	3.1	20.8	6.5	1.68
130013	Faridkot	CSH-3129	27.90	51	4.2	21.4	4.8	2.15
130328	Bathinda	CSH-3129	27.90	49	3.5	21.4	5.1	2.57
130326	Siruguppa	NDLH 1938	28.00	50	3.7	22.1	5.2	2.05
130890	Bhawanipatna	BS-79	29.40	49	4.1	20.8	6.0	2.84

131156	Coimbatore	TCH-1608	29.50	45	4.1	20.0	5.6	1.14
130891	Bhawanipatna	NDZU-1938	29.70	50	4.7	21.2	5.5	3.46
131227	Indore	BS-79	29.80	49	3.7	22.2	5.8	2.47

Table 2.4 (e): Extra long staple (SL 32.5 mm and above)

Store No.	Location	Variety	2.5% SL (mm)	UR (%)	MIC	Tenacity (g/tex)	E (%)	Trash (%)
131005	Dharwad	GSB-39	35.1	46	2.7	26.5	6.1	2.52

Full Spinning of Pre-release Strains (2012-2013): 39 cotton samples were received for evaluating the spinning potential, 35 for Full spinning trials and 4 for Micro spinning. Five samples could not be spun due to their very short fibre length (strain FMDH-9 from Dharwad), low fibre strength (MRDC-233 from Dharwad) and heavy roller lapping on drawing machine due to presence of honey-dew with reducing sugar content of 0.58%, 0.63%, and 0.56% (CCH-2623 from Junagadh, NHH-255 from Nanded and AKH-9916 from Akola).

Table 2.5: Full Spinning Result on AICCIP Samples (pre-release strains)

Fibre Test									Spinning Test			
St. No.	Location	Variety	2.5% SL	UR (%)	MIC	S (3.2mm)	E (%)	Trash%	Count	U%	Neps/km	CSP
121948	Indore	RAHH-259	27.3	50	3.1	20.8	6.5	1.68	40s	16.0	0617	2168
									50s	17.5	1058	2015
130013	Faridkot	CSH-3129	27.9	51	4.2	21.4	4.8	2.15	40s	19.3	1315	2112
									50s	20.3	2891	2030
130014	Faridkot	Bihani-251	25.7	51	4.4	19.9	4.9	1.54	30s	17.0	0997	2007
									40s	18.2	1379	1948
130015	Kurnool	NDLH 1938	27.6	50	4.5	22.1	4.8	1.44	50s	18.8	2845	2145
									60s	20.1	3660	1860
130077	Rahuri	V1	25.4	51	3.4	19.9	4.6	1.88	30s	15.9	1032	2169
									40s	17.8	1379	2088
130078	Rahuri	V2	27.4	47	4.0	21.0	5.0	1.94	30s	16.1	1657	2376
									40s	17.8	2329	2048
130079	Rahuri	V3	26.3	48	3.8	19.3	4.5	2.92	30s	16.4	1333	2106
									40s	18.3	2299	2088
130326	Siruguppa	NDLH 1938	28.0	50	3.7	22.1	5.2	2.05	40s	17.0	1780	2400
									50s	18.3	2303	2080
130327	Siruguppa	CCH-2623	25.4	49	3.4	21.1	4.4	2.20	40s	16.5	1520	2276
									50s	17.8	1956	2055
130328	Bathinda	CSH-3129	27.9	49	3.5	21.4	5.1	2.57	40s	17.3	2305	2356
									50s	19.0	3162	2210

130329	Bathinda	Bihani-251	24.4	51	3.6	19.9	4.7	2.60	30s	16.7	1766	2304
									40s	18.1	2712	2184
130330	Bathinda	CHH-1350	26.9	53	4.0	20.3	4.9	4.10	30s	15.0	0971	2112
									40s	16.4	1611	1624
130331	Bathinda	RAJHH-743	25.1	49	4.0	19.4	4.6	6.60	30s	19.8	0891	2169
									40s	17.5	1626	2008
130844	Junagadh	CCH-2623	24.8	47	3.8	19.6	3.8	5.59	Heavy calendar roller lapping during spinning, hence not spinnable, RS: 0.58%			
130845	Hisar	SVHH-139	25.3	52	4.8	20.4	4.7	3.14	30s	16.8	1372	2133
									40s	18.6	2094	1896
130890	Bhawani patna	BS-79	29.4	49	4.1	20.8	6.0	2.84	50s	18.2	1424	2100
									60s	18.9	1829	2112
130891	Bhawani patna	NDZU-1938	29.7	50	4.7	21.2	5.5	3.46	50s	17.6	1594	2270
									60s	18.5	2070	2136
130892	Bhawani patna	H-133	27.7	52	4.4	21.1	6.4	3.24	30s	17.5	1166	2031
									40s	17.8	1604	1916
131003	Dharwad	MRDC-233	24.6	48	4.3	20.0	4.7	2.36	No adequate strength even for 16s count, so not spinnable			
131004	Dharwad	FMDH-9	20.1	52	5.2	16.5	5.2	2.12	High Short fibre content, unable to process on Draw frame, so not spinnable			
131005	Dharwad	GSB-39	35.1	46	2.7	26.5	6.1	2.52	60s	17.7	2940	2748
									80s	19.3	4209	2280

131152	Coimbatore	CCH-2623	25.7	50	3.8	20.3	4.9	2.42	50s 60s	17.8 19.6	2110 3043	2245 2022
131153	Coimbatore (MS)	NDLH-1938	26.0	49	3.9	18.7	4.4	-	16s	-	-	2167
131154	Coimbatore-(MS)	GSB-39	32.3	44	2.9	25.9	6.0	-	60s	-	-	2357
131155	Coimbatore	TCH-1705	26.7	46	3.3	20.8	5.3	1.18	50s 60s	18.0 19.8	2012 3229	2240 2070
131156	Coimbatore	TCH-1608	29.5	45	4.1	20.0	5.6	1.14	40s 50s	16.6 17.7	1463 2138	2176 2020
131157	Guntur-(MS)	CCH-2623	28.5	46	3.1	20.3	5.2	-	40s	-	-	2369
131158	Guntur	NDZH-1938	26.9	48	3.5	22.3	5.3	1.10	50s 60s	18.4 19.8	2358 3109	2260 2004
131190	Kovilpatti	TLA-910213	26.5	47	4.8	21.6	5.1	1.92	30s 40s	15.2 16.8	0293 0575	2208 1988
131191	Kovilpatti	Check K-11	25.3	50	5.6	19.7	5.6	2.16	20s 30s	14.3 16.7	0118 0526	2040 1791
131192	Nandyal - (MS)	FMDH-9	22.9	51	6.5	16.9	4.4	-	16s	-	-	1335
131193	Nanded	MRDC-233	26.1	48	5.3	18.4	4.5	1.14	20s 30s	14.1 15.9	0136 0462	2026 1737

131194	Nanded	NHH-255	23.1	48	3.0	17.3	4.3	1.33	Heavy roller lapping observed, so not spinnable, RS: 0.63%			
131211	Akola	AKH-9916	23.9	48	3.4	16.6	4.8	6.2	Heavy roller lapping observed, so not spinnable, RS: 0.56%			
131212	Akola	AKH-2005-3	24.6	51	5.0	20.5	5.8	7.64	16s	13.5	0356	2122
									20s	14.6	0476	1900
131213	Akola	BS-79	25.3	46	3.2	18.4	4.6	4.18	30s	17.7	3137	2013
									40s	21.6	4879	1660
131225	Parbhani	PA-528	26.3	49	4.8	18.4	4.9	1.22	30s	17.4	0638	1989
									40s	18.9	1493	1900
131226	Parbhani	PA-402	24.9	49	5.1	19.4	4.9	2.30	30s	15.9	0506	1998
									40s	17.9	1079	1736
131227	Indore	BS-79	29.8	49	3.7	22.2	5.8	2.47	50s	19.1	2212	2155
									60s	20.4	2983	1992

Note: Percentage of Reducing sugars (RS%) in spinnable cotton should be 0.05 to 0.1%
Abbreviations: MS – Micro Spinning; RS – Reducing Sugar

Comparison on HVI and ICC Mode of Fibre Testing

38 cotton samples received for evaluation of spinning potential were tested for fibre quality in both the modes of testing – ICC and HVI, presented in Table 2.6.

Table 2.6: Comparison HVI and ICC Mode of Fibre Testing

Sr. No.	Place	Variety		2.5% SL (mm)	Uniformity*	S (3.2 mm) (g/tex)	MIC (gm/inch)	EL %
130013	Faridkot	CSH-3129	ICC	27.9	51	21.4	4.2	4.8
			HVI	28.2	84	30.1		
130014	Faridkot	Bihani-251	ICC	25.7	51	19.9	4.4	4.9
			HVI	26.6	84	27.7		
130015	Kumool	NDLS 1938	ICC	27.6	50	22.1	4.5	4.8
			HVI	27.9	84	30.8		
130077	Rahuri	V1	ICC	25.4	51	19.9	3.4	4.6
			HVI	25.6	82	26.4		
130078	Rahuri	V2	ICC	27.4	47	21	4	5
			HVI	27.7	82	26.5		
130079	Rahuri	V3	ICC	26.3	48	19.3	3.8	4.5
			HVI	25.7	81	25.8		
130326	Siruguppa	NDLH 1938	ICC	28	50	22.1	3.7	5.2
			HVI	27.6	84	27.8		
130327	Siruguppa	CCH-2623	ICC	25.4	49	21.1	3.4	4.4
			HVI	25.8	81	25.2		
130328	Bathinda	CSH-3129	ICC	27.9	49	21.4	3.5	5.1
			HVI	27.7	84	29.2		
130329	Bathinda	Bihani-251	ICC	24.4	51	19.9	3.6	4.7
			HVI	25.7	83	25.7		
130330	Bathinda	CHH-1350	ICC	26.9	53	20.3	4	4.9
			HVI	26.2	81	28		
130331	Bathinda	RAJHH-743	ICC	25.1	49	19.4	4	4.6
			HVI	25.1	81	25.7		
130844	Junagadh	CCH-2623	ICC	24.8	47	19.6	3.8	3.8
			HVI	24	79	22.3		

130845	Hisar	SVHH-139	ICC	25.3	52	20.4	4.8	4.7
			HVI	24.8	83	26.5		
130890	Odisha	BS-79	ICC	29.4	49	20.8	4.1	6
			HVI	30.4	85	28.4		
130891	Odisha	NDZU-1938	ICC	19.7	50	21.2	4.7	5.5
			HVI	30.5	87	28.3		
130892	Odisha	H-133	ICC	27.7	52	21.1	4.4	6.4
			HVI	26.6	83	26.3		
131003	Dharwad	MRDC-233	ICC	24.6	48	20	4.3	4.7
			HVI	24.5	80	26.7		
131004	Dharwad	FMDH-9	ICC	20.1	52	16.5	5.2	5.2
			HVI	20.2	75	20.7		
131005	Dharwad	GSB-39	ICC	35.1	46	26.5	2.7	6.1
			HVI	34.5	84	30.6		
131152	Coimbatore	CCH-2623	ICC	25.7	50	20.3	3.8	4.9
			HVI	27.8	82	28.6		
131153	Coimbatore	NDLH-1938	ICC	26	49	18.7	3.9	4.4
			HVI	25.8	82	24.4		
131154	Coimbatore	GSB-39	ICC	32.3	44	25.9	2.9	6
			HVI	33.6	84	29.3		
131155	Coimbatore	TCH-1705	ICC	26.7	46	20.8	3.3	5.3
			HVI	28	82	27.7		
131156	Coimbatore	TCH-1608	ICC	29.5	45	20	4.1	5.6
			HVI	28.7	82	24.8		
131157	Guntur	CCH-2623	ICC	28.5	46	20.3	3.1	5.2
			HVI	29.8	84	27.6		
131158	Guntur	NDZH-1938	ICC	26.9	48	22.3	3.5	5.3
			HVI	27.2	84	29.1		
131190	Kovilpatti	TLA-910213	ICC	26.5	47	21.6	4.8	5.1
			HVI	27.2	83	30.5		
131191	Kovilpatti	Check K-11	ICC	25.3	50	19.7	5.6	5.6
			HVI	25	81	27.6		
131192	Nandyal	FMDH-9	ICC	22.9	51	16.9	6.5	4.4

			HVI	22.5	78	24		
131193	Nanded	MRDC-233	ICC	26.1	48	18.4	5.3	4.5
			HVI	26.2	82	24.2		
131194	Nanded	NHH-225	ICC	23.1	48	17.3	3	4.3
			HVI	24.4	80	21.5		
131211	Akola	AKH-9916	ICC	23.9	48	16.6	3.4	4.8
			HVI	24.9	81	23.4		
131212	Akola	AKH-2005-3	ICC	24.6	51	20.5	5	5.8
			HVI	25.7	82	28.2		
131213	Akola	BS-79	ICC	25.3	46	18.4	3.2	4.6
			HVI	26	80	24.2		
131225	Parbhani	PA-528	ICC	26.3	49	18.4	4.8	4.9
			HVI	27.5	80	25.8		
131226	Parbhani	PA-402	ICC	24.9	49	19.4	5.1	4.9
			HVI	25.8	82	28.5		
131227	Indore	BS-79	ICC	29.8	49	22.2	3.7	5.8
			HVI	28.7	85	27.4		

*In ICC measurement Uniformity is measured in UR % (uniformity ratio)

* In HVI measurement Uniformity is measured in UI (uniformity index)

It was found that 2.5 % span length in ICC mode and Upper Half Mean Length (UHML) in HVI mode of testing had almost similar values for all the cottons, whereas for UI (Uniformity Index) in HVI mode of testing the values were almost 1.8 times higher than the present UR (Uniformity Ratio) in the ICC mode. The tenacity values in HVI were about 1.25 times higher than the values obtained in the ICC mode.

Evaluation of Standard Varieties of Indian Cotton

Full Spinning and fibre quality assessment of 25 standard cotton varieties have been achieved by using the state of the art instruments available in CIRCOT during the reported period, and the final reports were sent to the respective cotton breeders. The instruments of various divisions for the testing of these cotton samples are in extensive use in the area of textile testing and some of them are modern digital electronic instruments. Out of these 25 samples, most of them were found spinnable between 20s to 30s yarn count, except PKA-Hy-4 from Akola, which was spun to 16s count and LRA-5166 and MCU-5VT from Coimbatore spun to 50s and 60s counts respectively. The fibre traits, such as 2.5% span length, micronaire, uniformity ratio and bundle breaking tenacity was found to have no significant change in comparison to fibre traits observed at the time of release of those varieties. Their quality parameters as well as the spinnability were found to be in close agreement and satisfy the CIRCOT Quality and Spinning (CSP) norms, especially for the lower yarn counts. The results for these 25 samples are presented in Table 2.7.

Table 2.7: Evaluation of Standard Varieties of Indian Cotton

Year/ Location	Store No.	Variety	2.5 % SL	MIC	Tenacity	Maturity	Count	CSP	CSP Norms
2010	100760	AKH-8828	26.9	3.4	21.6	76	30s	**1929**	**2116**
Akola							40s	1664	2208
2010	100766	PKA-Hy-4	26.8	4.4	20.5	77	16s	**1810**	**1836**
Akola							20s	1660	2024
2010	100769	PKV-Suvarna	23.6	4.7	21.0	83	20s	**2346**	**2024**
Akola							30s	2085	2116
2010	100794	F-846	25.5	4.1	21.0	70	20s	**2164**	**2024**
Faridkot							30s	2007	2116
2010	101355	G.Cot-10	24.2	3.3	20.1	75	30s	**2238**	**2116**
Surat							40s	1960	2208
2010	101356	G.Cot-12	25.3	3.5	20.7	69	30s	**2313**	**2116**
Surat							40s	2668	2208
2010	102167	LH-2076	26.0	4.8	21.2	87	20s	**2176**	**2024**
Abhor							30s	2073	2116
2011	100790	V-797	24.4	5.7	17.5	82	Not		--
Viramgam (Gujrat)							Spinnable	---	
2011	100797	F-505	25.9	4.8	19.4	83	30s	**2118**	**2116**
Faridkot							40s	1852	2208

2011 Jalgaon	101032	Y-1	24.8	4.7	19.9	89	30s 40s	1804 1664	2116 2208
2011 Akola	111170	AKA-8	25.0	4.4	21.8	87	30s 40s	1884 1604	2116 2208
2011 Akola	111171	AKA-8401	26.3	4.5	21.3	87	16s 20s	**2350** **2260**	**1836** 2024
2011 Akola	111172	PKV-DH-1	26.2	5.3	21.3	84	20s 30s	**2384** 2010	**2024** 2116
2011 Akola	111174	PKV-Rajat	25.8	4.6	21.3	79	30s 40s	**2184** 1952	**2116** 2208
2011 Akola	111175	AKOH-8828	25.6	3.7	20.2	77	30s 40s	**2175** 1960	**2116** 2208
2011 Akola	111177	DHY-286	26.3	3.8	22.0	88	30s 40s	**2361** 2004	**2116** 2208
2011 Sriganganagar	111188	RS-2013	24.8	4.2	19.8	71	30s 40s	**2409** 2076	**2116** 2208
2011 Sriganganagar	111191	RS-875	25.6	5.1	20.7	80	30s 40s	**2049** 1888	**2116** 2208

2011 Sriganganagar	111192	Bikaneri Narma	24.8	4.7	20.5	76	30s 40s	**2553** 2119	**2116** 2208
2011 Surat	112516	G.Cot-MDH-11	26.8	5.1	20.9	75	20s 30s	1902 1800	2024 2116
2011 Khandwa	111649	JK-4	24.6	4.2	19.1	82	30s 40s	**2202** 1960	2116 2208
2011 Coimbatore	111650-C	MCU-5VT	34.1	3.1	23.2	66	60s 80s	**2400** 1912	**2392** 2576
2011 Khandwa	111651	JK-5	25.1	4.7	21.5	75	30s 40s	**2193** 1988	**2116** 2208
2011 Coimbatore	111652	LRA-5166	30.6	4.4	23.2	77	50s 60s	2210 2226	2300 2392
2011-12 Nanded	111803	NH-615	28.0	3.0	20.3	58	40s 50s	**2204** 2100	**2208** 2300

Design and Development of RFID Bale Tagging and Software System for Centralized Bale Trading and Tracking Application

A ginnery processes about five thousand to one lakh bales in a year depending on its capacity. Manual methods of bale marking and record keeping which is very tedious and cumbersome are still followed in India. Fibre quality is likely to be affected due to spreading of ink used for bale marking. Prolonged storage of bales often leads to fading of ink affecting the readability of markings. To circumvent this problem, CIRCOT has developed a bale tagging system that incorporates the fibre properties as well. Further, integrating with latest technology available in software, a new on-line RFID system to track the bales has been developed. Initially, parameters like Pressmark No, Year of manufacture, Lot Number, Bale Number and Weight need to be uploaded in the system. Optional Quality Parameters like Grade, Variety, Fibre Length, Micronaire, UR%, Trash and Moisture measurement can be incorporated after the bale is tagged. A schematic diagram of the RFID Bale Tagging System is shown in fig. 2.12.

Fig. 2.12: RFID Bale Tagging System

Externally funded project under National Agricultural Innovation Project (NAIP)-Component 2

A Value chain on Utilization of Banana Pseudostem for Fibre and other Value added Products

a. Development of CIRCOT-Phoenix Charkha

CIRCOT-Phoenix Charkha is a pedal driven machine for spinning coarse long-staple fibres like banana pseudostem fibres at the cottage level. This charkha can produce fairly fine yarn with sufficient uniformity from natural fibres which are otherwise difficult to spin. The fibre after extraction is cleaned and dried before use for spinning. Fineness of the yarn produced depends on the fibre fineness and feeding rate.

The paddling action by the operator puts the large diameter flywheel in rotation. The operator feeds the fibres through a pair of rollers which pull the fibre through axial orifice of the spinning unit. The spinning unit consists of a flyer with hooks. The yarn formed after spinning is wound over a bobbin. In CIRCOT-Phoenix Charkha the flyer and the bobbin are driven independently. The differential in the RPM of the flyer and bobbin decides the twist imparted to the yarn that can be changed by change wheels in the drive unit.

The quality of yarn produced from the CIRCOT-Phoenix Charkha is largely independent of spinning speed. Yarn non-uniformity due to changes in spinning speed is reduced to a great extent. A moderately skilled operator can achieve better production of yarn on the charkha at higher speeds.

Fig 2.13: CIRCOT - Phoenix Charkha

a. Development of Multi-Sheath Feeder for Banana fibre Extraction Machine

A multi-sheath feeder has been designed and developed as an attachment to banana fibre extractor, the Raspador machine. This invention is a modification of the Raspador machine by incorporating a feeder platform and clamping devices. The feeder platform can simultaneously take 5-6 sheaths of pseudostem at a time compared to single sheath extraction currently practiced.

The feeder platform is fitted adjacent to the stationary roller of the Raspador. On the tail end of the feeder platform there is a movable clamp for holding the sheaths. The clamp can be slided over the feeder platform with the help of a pair of ball bearings. The platform consists of a fixed lower base plate and an upper movable plate, the latter being firmly pressed over the former by spring tension. By turning a handle one can lift the upper movable plate for loading the sheaths. After securing the sheaths between the upper and the lower plates, the clamp assembly can be moved forward–pushing the sheaths between the rollers of the Raspador.

The multi-sheath feeder attachment will help in increasing productivity of fibre extraction by 1.5 to 2 times without additional energy consumption or manpower requirement. It can also be used for extracting fibre from other plant sources.

Fig. 2.14: Multisheath feeder attachment on Raspador

CORE AREA IV

CHEMICAL AND BIOCHEMICAL PROCESSING & BY-PRODUCT UTILIZATION

Surface Modification of Cotton Textiles using Nanotechnology to Impart Super Hydrophobicity

Cotton fabrics are generally hydrophilic in nature, however, some applications like upholstery fabric, uniforms, bags etc. demand that they be imparted with hydrophobicity. Normally, hydrophobic finishing of cotton textiles is done using Fluro chemicals, which are not ecofriendly in nature. In this development, hydrophobic cotton fabric was developed using nano zinc oxide, silicone and organic acid by simultaneous three bath pad-dry-cure method. To find out the washing durability of the developed fabric, AATCC 61-2005 method was used. Hydrophobicity of the treated fabric was evaluated using AATCC Test method 22-2010 and AATCC spray rating chart (100, 90, 80, 70, 50 and 0). Water wetting time of the samples was evaluated using AATCC Test method 79-2010. Ultra-violet protection of the sample was evaluated using AATCC Test method 183-2010. It was found that even after eight wash cycles (approx. equivalent to forty home washes), the treated fabric had higher wetting time of more than 60 seconds, and excellent UPF rating of 50+. The sample was found to have good spray rating up to four wash cycles equivalent to twenty home washes.

Fig. 2.15: Water droplets retained on cotton textiles indicating superhydrophobicity

Nano-finishing of Cotton Textile to Impart Flame Retardence and UV Protective Functionalities

Fig. 2.16: Flame retardant cotton textile using nanoparticle (Left: Untreated and Right: Nano-treated)

In continuation to development done in previous year, an attempt was made to improve the UV protective performance of cotton textiles to excellent rating with UPF 50+. It may be noted that UPF rating of <10 does not provide any protection from UV light. In this study, Silica (SiO_2) nanoparticles of size 120-220 nm were synthesized using sodium silicate and hydrochloric acid. After application of CIRCOT synthesized as well as commercial SiO_2 nanoparticles, much improvement in UPF rating was not observed. Hence an improved process technology was developed to increase the UPF rating. Accordingly, a new core SiO_2 – shell TiO_2 complex nanoparticle having a size of 300-500 nm, was synthesized and applied on cotton textiles. It was seen that when this core SiO_2-shell TiO_2 nanoparticles were applied, the UPF rating significantly increased from 10 in the untreated sample to 50+ in the nanoparticle treated sample. It was also observed that the UVA and UVB transmittance percentage significantly decreased from 14.2 to 5.5 (UVA) and 8.1 to 0.7 (UVB) in the untreated to nanoparticle treated samples, respectively. The nanoparticles were also characterized using XRD and UV visible spectroscopy. Thus, an improved process using SiO_2 core and TiO_2 shell complex nanoparticle has been developed to impart excellent UPF rating of 50+.

Utilization of Tender Coconut Husk for Dyeing of Natural Fibre / Fabric

Cotton textiles mordanted with tannic acid and alum was successfully dyed using the extract obtained from tender coconut husk at an alkaline pH to reddish pink shade. Such extract from tender coconut husk that is abundant in tannins can act as a self mordant cum dye for cotton fabrics. The tannin content of the extract prepared from tender coconut husk was found to be 3600 ppm. Though the dyeing resulted in good color, the shade obtained was lighter compared to that with commercial tannic acid.

In the present study, the colour shades could be improved when inorganic salts, such as copper sulphate and ferrous sulphate were used as secondary mordants. Fastness properties of most of the fabric samples were found to be very good. But samples showed colour shift towards darker shade due to perspiration. Besides in case of copper mordanting, the adjacent fabrics had stain on them.

The results of scale-up trials were quite encouraging. For scale-up trials, rope dyeing machine as well as Rotary Pressure Vessel were used. Although the samples dyed in rope dyeing machine were uniformly dyed, the shades were found lighter compared to those fabrics dyed in launderometer beaker at a lab-scale. In order to simulate the lab-scale experiment, the trial was escalated with a paper digester, which proved successful. Thus, fabrics with bright and dark colours were obtained when dyed with extract of tender coconut husk and use of an inorganic salt as the secondary mordant.

Fig. 2.17 (a): Samples Dyed in Rope Dyeing machine

Fig 2.17 (b): Samples dyed in Rotary Pressure Vessel

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

The rind is the non-edible part of the pomegranate fruit. At present, the annual production of pomegranate is 8.2 lakh tones, providing large quantities of pomegranate rinds as by-product. Nowadays, there is a good demand for ecofriendly natural products for dyeing and functional finishing of textiles. Utilization of the pomegranate rinds for dyeing and improving the ultraviolet protection of cotton textiles was therefore attempted in the present research.

Dried pomegranate rind samples of two popular cultivars, viz., Bhagwa and Ganesh obtained from NRC on Pomegranate, Solapur were powdered in a mixer and analysed for total tannins using AOAC method employing Folin-Denis reagent. Pomegranate rind was found to be rich in tannins, with a total content of 20 and 36%, respectively for Bhagwa and Ganesh cultivars. Use of rind powders as mordant followed by alum treatment produced a very good orange-red hue on scoured and bleached cotton fabrics upon dyeing with natural dye manjith (Rubia cordifolia). Colour obtained with cv. Ganesh was found to be better compared to that obtained with conventional mordants, such as tannic acid or harda powder. The same was confirmed by measurement of K/S (colour strength) values on reflectance spectrophotometer. The samples dyed using pomegranate rind powder as mordant were found to have good colourfastness to light, washing, rubbing and perspiration, comparable to that obtained with conventional mordants.

Cotton fabrics in general provide poor protection from the harmful effects of ultraviolet light. The untreated cotton fabric used in the present study was found to have an ultraviolet protection factor (UPF) rating of 5, when analysed on UV transmittance analyzer, thus indicating very poor protection from ultraviolet light. However, mordanting of this fabric with pomegranate rind powder followed by dyeing with manjith improved the UPF value to 50+ indicating excellent protection from ultraviolet light.

Thus, the present study indicates that pomegranate rind can not only be successfully utilized as mordant for dyeing, but also for improving the ultraviolet protection functionality of cotton fabrics.

Fig. 2.18: Cotton fabrics mordanted with pomegranate rind powder and dyed to deep orange-red colour

Process for Improving Interfacial Interaction between Nanocellulose and Synthetic Polymer

As an additive in biopolymeric films like starch, nanocellulose can enhance their mechanical and thermal properties. But for its hydrophilic nature, nanocellulose could not be used suitably as an additive in synthetic polymeric films, like polypropylene and polyethylene. To circumvent this problem, the surface of nanocellulose was modified using polyethylene glycol tert-octylphenyl ether, a non ionic surfactant and/or sodium lauryl sulphate, an anionic surfactant through noncovalent bonding. Among the two surfactant compatilizers evaluated, nonionic surfactant at the level of 10% (w/w) showed better dispersion of nanocellulose in toluene. The contact angle (15°) of native nanocellulose increased to 75° due to the modification with nonionic surfactant indicating a reduction in surface energy, and hence the hydrophilicity. This new process for making nanocellulose compatible with synthetic polymeric matrix like polyethylene and polypropylene will help to explore the commercial application of nanocellulose in packaging industry.

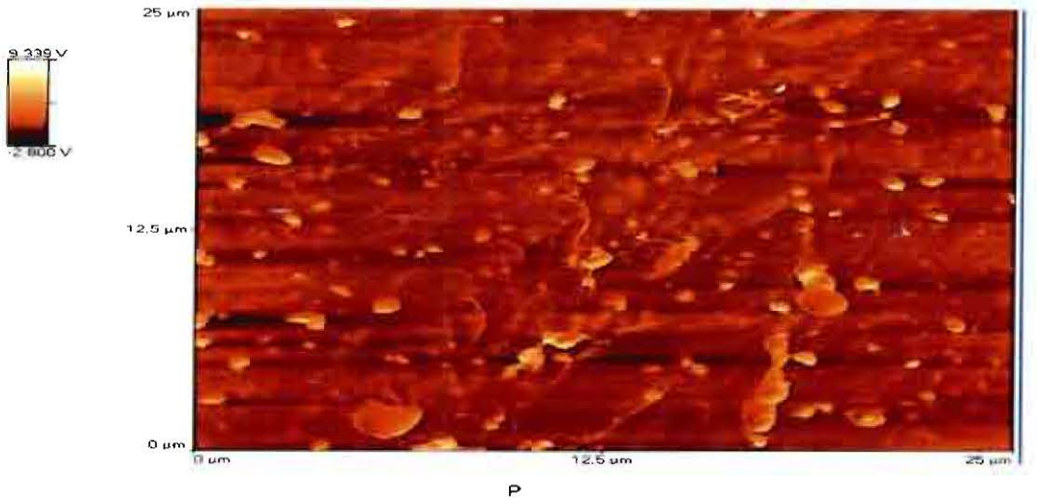


Fig 2.19: AFM image of nanocellulose reinforced polyethylene film

An Accelerated Process for Preparation of Bioenriched Compost from Cotton Plant Residues

Cotton stalk is an abundantly available agro biomass with approximately 30 million tonnes being available in India annually. Burning them in fields after harvest leads to pollution. One viable alternative is the composting. As the cotton stalk is a high lignin containing (20-25%) agro residue, conventional composting takes a long time. The composting process is controlled by type of microorganisms, aeration and moisture. CIRCOT has developed a new process where acceleration in composting is achieved by using aerobic microbes and CIRCOT anaerobic consortium (Fig. 2.20).

Good quality compost could be obtained from wet cotton stalks in 45 days by using the microbial consortia, while it takes about 60 days for dry cotton stalks. In case of the control samples (e.g., without microbial consortia) the compost could be prepared in about 60 days from wet cotton stalks and in 90 days from dry cotton stalks. Thus, 15 and 30 days respectively could be saved in preparation of compost from cotton stalks using the CIRCOT developed accelerated process (Table 2.8). The percent NPK content was found better in compost prepared from cotton stalks through accelerated process in comparison to farm yard manure.

Table 2.8: Comparison between Compost from Cotton biomass and FYM

Parameters	**Compost from cotton biomass**	**FYM**
Cost (Rs.)	3200	3000 to 3500
NPK content (%)	1.1, 0.9, 0.5 (wet cotton stalks) 1.43, 0.78, 1.82 (dry cotton stalks)	0.5, 0.2, 0.5
Duration of preparation	45 days (wet cotton stalks) 60 days (dry cotton stalks)	120 days

Fig. 2.20: Composting trial conducted at CIRCOT unit, Sirsa

Externally funded project under National Fund for Basic, Strategic & Frontier Application Research in Agriculture, (NFBSFARA)

a. Improvement in Cotton Fabric Quality by Plasma Nano-technology: An Eco-Friendly Approach

Chemical processing not only imparts high value to textiles, but also causes significant water pollution. An alarming reality is that about 100 litres of water is used to process 1 kg of textile, which is finally discharged as an effluent. Increased environmental awareness in recent years is gradually diverting textile industries towards the implementation of water-less or low-water based technologies, such as digital printing, spray and foam finishing, and plasma processing. Atmospheric pressure plasma is gaining increased attention for developing water free, environment friendly and cost-effective textile chemical processing technology, which can be used for surface modification of natural and synthetic textiles in dry state to develop various value added textile products.

CIRCOT has designed and fabricated indigenously three different sizes of atmospheric pressure plasma reactors with and without cooling system with advanced plasma characterization equipments such as mass flow controllers, digital oscilloscope with voltage and current probes, optical emission spectroscopy (OES) and gas chromatography mass spectroscopy (GC-MS). The plasma is generated using high voltage (2-15 kV) and high frequency (10-25 kHz) AC supply. Therefore, the electrical insulating material has been used to fabricate the body of the plasma reactor, avoiding electrical hazards. The size of the reactor body is 24×14×18 cms. Two mass flow controllers have been attached with the plasma reactor for precise control over the gas flow. Atmospheric pressure cold plasma was generated in the above reactors in the presence of helium (He), He+air, He+nitrogen, He+oxygen, and He+fluorocarbon gases.

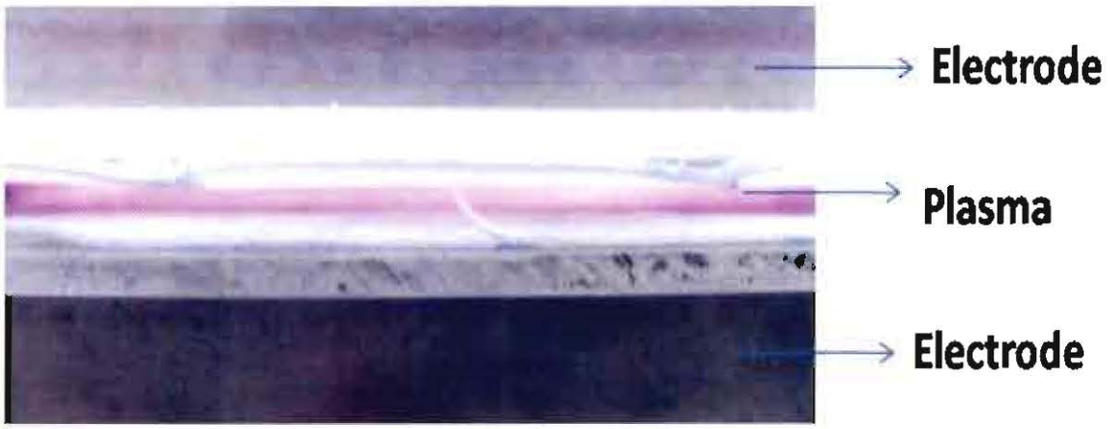


Fig. 2.21: Atmospheric pressure cold plasma generated in the mixture of helium-air gases

Plasma generated at the CIRCOT developed reactors are being utilized for improving hydrophilic properties of various natural as well as synthetic textiles. Besides, they are utilized to impart good degree of hydrophobicity in cotton textiles.

b. Development of Gossypol-free Lysine-rich Cottonseed Cake By Solid State Fermentation

In India about 4 million tonnes of cottonseed cake is available annually. Cottonseed cake contains about 20 – 25% of protein. Gossypol is a yellow polyphenolic compound present in two forms, viz., free and bound. While protein bound gossypol is non-toxic, free gossypol is toxic to animals causing reproductive disorders and even death in higher concentrations. The present methods of gossypol detoxification either inactivates free gossypol or convert it into bound form thus affecting the nutritive value of the protein. Generally, epsilon group of lysine reacts with gossypol and makes lysine unavailable in the feed. Hence the issues such as gossypol toxicity, available lysine content and protein digestibility need to be addressed before using it as a protein supplement in non-ruminant feeds.

In this development an attempt was made to address the above issues using the solid state fermentation process. During fermentation process, microorganisms release enzymes, the growth promoting substances that improve protein content, and thereby enhance the entire nutritive composition of cottonseed cake. In this study, LF1-2F1, LF1-5F1 and SV-2F2 were identified as potential fungal isolates for detoxification of gossypol and improvement of lysine content in cottonseed cake. Two solid state fermentation processes were developed using different combinations of microbial strains. While the first process uses the combination of P. sajor-caju and S. cereviseae, the second process uses the combination of S. cereviseae and C. tropicalis for detoxification of free gossypol from 0.22 to 0.04% and total gossypol from 2.3 to 0.8% in 36 to 48 hours for the first process, and in 24 hours for the second process (Table 2.9). In both the processes, the lysine content (absorbance difference) was improved from 0.3 to 0.4. Currently, soybean has been the preferred protein supplement in non-ruminants feed due to its protein content and better digestibility. The cost of soybean is minimum Rs. 25 per kg as against the cost of cottonseed cake of Rs. 10-14 per kg. The gossypol-reduced lysine improved cottonseed cake/meal developed through CIRCOT process (Fig. 2.22) would be a viable alternative protein supplement which could replace soybean meal either partly or completely, in feed ration. The beneficiaries of the project would be cotton growing farmers, cottonseed industries and poultry feed industries in the cotton growing states.

Table 2.9: Effect of solid state fermentation process on nutritive parameters of cottonseed cake

Process	FG (%)	FGR (%)	TG (%)	TGR (%)	Lysine content (Abs difference)	Crude protein (%)	Crude fibre content (%)
Ist process	0.040	81.8	0.86	63.1	0.442	28.3	28.2
IInd process	0.037	83.2	0.87	62.5	0.436	28.2	29.6
Control	0.22	-	2.32	-	0.29	20.3	37.2

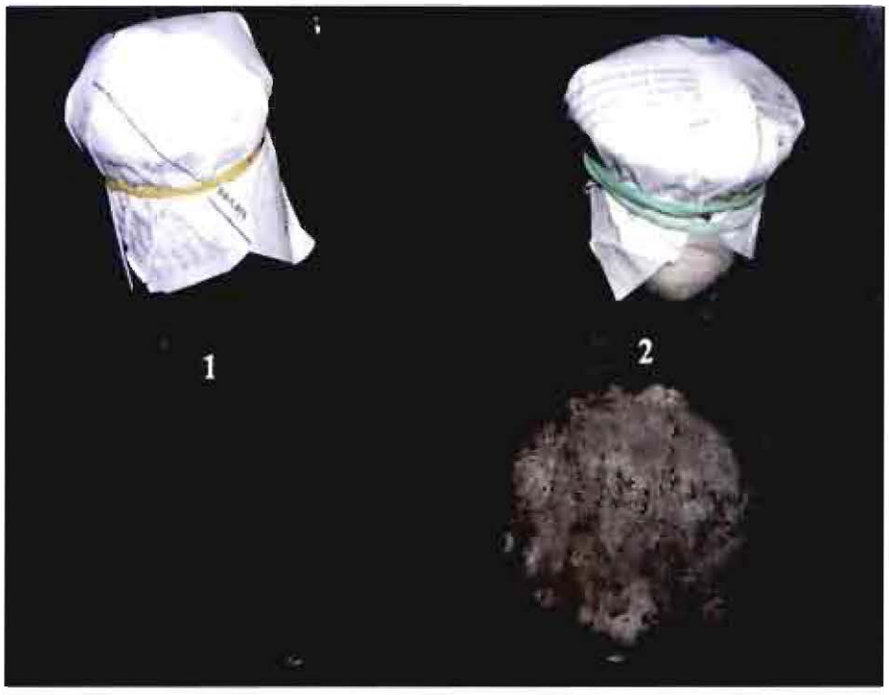


Fig. 2.22: Untreated (1) and microbial treated cottonseed cake (2)

CORE AREA V

ENTREPRENEURSHIP AND HUMAN RESOURCE DEVELOPMENT

Impact Assessment of CIRCOT-Bajaj Cotton Precleaner

CIRCOT has initiated the impact assessment of the inclined spike type pre-cleaner, developed in the year 1998. This pre-cleaner is employed for cleaning of seed cottons after harvest but before the ginning process. The technology was commercialized in association with Bajaj Steel Industries, Nagpur and hence the name given is CIRCOT-Bajaj Cotton Pre-cleaner. So far, about 1000 machines have been sold including 400 exported to other countries. In the present study, an exercise is being done to generate adequate quantifiable data on the technical and economic performance of the pre-cleaner being used in the industry for technology assessment. A detailed questionnaire has been prepared and circulated among the stakeholders enquiring about the basic industrial, technological and fibre quality related information.

Externally funded project under National Agricultural Innovation Project (NAIP)-Component 1 – Learning & Capacity Building

Zonal Technology Management and BPD Unit

Post revamping of ZTM-BPD with a new team since October 2012, the CIRCOT ZTM-BPDU has significantly facilitated commercialization and undertaken consultancies in twelve technologies in diverse areas of Nanocellulose, Particle Board, Objective evaluation of fabric handle quality, Bleached cotton linters and its evaluation, Saw ginning, Optimization of worsted Suiting Fabric and New Double Roller Ginning machine with Self Grooving Rubber Roller. It successfully organized an International Training cum Exposure Programme on Post Harvest Management of Cotton & Value Addition to crop residues called Cotton TAP under support from Dept. of Commerce, Ministry of Commerce & Industries (Govt. of India) for 31 delegates from select African Countries – Benin, Burkina Faso, Chad, Mali, Malawi, Nigeria and Uganda. The ZTM & BPD unit, for the first time organized a 3-day Entrepreneurship Development Programme (EDP) with 22 participants for Technologies on Biomass Utilization, Focus: Particle Board & Nanocellulose, in March 2013, generating a revenue of Rs. 1,76,000. During the reported period, it facilitated filing of nine CIRCOT patents on diverse technologies and also facilitated filing of three patents from other west-zone institutes. It has developed linkages with CARMa Connect, State Bank of India, Ministry of Micro, Small & Medium Enterprises (MSME), Mumbai, National Bank for Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC), Mumbai, and India International Textile Machinery Exhibition (ITME) Society, Mumbai. It facilitated incubation of entrepreneur for hands on training in cotton technology. Concentrated efforts by the dynamic new ZTM-BPD unit at CIRCOT could generate revenue worth Rs. 25 lakhs, which is a laudable achievement for the unit and for CIRCOT.

3

On-going Projects: 2012 – 13

CORE AREA I: PRE-GINNING AND GINNING

Sl. No.	Proj. Code	Name of the Project (Year: From-To)	Principal Investigator	Co-PIs / Associates
1.	MP.70	Engineering Intervention for improving Energy Efficiency in Bale Presses (May 2010 - April 2013)	Er. V.G. Arude	Dr. S.K. Shukla, Dr. (Smt.). J.M. Nath, Shri U.D. Devikar
2.	MP.73	Design and Development of Pollution Abatement System for Collection of Flying Dusts from Ginning and Pressing Halls (October 2011 - September 2013)	Dr. S.K. Shukla	Dr. (Smt.). J.M. Nath, Dr. P.G. Patil
3.	MP.74	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)	Er. V. G. Arude	Dr. S. K. Shukla, Shri R. K Jadhav, Shri U. D. Devikar

CORE AREA II : MECHANICAL PROCESSING, TECHNICAL TEXTILES AND COMPOSITES

Proj. Code	Name of the Project (Year: From-To)	Principal Investigator	Co-PIs/Associates
MP.71	Standardisation of Compression Molding Machine Parameters for Natural Fibre Reinforced Composite for use in Construction Purposes as Wood Substitutes (October 2012 - September 2015)	Er. Manik Bhowmick	Dr. S.K. Chattopadhyay, Dr. Kartick Samanta

CORE AREA III : CHARACTERIZATION – COTTON AND OTHER NATURAL FIBRES, YARNS AND TEXTILES

S. No.	Proj. Code	Name of the Project (Year: From-To)	Principal Investigator	Associates
1.	A.1	Evaluation of the Quality of Cotton Samples under the All India Co-ordinated Cotton Improvement Project (1924 - Continuing)	Shri Chitranayak	Dr. S.K. Shukla, Dr. C. Sundaramoorthy, Er. G.T.V. Prabu, Er. T. Senthilkumar
2.	A.2	Evaluation of Quality of Standard Varieties of Indian Cotton (1926 - Continuing)	Shri Chitranayak	Er. G. Krishna Prasad
3.	QE.104	Design and Development of Portable Moisture Instrument for Cotton using Customized Sensor Designed for Fixed Volume and Uniform Packing Density (October 2010 - September 2012)	Dr. (Smt.) J.M. Nath	Er. V. G. Arude, Dr. S. K. Shukla
4.	MP.72	Design and Development of Field Level Banana (Musa spp.) Pseudostem Fiber Extraction Machines (April 2011 - March 2014)	Er. P.S. Deshmukh	Dr. V. Mageshwaran, Shri R. K. Jadhav
5.	QE.105	Design and Development of RFID Bale Tagging and Software System for Centralised Bale Trading and Tracking Application (Oct 2011 - Sep 2013	Dr. (Smt.) Jyoti M. Nath	Dr. S.K. Shukla

6.	Flagship Project	Development of Innovative Fibre Blends and Finishes for Improved Functionality of Cotton Textiles (April 2012 - March 2017)	Dr. R. Guruprasad	Dr. S.K. Chattopadhyay, Er. G.T.V. Prabhu, Er. G. Krishna Prasad, Shri. R.K. Jadhav, Shri. D.L. Upadhye, Shri. D.U. Kamble, Dr. P.K. Mandhyan, Dr. Sheela Raj, Dr. M.V. Vivekanandan, Shri C.M. More, Shri.R.S. Prabhudesai, Shri.B.R. Pawar, Dr. Sujata Saxena, Shri.A. Arputharaj, Dr. Virendra Prasad, Dr. Kartick Kumar Samanta, Shri Santanu Basak, Dr. R.R. Mahangade, Shri. R.R. Chhagani , Smt. N.M. Ashtaputre
7.	QE.106	Development of Objective Fabric Handle Model for Indian Market (April 2012 - March 2015)	Dr. N. Shanmugam	Dr. (Smt.) Sheela Raj, Dr. M.V. Vivekanandan, Shri S. Banerjee, Shri B.R. Pawar, Shri G. B. Hadge, Shri R.R. Chhagani
8.	MP.75	Development of High Performance Cotton Textiles by Electro Spraying / Spinning Technique (October 2012 - September 2015)	Er. G.T.V. Prabu	Dr. N. Vigneshwaran, Shri A. Arputharaj, Er. G. Krishna Prasad
9.	MP.76	Improvement in coconut fibre compatibility for production of superior quality fibre reinforced composites (November 2012 - September 2015)	Er. T. Senthilkumar	Dr. R. Guruprasad, Er. G. Krishna Prasad, Dr. N. Vigneshwaran, Dr. Kartick K. Samanta

CORE AREA IV : CHEMICAL AND BIOCHEMICAL PROCESSING AND BIOMASS AND BY-PRODUCT UTILISATION

Sl. No.		Name of the Project (Year : From-To)	Principal Investigator	Co-PIs/Associates
1.	CH.82	Surface Modification of Cotton Textiles using Nano Technology to Impart Super Hydrophobicity (October 2010 - September 2012)	Shri A. Arputharaj	Dr. N. Vigneshwaran Dr. Sujata Saxena Dr. P. K. Mandhyan Shri G.B. Hadge Shri R.R. Chhagani
2.	CH.83	Nano-finishing of Cotton Textile to Impart Flame Retardence and U.V. Protective Functionalities (October 2010 - March 2013)	Dr. Kartick Kumar Samanta	Dr. N. Vigneshwaran Dr. (Smt.) Sujata Saxena Dr. (Smt.) Sujata R. Kawlekar Shri Rajesh S. Narkar
3.	CH.84	Utilisation of Tender Coconut Husk for Dyeing of Natural Fibre Fabric (April 2011 - March 2013)	Shri R.M. Gurjar	Dr. Sujata R. Kawlekar
4.	CH.85	Use of Plant Extracts for Dyeing and Imparting Ultraviolet Protective and Antibacterial Properties to Cotton Textiles (April 2012 - March 2014)	Dr. Sujata Saxena	Shri S. Basak, Dr. R R Mahangade, Smt. N. M. Ashtaputre, Dr. M.V. Vivekanandan, Shri R.S. Narkar
5.	CH.86	Improving Interfacial Interaction of Nanocellulose with Commodity Polymers to Enhance their Performance (April 2012 - March 2014)	Dr. Virendra Prasad	Dr. N. Vigneshwaran, Er. Ashok K. Bharimalla , Dr. R. D. Nagarkar, Shri Rajesh Kadam
6.	CH.87	Fire Retardant Finishing of Cotton Fabric using Herbal Extract (October 2012 - September 2014)	Shri Santanu Basak	Dr. (Smt.) Sujatha Saxena, Dr. R. R. Mahangade, Shri R. S. Narkar
7.	CH.88	Regeneration of Discarded Polymerized Frying Oil and its Utilization	Shri R.M. Gurjar	Dr. Virendra Prasad, Dr. (Smt.) Sudha Tiwari, Shri Manoj Ambare

CORE AREA V: TECHNOLOGY MARKETING

Name of the Project (Year : From-To)	Principal Investigator	Co-PIs/Associates
Impact Assessment of CIRCOT Bajaj Cotton Pre-cleaner (October 2012 - September 2014)	Dr. C. Sundaramoorthy	Er. V.G. Arude, Dr. S. K. Shukla

Inter Institutional Project

S. No.	Name of the project (Year From -To)	Funding Agency	Principal Investigator	Co-PIs/Associates
1.	An Accelerated Process for Preparation of Bioenriched Compost from Cotton Plant Residues (April 2011 - March 2013)	Inter-institutional Project with CICR, Nagpur	Dr. V. Mageshwaran,	**From CIRCOT** Dr. P.G. Patil, Dr. (Smt.). A.A. Kathe Dr. R.D. Nagarkar Dr. Hamid Hasan Mrs. N.M. Ashtaputre Dr. S. Venkatakrishnan Shri Shirsat

EXTERNALLY FUNDED PROJECTS

S. No.	Name of the project (Year From -To)	Funding Agency	Principal Investigator	Associates
1	A Value Chain for Cotton Fibres, Seed, Stalks: An Innovation for Higher Economic Returns to Farmers and Allied Stake Holders (December 2007 - December 31, 2013)	National Agricultural Innovation Project (Component 2)	Dr. R.P. Nachane	Dr. A.J. Shaikh Shri R.M. Gurjar Dr. Hamid Hasan, Dr. S. Venkatakrishnan,
2.	Design and Development of Rubber Dams for Watersheds (January 2008 - March 31, 2014)	National Agricultural Innovation Project (Component 4)	Dr. S.K. Chattopadhyay	Er. A.K. Bharimalla Er. Krishna Prasad Er. Sekhar Das Smt. Bindu Venugopal

3.	A Value Chain on Banana Pseudostem for Fibres and other Value Added Products (June, 2008 - March 31, 2014)	National Agricultural Innovation Project (Component 2)	Dr. R.P. Nachane	Dr. N. Shanmugam
4.	A Value Chain for Coconut Fibre and its By-products: Manufacture of Diversified Products of Higher value and Better Marketability to enhance the Economic Returns of Farmers (December, 2008 - March 31, 2013)	National Agricultural Innovation Project (Component 2)	Dr. S.K. Chattopadhyay	Er. Ashok Kumar Bharimalla Er. Senthil Kumar Smt. Bindu Venugopal
5.	Zonal Technology Management and Business Planning & Development Unit at CIRCOT, Mumbai (November, 2008 March 31, 2014)	National Agricultural Innovation Project (Component 1)	Er. Ashok Kumar Bharimalla	Dr. N. Vigneshwaran, Shri R.M. Gurjar, Shri B.R. Pawar Dr. S. Venkatakrishnan, Shri K. Narayanan, Shri S. Mukundan, Dr. Hamid Hasan, Shri G.G. Mistry
6.	Improvement in Cotton Quality by Plasma Nanotechnology: An Eco-friendly Approach (June, 2011 - May 31, 2014)	National Fund for Basic, Strategic & Frontier Application Research in Agriculture, ICAR	Dr. Kartick Kumar Samanta	Dr. (Smt.) Sujata Saxena Shri A. Arputharaj Er. Manik Bhowmick
7.	Development of Gossypol-free Lysine-rich Cottonseed cake by Solid State Fermentation (June 2012 - May 2014)	National Fund for Basic, Strategic & Frontier Application Research in Agriculture, ICAR	Dr. V. Mageshwaran	Dr. (Smt.) A.A Kathe, Shri Nishant D. Kambli

8.	Electrospinning Geometry Optimization for Preparation of Core-sheath Nanofibres and Conversion of Nanofibers into Yarns (March, 2012 - March 31, 2014)	Department of Science and Technology	Dr. N. Vigneshwaran	Mr. A. Arputharaj, Dr. Kartick Kumar Samanta, Er. Manik Bhowmick
9.	Jute Based Bio Composite for Industry (April 2012 - March 2015)	Inter-institutional Project under NFBSFARA	Er. Manik Bhowmick	Dr. R. Guruprasad, Er. T.Senthilkumar

4

Technology Assessed and Transferred

CIRCOT is mainly engaged in developing newer technologies in the area of post harvest processing of cotton, eco-friendly finishing of textiles, better utilization of by-product of cotton stalk and refinement of the developed technologies. The continuous monitoring of the transferred technologies and processes enables to provide enhanced benefit to the users. Impact assessment of transferred technologies has also been taken up recently.

The Institute maintains a liaison with private organizations and entrepreneurs to meet their needs and to generate revenue. This chapter summarizes the technologies developed and consultancies offered by the Institute during the current year. Attempts were made for popularization and commercial adoption of viable technologies through periodically conducted Awareness Meets and through participation in various exhibitions and seminars.

Consultancies Undertaken

Title of Consultancy / area	Name of the Coordinating Scientist	Name of Organization to which consultancy was given	Amount (Rs.)
Production of Nano-based Formulation for Application onto Cotton Terry-Towel	Dr. N. Vigneshwaran	M/s. Blue Ocean Business Consulting, Coimbatore	30,000
Characterization of Anaerobic Digestive Slurry for presence of Anaerobic Micro-Organism: Part I	Mr. R. M. Gurjar	M/s. Hanjer Bio-tech Energies Ltd. Mumbai	22,472
Supply of Nanocellulose	Dr. N. Vigneshwaran	The Energy & Resource Institute, Bangalore	30,000
Valuation Charges of Spinnable Waste Cotton	Dr. S. K. Shukla	M/s. Amravati Grover's Co-op. Spg. Mills Ltd., Amravati Maharashtra	17,500

Characterization of Anaerobic Digestive Slurry for Presence of Anaerobic Micro-Organism: Part II	Mr. R. M. Gurjar	M/s. Hanjer Bio-tech Energies Ltd., Mumbai	10,112
Offering Technical Opinion on performance of the NIPHA made Humidification System Suitable for Bajaj make PLC Bale Press of 15-17 bales/hrs.	Dr. P. G. Patil	M/s. Konark Cotton Growers Co-op. Spg Mills Ltd., Kesinga, Kalahandi (Dist.), Odisha	15,000
Cross Sectional & Surface Morphological Study of Drug Pellets by SEM	Dr. R. P. Nachane	M/s. Sandoz Private Ltd., Navi Mumbai	55,618
Consultancy for R & D for Developing Various Machines in Ginning	Dr. P. G. Patil	M/s. Bajaj Steel Industries Ltd., Nagpur	6,06,744
Hand Evaluation of Denim Fabric	Dr. Sheela Raj	Jawaharlal Darda Institute of Engineering, Yawatmal	1,01,124
Consultancy for chemical Analysis of Raw & Bleach Cotton Linter	Dr. R. D. Nagarkar	M/s. Synergy Exports (P) Ltd., Kothrud, Pune	33,708
Consultancy for Preparation of Particle Board Blocks from Cotton Stalk	Er. Ashok Kumar Bharimalla	M/s. HYVA India (P) Ltd., Mahape, Navi Mumbai	83,248
Cotton TAP to Strengthen Cotton Value Chain in C-4 Countries and Malawi, Nigeria & Uganda in Africa	Dr. P. G. Patil	M/s. Infrastructure Leasing & Financial Services (IL & FS) Clusters Development Initiative Ltd., New Delhi	4,50,000
Preparation of Technical Specification & Tender Evaluation & Installation of Ginning & Pressing Machinery at Kesinga, Odisha	Dr. P. G. Patil	M/s. Konark Cotton Growers Co-op. Spg. Mills Ltd., Kesinga, Kalahandi (Dist.), Odisha	55,000

Surface Morphlogical Study of Drug Pellets by SEM	Dr. R. P. Nachane	M/s. Sandoz (P) Ltd., Navi Mumbai	22,753
To Evaluate the Process Technology of Nanocellulose Production on Sugarcane	Dr. N. Vigneshwaran	Godavari Biorefineries Ltd. Mumbai	50,562
Total Appearance Value and Total Hand Value of Worsted Suiting Fabric	Dr. Sheela Raj	Jawaharlal Darda Institute of Engineering & Technology, Yawatmal Maharashtra	1,23,596
Incubation Facility for Saw Ginning Technology for Processing of Assam Comilla Cotton at Ginning Training Centre	Dr. S. K. Shukla	M/s Rathi Chemicals, Nagpur	55,056
Consultancy Service for Production of Nanocellulose from Wood Pulp	Dr. N. Vigneshwaran	M/s Thapar Centre for Industrial R & D	1,12,360
		Total Amount	**18,74,853**

Commercial Testing

More than 9500 samples were tested during the year under report at the Headquarters Mumbai, and other regional quality evaluation stations at Coimbatore, Guntur, Sirsa, Surat, Dharwad, and the Ginning Training Centre at Nagpur. The total revenue generated through commercial testing was around Rs. 21.67 lakh as shown in table below

Number of Samples Tested and Revenue Generated

Unit at	No. of Samples Tested	Revenue Generation (Rs.)
Headquarters (Mumbai)	3390	1183389
Coimbatore	1618	293648
Guntur	2164	355495
Dharwad	113	91562
Surat	1007	89200
GTC, Nagpur	829	98700
Sirsa	655	64700
Total	**9776**	**2176694**

MoU With

1. M/s. Blue Ocean Business Consulting, Coimbatore for production of nano-based formulation for application on cotton terry towel to impart antimicrobial and super hydrophilic properties on May 30, 2012.
2. Non-disclosure Agreement with M/s. Hindustan Uni-lever Limited, Mumbai for Analytical Techniques for Textiles including Kawabata Evaluation System on December 15, 2012.
3. University of Agricultural Sciences, Raichur to establish a framework for collaboration in the area of research and education on December 19, 2012.
4. M/s. Synergy Exports Pvt. Ltd, Pune for Absorbent Cotton Technology/Paper Pulp Technology of Cotton Linters on January 1, 2013.
5. Shri Lakhamsy Sakhla an entrepreneur for incubation facilities for particle board preparation at GTC, Nagpur on January 13, 2013.
6. Shri Prakash Rathi, an entrepreneur for incubation facilities for Saw Ginning Technology at GTC, Nagpur on January 13, 2013.
7. M/s. Godavari Biorefineries, Ltd. Mumbai for optimizing the process for conversion of cellulose sheet and microcrystalline cellulose from bagasse into nanocellulose on February 13, 2013.

Patents Filed

S. No.	Application No & Date	Title	Name of scientists
1.	1553/MUM/2012 22/5/2012	Pretreatment of Cottonseeds with Microbial Consortium for Energy Efficient Removal of Linters	Dr. R.H. Balasubramanya Shri Nishant Kambli
2.	1554/MUM/2012 22/5/2012	Pedal Driven Banana Fibre Spinning System	Dr. R.P. Nachane Shri. M.V. Vivekanandan
3.	3464/MUM/2012 7/12//2012	Banana Pseudostem Fibre Drawing Machine	Dr. R. P. Nachane Dr. N. Shanmugam
4.	3465/MUM/2012 7/12//2012	Banana Pseudostem Fibre Carding Machine	Dr. R. P. Nachane Dr. N. Shanmugam

5.	3466/MUM/2012 7/12/2012	Cellulosic Materials Incorporating Nano Zinc Oxide and Method to Manufacture the Same	Shri Arputha Raj Dr. N. Vigneshwaran Shri Rajesh Narkar Shri Rajesh Kadam Shri R. R. Chhagani Dr. P. K. Mandhyan Shri G. B. Hadge
6.	3467/Mum/2012 7/12/2012	Banana Pseudostem Fibre Ring Spinning Machine	Dr. R. P. Nachane Dr. N. Shanmugam
7.	3468/MUM/2012 7/12/2012	Cotton Textile Incorporating Titanium Dioxide Nano particles and Method to Manufacture the Same	Dr. Kartick Kumar Samanta Dr. Sujata Saxena Dr. N. Vigneshwaran Dr. (Smt.) Sujata Kawlekar Shri Rajesh Narkar
8.	3469/MUM/2012 7/12/2012	Method of Dyeing and Protective Finishing of Cotton Textiles Using Vegetable Extract	Shri Shantanu Basak Dr. Kartick Kumar Samanta Shri Arputha Raj Dr. (Smt.) Sujata Saxena Dr. Ramesh Mahangade Shri Rajesh Narkar
9.	362/MUM/2013 7/2/2013	Optical scanner based fabric pilling measurement system	Dr. R. P. Nachane Shri V. N. Mayekar

5

Education, Training and EDP

Education

CIRCOT has permanent recognition from University of Mumbai for guiding students in Physics, Bio-Physics, Physical Chemistry, Organic Chemistry, Textile Technology and Microbiology. In the year 2012-13, two students in Physics and three students in Microbiology completed their PhD degree and one student in Chemistry completed his M.Sc degree. Besides, five students from various colleges have undergone training in the field of microbiology and nanotechnology for their project work for completion of M.Sc degree.

Training

The institute conducts regular training programmes on cotton quality evaluation for personnel drawn 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 the production of clean quality cotton and on the maintenance of various ginning and allied machines apart from solving technical problems that arise in the ginning industry. The Institute also organises customized training courses as per demand on the operation of High Volume Instrument (HVI) and Advanced Fibre Information System (AFIS) at the Headquarters, generally for a duration of three days. The Institute provides special training programmes to personnel sponsored from the industry on specific topics as per the demand.

All courses comprise lectures coupled with hands-on-training on the testing instruments. Field visits to Textile/ Ginning and Pressing industries to get practical knowledge on the respective subject are also arranged. The course material provided to the trainees contains details of test methods and statistical interpretations of results.

The Ginning Training Centre, GTC at Nagpur

Training cum Exposure Programme on Post-Harvest Management of Cotton and Value Addition to Crop Residue organized under the Technical Assistance Programme (TAP) for Cotton for C-4 and other countries of Africa

An important activity for CIRCOT this year was the successful conduct of the Training cum Exposure Programme on Post-Harvest Management of Cotton and Value Addition to Crop Residue (B-1 activity) organized under the Technical Assistance Programme (TAP) for Cotton for C-4 and other countries of Africa, labeled as Cotton TAP for Africa. This training is an initiative of GOI with a commitment to support the C-4 countries of Africa (Benin, Burkina Faso, Chad and Mali), Malawi, Nigeria and Uganda. CIRCOT, Mumbai along with CICR, Nagpur were identified by the Department of Commerce as project partners from ICAR.

The two-week training was conducted during January 12-25, 2013, in two phases. Thirty-one delegates from diverse fields of government and private sectors, policy makers, producers, production technologists, scientists and entrepreneurs from the African countries participated in the programme. The first phase from January 12-22 was organized at CIRCOT-GTC, Nagpur and the second phase from January 23-25 was organized at CIRCOT Headquarters, Mumbai.

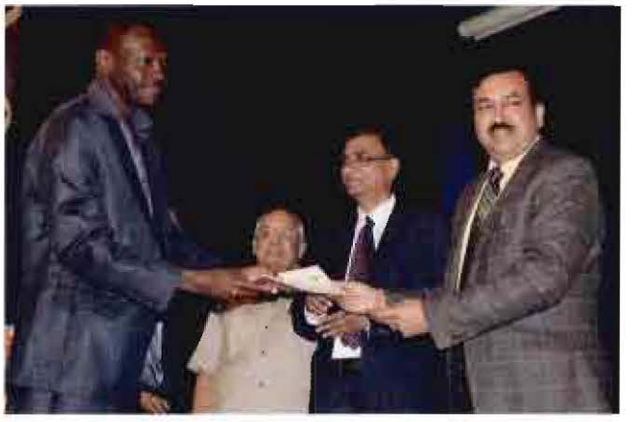
Inaugural of the Cotton TAP

The programme was inaugurated on January 13, 2013 at Nagpur by Dr. K. K. Singh, ADG (PE), ICAR. Dr. S. K. Chattopadhyay, Director, CIRCOT welcomed the delegates and Dr. P.G. Patil, Head, Technology Transfer Division and PI, Cotton TAP gave a brief presentation about the activities of the Cotton TAP project to be implemented by CIRCOT. Training manuals on "Post-Harvest Management of Cotton and Value Addition to Crop Residue", compiled in English and French were released during the inaugural function.

The delegates from C-4 and other African countries

Besides lectures on various topics, field/industrial study visits to ginning and allied machinery manufacturing units, modern ginning and pressing factories, spinning and textile mills, particle board manufacturing plant, seed industry, weaving and cotton trading institutions were organized to provide a first-hand experience on cotton technology. The valedictory was conducted at CIRCOT Headquarters, Mumbai on January 24, 2013. Mr. Sudhanshu Pandey, Joint Secretary, Min. of Textiles, GOI; Dr. P. Nayak, Secretary, Textiles Committee; Mr. M. B. Lal, former MD, CCI and Dr. (Mrs.) Milan Sharma, IL&FS Cluster graced the occasion and distributed certificates to all the delegates.

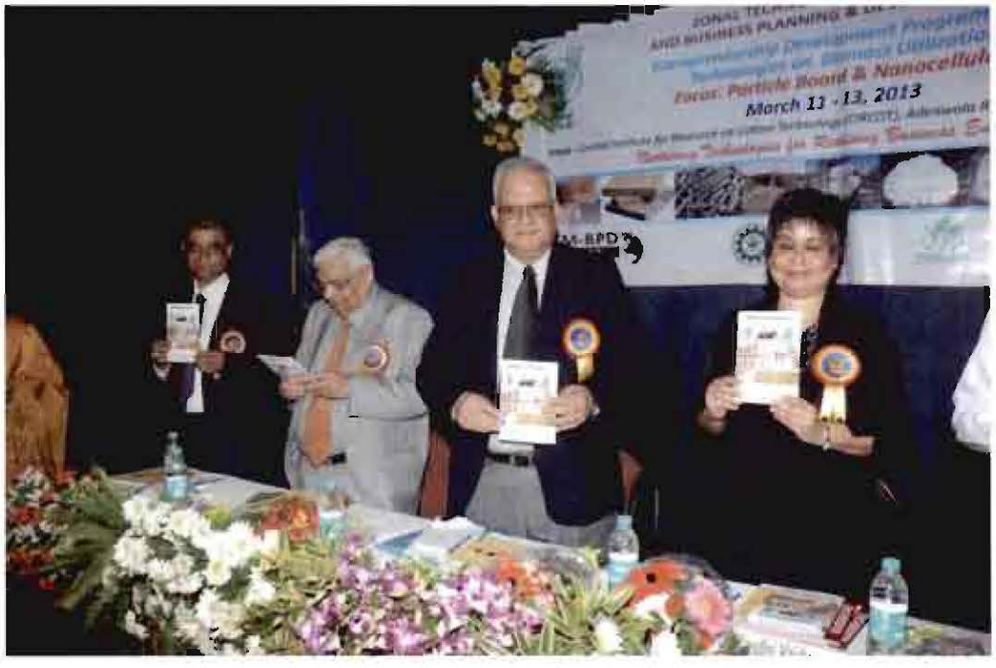
Mr. Sudhanshu Pandey, Jt. Secretary addressing delegates at the valedictory



Certificate distribution to the participants

Entrepreneurship Development Programme for Technologies on Biomass Utilisation, Focus: Particle Board and Nanocellulose

Yet another activity initiated by the CIRCOT ZTM-BPD (NAIP) unit was, Entrepreneurship Development Programme (EDP) for Technologies on Biomass Utilization, Focus: Particle Board and Nanocellulose, and organised during March 11-13, 2013. Twenty-two delegates from industries, spinning mills, Government departments and NGOs participated in the programme. Dr. R.P. Kachru, chairman, RAC, CIRCOT and former ADG (PE), ICAR was the Chief Guest at the inauguration. In his inaugural address, he complimented CIRCOT for developing innovative and environment friendly technologies like Particle Board and Nanocellulose for effective management of biomass. Mr. Sudhir Bhargava, Guest of Honour and Member, Governing Body, ICAR, in his address emphasized that the existing market situation provides large scope for the particle board industry as the country still imports them to meet its domestic needs. Mr. Hemraj Singh, CGM, NSIC, Special guest, in his address projected the scenario of the MSME and informed about the programmes of NSIC to assist budding entrepreneurs for setting-up small scale industries. Mr. Suresh Kotak, Special Guest and Chairman, Kotak & Company Ltd. in his address opined that EDP should emphasize on providing help to first-time entrepreneurs, which will create employment opportunity. Prof. Nandini Vaidyanathan, the founder of CARMa, also a Special Guest, in her address complimented 'entrepreneurs' as 'the people who exploits as well as creates opportunities.' The addresses were followed by release of CIRCOT publications, Enchiridion on Entrepreneurship Development and Schedule of Fees for Tests.



Dr. R.P. Kachru, Chairman, RAC, CIRCOT, releasing the publications

The EDP was designed to train and motivate potential public and private entrepreneurs to start a new business in the technologies under focus. The information disseminated and demonstrations given on particle board production from cotton stalks, briquetting and nanocellulose production from cotton biomass were informative and appreciated by the participants. A panel discussion on 'Technology & Fiscal support to Entrepreneurs' was also conducted to address the participants' doubts and queries.

Prof. Nandini Vaidyanathan, interacting with delegates at EDP

Besides, in the year 2012-13, the following training programmes were organized:

(a) Training on Quality Evaluation of Textile Fibres

42 sponsored personnel from trade and textile industry were imparted training on fibre quality evaluation in five batches.

(b) Training on Ginning and Baling for Fitters, Operators and Managers from Ginning Industry

150 persons distributed in 14 batches underwent the training. Along with the subject oriented training, awareness on the need to produce contaminant free cotton was stressed.

(c) Training under ATMA scheme

36 cotton farmers from Junagadh, Gujarat participated in a three days training programme under ATMA scheme at GTC, Nagpur.

6

Linkages and Collaboration

The six Quality Evaluation Units of the institute are located within the premises of agricultural universities or other ICAR institutes and function as extension wings. CIRCOT actively participates in the AICCIP meetings and provide feed-back to the breeders for improvement of cotton variety. The five quality evaluation units, the Ginning Training Centre (GTC) at Nagpur and CIRCOT headquarters at Mumbai promote the technologies developed by the Institute and serve as a window for technology transfer activities. The Institute has a strong linkage with CICR, Nagpur, NIRJAFT, Kolkata, Indian Rubber Manufacturers' Research Association (IRMRA), Thane, Directorate of Water Management (DWM), Bhubaneswar, M/s. Kusumgar Corporates, Mumbai under the National Agricultural Innovation Project (NAIP). Besides, the Institute also undertakes collaborative research programmes with other research bodies like the Navsari Agricultural University, Bombay Veterinary College, Department of Physics, IIT Madras, Institute of Chemical Technology (ICT) and private organizations like M/s. Physics Instruments Co., Chennai.

The institute participates in various exhibitions and Kisan melas for propagating the technologies developed by the Institute.

The scientific community of CIRCOT officiates as resource persons in various committees and advisory panels of other academic and research institutions, such as SITRA, CCI, ICMF, CAI, etc. They participate in various seminars, symposia, conferences, workshops and training programmes organised both within and outside the country. This serves as a platform for exchange of their knowledge and expertise in different fields of research. Few scientists are experts in committees like the Technology Development Board (TDB) under the Department of Science and Technology (DST), for assessment of proposals for setting up/expanding cotton processing industry. Scientists are also invited by various organizations to deliver lectures as experts.

Regular training courses are conducted by the institute on Cotton Quality Evaluation including elementary statistics applicable to textile testing for personnel from the cotton trade and industry. At the Ginning Training Centre at Nagpur, theoretical and practical training skills are imparted on different aspects of ginning like maintenance of ginning machines, problem solving during the ginning operations, effect of clean cotton picking for better remuneration and utilization of biomass for preparing particle boards. Need based courses are also organized both at the headquarters and at GTC, Nagpur.

The technical expertise of the Institute is sought by diversified stakeholders for queries related to cotton fibre, yarn, fabric etc. Further, CIRCOT regularly publishes brochures and leaflets about the various technologies developed for circulation in the public domain. The Institute undertakes consultancy services and contract research in specific areas for various individuals as well as for organizations.

Commercial Testing: The Institute undertakes commercial testing jobs for samples from trade and industries, educational institutes including textiles and state government bodies. Fibre, Yarn, Fabric and other miscellaneous tests are carried out generating significant revenue for the Institute. The details of commercial samples tested at CIRCOT, Mumbai during the period 2012-13 along with those of the recent past are presented in table below.

DETAILS OF SAMPLES TESTED AT CIRCOT

Sr. No.	Type of Tests	Average during the X Plan (2002-03 to 2006 - 07)	XI Plan					XII Plan
			2007 - 08	2008 - 09	2009 - 10	2010-11	2011-12	2012-13
1.	Ginning, Fibre, Trash Content and Spinning	8438	1961	5253	8965	2860	6534	**9000**
2.	Yarn	254	160	35	40	35	71	**36**
3.	Fabric	445	418	616	396	146	306	**352**
4.	Miscellaneous	516	332	180	159	378	277	**388**
	T o t a l	9653	2871	6084	9560	3419	7188	**9776**

Besides the above mentioned tests, special tests were carried out as per demand on samples received from private/government organizations and universities as listed below:

Sr. no.	Party's Name	Test
1	M/s. Aditya Birla Science and Technology, Taloja.	Lignin
2	Alder Trading Co. Pvt. Mumbai.	Linter
3	Avinashilingam University for Women, Coimbatore	Handmade paper
4	BARC, Trombay, Mumbai	SEM
5	Basant Agro Tech. (I) Ltd. Akola	Oil & Gossypal content
6	M/s. Birla Cellulose, Bharuch	Kawabata
7	BTRA, Mumbai	UPF
8	Carver Tech. & Equipment Pvt. Ltd . Mumbai.	Linter
9	Cottor Plant (India) Pvt. Ltd. Andheri, Mumbai.	Paper
10	M/s. Croda Chemicals (I) Pvt. Ltd., Navi Mumbai	SEM
11	CSWRI, Avikanagar.	SEM , FTIR

12	M/s. Delkon Textiles, Faridabad	LOI
13	Dept. of Textiles Technology Anna University, Chennai.	UPF
14	DKTE, Ichalkaranji	Kawabata , XRD
15	M/s. G.S. Oils Ltd, Adilabad	Linter
16	M/s. High Grade Industries Pvt. Ltd., Mumbai	SEM
17	M/s. Hindustan Unilever Ltd. Andheri (E), Mumbai	SEM, Drape
18	ICT, Matunga, Mumbai	SEM
19	Indian Jute Research Association, Kolkatta	UPF
20	Jawaharlal Darda Institute of Engg. & Tech., Yavatmal.	SEM, UP, Cellulose, Wax
21	Khalsa College, Mumbai.	XRD
22	Kumarappa National Handmade paper Institute, Jaipur	Linear density (Banana fibre)
23	Mumbai University Press, Mumbai	Paper
24	NIFT, Chennai	Moisture Management Test
25	NIRJAFT, Kolkata	FTIR, XRD, AAS
26	Piramal Life Sciences, Mumbai	SEM
27	PSG Technology, Coimbatore	Kawabata
28	Ramnarain Ruia College, Mumbai	Colour Matching
29	M/s. Reliance Inspection Services, Mumbai	Moisture Management Test
30	SNDT, Juhu, Mumbai	Antibacterial, Colour Matching
31	Shree Ram Proteins Pvt. Ltd., Rajkot	Linter
32	M/s. Toshniwal Bros, Mumbai	Particle size
33	VJTI, Mumbai	SEM , Particle size
34	Wool Research Association, Thane	Particle size

Exhibition and Publicity

1. Participation in SAU-ICAR-CII Industry Meets

BPDU-CIRCOT participated in the following meets at –

a. Anand Agriculture University, Anand on April 16, 2012

b. Tamil Nadu Agriculture University, Coimbatore on April 25, 2012

c. Central Agriculture University, Imphal on July 3, 2012

At Central Agriculture University, Imphal

At CCS Haryana Agriculture University, Hisar

d. CCS Haryana Agriculture University, Hisar on September 4, 2012

BPD-CIRCOT participated in various SAU-ICAR-CII industry meets of ICAR. BPD-CIRCOT used these exhibitions as a formidable tool to showcase technologies/products developed at CIRCOT and for promoting ICAR-Industry alliances and accelerating the commercialization activities.

2. Participation in Exhibition/Awareness Meet

a. Farmers Awareness meet with the association of CICR at Sirsa on 20.04.2012

b. Cotton Ginners Awareness Meet on "Modernization in Ginning and Advantages of Bale Tagging with Fibre Properties" at Club City, Sirsa on 20.04.2012

c. Participated in the exhibition and Farmers Awareness meet at MAU, Parbhani on 18.05.2012.

3. CIRCOT- BPDU was represented by Shri Anurag Athavale, Manager, BPDU at the Capacity Building and Business Incubation meet, at TBI, Trivandrum from 17-23, Sep 2012

At the Capacity Building & Incubation Meet, Trivandrum

4. MAM-12 – 6th International Symposium on Macro-and Supramolecular architectures and Materials – Special Theme on Nanosystems and Applications, November 21-25, 2012 at Hotel Le Meridian, Coimbatore; sponsored by IUPAC and organized by Centre for Nanoscience and Technology, KSR College of Technology, Tiruchengode (Tamil Nadu) in collaboration with Department of Nanobiomaterials and Electronics, World Class University, South Korea. CIRCOT presented a stall and exhibited its Nanotechnology facilities and relevant technologies.

CIRCOT stall at MAM-12, Coimbatore

5. CIRCOT participated as a 'Knowledge Partner', at the India International Textile Machinery Exhibition (ITME) 2012 held at Bombay Convention and Exhibition Centre, Goregaon, Mumbai from December 2-7, 2012.

Dr. A.N. Desai inaugurating the CIRCOT stall at India ITME 2012

6. CIRCOT participated in the science exhibition conducted by Don Bosco High School, Matunga in collaboration with other schools from December 11 – 13, 2012 at Don Bosco High School, Matunga. Theme of the exhibition was: Science and Society. Various technologies developed by the Institute was exhibited.

Dr. S.K. Chattopadhyay, Director, CIRCOT interacting with the Principal of Don Bosco High School

Enthusiastic students explaining their exhibits

7. CIRCOT participated in the 4th Annual Seminar and Exhibition on Post Ginning Value Addition to Cotton, arranged by MP Association of cotton processors and traders (MPACPT), at Indore on , December 23, 2012.

Dr. S.K. Chattopadhyay, Director CIRCOT and Special Guest at the Seminar addressing the audience

8. XIth Agricultural Science Congress at Odisha University of Agriculture and Technology (OUAT), Bhubaneswar, February 7-9, 2013. 'CIRCOT developed technologies' stall was set up by ZTM-BPDU at the exhibition.

Mr. Debiprasad Mishra, Hon'ble Minister of Agriculture, Odisha and Dr. D. P. Ray, Former VC, OUAT at the CIRCOT stall at XIth Agricultural Science Congress

7
Publications

A. Annual Report

Annual report of the Central Institute for Research on Cotton Technology for the year 2011 - 2012 in English and Hindi

B. Research Publications

1. Chattopadhyay, S.K. and Senthilkumar, T., 2013 - Influence of Yarn and Fabric Structure on Colour Values of Textiles, Textile Value Chain, Vol. 1 (4), pp. 23-24, 2013.
2. Gayal, S. G., Nagarkar, R.D., Kambli, N. D. and Kadam, R. P.- Ecofriendly Absorbent Cotton from Non Spinnable Fibres, Journal Cotton Res. Dev. 26 (2), July, pp. 267-271, 2012.
3. Jain, P. and Vigneshwaran, N. - Effect of Fenton's Pretreatment on Cotton Cellulosic Substrates to Enhance its Enzymatic Hydrolysis Response, Bioresource Technology, 136 (1) pp. 219-226. 2012.
4. Manik Bhowmick, Samrat Mukhopadhyay and Ramasamy Alagirsamy – Mechanical Properties of Natural Fibre-Reinforced Composites, Textile Progress, Vol. 44 (2), June, pp. 85-140, 2012
5. Manojkumar, T.S., Arude, V.G and Shukla, S.K. - Design and Development of an Auto-Groover Machine for Making Helical Grooves on Ginning Roller, Cotton Research Journal, Vol.3(1), pp. 115-123, 2012.
6. Muralidhara, K. S., Chhagani, R. and Sreenivasan, S.- Flammability and Thermal Decomposition Characteristics of Upholstery Textiles Treated with Flame Retardant Chemicals, Colourage, Vol.LIX (8), p.43, Aug 2012.
7. Nagarkar, R.D., Shaikh, A. J., Gurjar, R. M., and Ambare, M. G.- Kraft Paper and Corrugated Boxes from Cotton Plant Stalks for Packaging of Mangoes, J. Cotton Res. Dev. 26 (2), July, pp. 272-276, 2012.
8. Nath, J.M., Patil, P.G., Shukla, S.G. and Balasubramanya, R.H. – Scientific Processing of Cotton Seed for Better Value Realization, Cotton Research Journal, Vol. 3(2), pp. 228-239, 2012.
9. Satyamurthy, P. and Vigneshwaran, N. - A Novel Process for Synthesis of Spherical Nanocellulose by Controlled Hydrolysis of Microcrystalline Cellulose Using Anaerobic Microbial Consortium, Enzyme and Microbial Technology, 52(1), pp. 20-25, 2012.
10. Savadekar, N.R., Karande, V.S., Vigneshwaran, N., Bharimalla, A.K. and Mhaske S.T. - Preparation of Nanocellulose Fibers and its Application in kappa- Carrageenan Based Film, International Journal of Biological Macromolecules, Vol. 51, pp. 1008-1013, 2012.
11. Vivekanandan, M.V., Sreenivasan, S.- Dynamic Transportation of Water Vapor Through Cotton and Polyester-Cotton Blended Fabrics. Part I: Part I: Indices Characterizing Moisture Buffering and their Interrelationships, Journal of Engineered Fibers and Fabrics, Vol. 7(4), pp. 70-80, 2012.
12. Yadav, A. and Chitranayak – Influence of Tightness Factor on Air Permeability and Thermal Transportation of Knitted Fabrics, Cotton Research Journal, Vol. 3 (1), January-June, pp. 122-130, 2012.

C. Other Research Publications (M. Tech/Ph. D. Publications)

1. Behera, B.K., and Guruprasad, R. - Predicting Bending Rigidity of Woven Fabrics using Adaptive Neuro fuzzy Inference System (ANFIS), Journal of The Textile Institute, Volume 103 (11), pp. 1205-1212, 2012
2. Kartick K. Samanta, Amish G. Joshi, Jassal, M. and Agrawal, A. K. - Study the Hydrophobic Finishing of Cellulosic Substrates using He/1,3 Butadiene Plasma at Atmospheric Pressure, Surface and Coating Technology, Vol. 213, pp. 65-76, 2012.
3. Basak, S. 2012 - Process Development of Wool Fabric: By 172 nm UV excimer lamp, LAP LAMBERT Academic Publishing, September 14, 2012, ISBN-10: 3659196800, ISBN-13: 978-3659196805 (in English)

D. Popular Articles

1. Basak, S., Das, M., 2012 - Party Wear for Children, Textile Trends, No. 7, October 24, 2012.
2. Chattopadhyay, S.K., Krishna Prasad, G. and Prabhu, G.T.V., 2012 - Production process for Value added Fancy Yarns, Textile Value Chain, Oct- Dec, pp. 12-14, 2012.
3. Chitranayak, 2012 - Prakrutik Reshon ke Bahuaayami Upyog, Dugdh Ganga, Annual Publication, NDRI, 2010-2011, pp.50-51.
4. Chitranayak, 2012 - Textile Uddyog Hetu Viksit Taknik Dwara Kapas ke Reshon ka Gunvatta Mulyankan, Vastra Paridhan, Vol. 69, pp. 9-12, 2011-2012.
5. Chitranayak, - HVI (High Volume Instrument) Dwara Kapas va Anya Reshon ka Gunvatta Mulyankan in Raj Bhasha Rashmi published by Cotton Corporation of India, July-Dec., pp. 37-40, 2012.
6. Das, Sekhar, 2012 - Contribution of Animal Fibre in Indian Economy, July 16 (http://www.fibre2fashion.com/industry-article/43/4209/contribution-of-animal-fibre1.asp)
7. Das, Sekhar, 2012 - Natural Fibre Composite, July 20 (http://www.fibre2fashion.com/industry article/43/4222/natural-fibre-composite1.asp)
8. Samanta, K. K., Saxena, S., Arputharaj, A. Bhowmick, M., Gayatri, T. N. and Abdul H. Shaikh, 2012 Plasma Nanotechnology for Value addition of Cotton Textiles, ICAR News July- Sept 2012 p 3
9. Samanta, Kartick K., Saxena Sujata, Arputharaj, A. Gayatri, T. N. and Abdul H. Shaikh, 2012, Plasma: Suti Vastron ke Mulyavardhan ke liye ek paryavaran Anukool taknik in Raj Bhasha Rashmi published by Cotton Corporation of India, July-Dec., 2012.

E. Papers presented in Conferences / Seminar

1. Chitranayak, 2012 - Quality Evaluation and Spinning Potential of AICCIP Cotton Breeding Trials, Oral presentation at the Annual AICCIP Workshop held during April 9-11, 2012 at ANGRAU, Hyderabad.
2. Patil, P.G., 2012 - Post Harvest Technologies, By-Products & Residue Management in Cotton Sector presented in Workshop on Cotton Technical Assistance Programme for Africa- Strengthening the Value Chain organised by IL&FS Clusters held on April 13, 2012 at Niryat Bhawan, New Delhi.
3. Saxena Sujata, 2012 –Environment Friendly Options for Textile Processing, Oral presentation at the National Workshop on Pollution Prevention Paradigm, held on May 11, 2012 at Amity University, Noida,

Uttar Pradesh.

4. Chattopadhyay, S. K and Senthilkumar, T., 2012 – Influence of Yarn and Fabric Structures on Colour Values of Textiles, presented at the Summer School organized by NIRJAFT, Kolkata on July 16, 2012 at NIRJAFT, Kolkata.

5. Basak, S., Gupta, D. 2012 - Functionalisation of Wool Fabric Treated by 172nm VUV excimer lamp, Poster Presentation in the 8th International Conference on Apparel & Home Textiles (ICAHT 12) held on September 21 – 22, 2012 at New Delhi.

6. Arude, V.G., Shukla, S.K. and Jyoti M. Nath, 2012 - Evaluation of Energy Consumption and Interventions to Improve Energy Efficiency of Cotton Bale Presses in Ginneries presented in International Symposium on Global Cotton Production Technologies vis a vis Climate Change held during October, 10-12, 2012 at CCS Haryana Agricultural University, Hisar.

7. Chitranayak, 2012 - Assessment of Cotton Fibre Attributes for Trade and Export, presented in the International Symposium on Global Cotton Production Technologies vis-a-vis Climate Change held during Oct. 10 - 12 at CCS, Haryana Agricultural University, Hisar, pp. 112-114.

8. Shukla, S.K., Patil, P.G., Nath, J.M., Arude, V.G., and Majumdar, G. 2012 - Quality Assessment of Indian Cotton Harvested using Spindle Picker vis-a-vis Effectiveness of Cleaners in its Processing presented in International Symposium on Global Cotton Production Technologies vis a vis Climate Change held during October, 10-12, 2012 at CCS Haryana Agricultural University, Hisar.

9. Kartick K. Samanta, Sujata Saxena, Arputharaj, A., Gayatri, T. N. and Abdul H. Shaikh 2012 - Environment Friendly Textile Chemical Processing using Atmospheric Pressure Plasma Third International Conference on Natural Polymers, Bio-Polymers, Bio-Materials, their Composite, Blends. IPNs, Polyelectrolytes and Gels: Macro to Nano Scale (ICNP 2012) held during October 26-28, 2012 at Kottayam, Kerala.

10. Agarwal, A.A., Jeengar, A.K., Satyamurthy, P., Arputharaj, A., Samanta, K.K., Bhowmick, M. and Vigneshwaran, N., 2012 - Production of Core-Sheath NanoFibres by Electrospinning Process for Functional Applications in IUPAC Sponsored International on Macro-and Super molecular Architectures and Materials: Nanosystems and Applications, organized by Centre for Nanoscience and Technology, KSR College of Technology in Association with WUC, South Korea held during November 21-25, 2012 at Coimbatore.

11. Basak, S. 2012 – Excimer Lamp in Textile Processing presented at the Science Communicators Meet at the Symposium of Mumbai Chapter of Indian Science Congress held on November 25, 2012 at Mumbai

12. Kartick K. Samanta, Sujata Saxena, Arputharaj, A., Gayatri, T. N. and Abdul H. Shaikh, 2012- Surface Modification of Textile using Atmospheric Pressure Cold Plasma presented at the 27th National Symposium on Plasma Science & Technology (PLASMA-2012) held during December 10-13, 2012 at Pondicherry University, Puducherry.

13. Patil, P.G., 2012 - Post Harvest Technology and Infrastructure presented at the Conference on Policy Framework for Development of Cotton and Textile Sector in India organised by IL&FS Clusters on December 10, 2012 at Hotel Le Meridian, New Delhi.

14. Sundaramoorthy, C., 2012 - The Extent and Pattern of Spatial Market Integration of Cotton in India, oral presentation at the International Conference of Indian Society of Agricultural Statistics held during

December 18 to 20, 2012 at IASRI, New Delhi.

15. Chattopadhyay, S.K. and Mageshwaran, V., 2012 - Gossypol – Free Protein Enriched Cottonseed Cake – A Reality?, presented at the 4th Annual Seminar on Post Ginning Value Addition to Cotton organized by Madhya Pradesh Association of Cotton Processors and Traders (MPACPT) held on December 23, 2012 at Indore, Madhya Pradesh.
16. Ammayappan,L., Ray, D.P., Das, S. Guruprasad, R. and Ganguly, P.K., 2013 - Effect of Lac Treatment on Performance Properties of Jute Fabric Based Bio-Composites in Comparison with Alkali Treatment & Peroxide Bleaching Treatment in National seminar on Jute & Allied Fibres in Changing Times : Issues & Strategies held during 3-5 January, 2013 at NIRJAFT, Kolkata, India.
17. Basak, S., and Das, S. 2013 - Fire Retardant Finishing of Natural Cellulosic Fabric presented at the National Seminar on Jute and Allied Fibres in Changing Times: Issues and Strategies held during January 3-5, 2013 at NIRJAFT, Kolkata.
18. Guruprasad, R., Senthilkumar, T., Krishna Prasad, G. and Chattopadhyay, S.K. 2012 - Banana Fibres: Challenges in Fibre Production and New Product Development published in the Book of Papers, National seminar on Jute and Allied Fibres in Changing Times: Issues and Strategies held during January 3-5, 2013 at NIRJAFT, Kolkata.
19. Manik Bhowmick, Dey, S.K. and Chattopadhyay, S.K. 2013 - Composite Yarns for Technical Textiles from Natural Fibres based on Friction Spinning Technology Oral presentation at the National Seminar on Jute and Allied Fibres in Changing Times: Issues and Strategies held during January 3-5, 2013 at NIRJAFT, Kolkata.
20. Kartick K. Samanta, Amish G. Joshi, Manjeet Jassal, Ashwini K. Agrawal, Sujata Saxena, and Arputharaj, A. 2013 - Application of Plasma Technology in Textile Chemical Processing to Reduce Water Pollution at the 100th Indian Science Congress held during January 3-7, 2013 at Kolkata.
21. Chattopadhyay, S.K., 2013 - Bridging Gaps Between Cotton Production Research and Spinning Industry Oral Presentation at the National Convention on India Cotton: Gearing up for Global Leadership held during January 6-8, 2013 at MCRS, NAU, Navsari, Surat.
22. Chitranayak, 2013 - Spinning Potential and Quality of Indian Cotton, Oral presentation at the National Convention on India Cotton: Gearing up for Global Leadership held during January 6-8, 2013 at MCRS, NAU, Navsari, Surat.
23. Guruprasad, R. 2013 - Indian Cotton & Needs of Spinning Industry, Oral presentation at the National Convention on India Cotton: Gearing up for Global Leadership held during January 6-8, 2013 at MCRS, NAU, Navsari, Surat.
24. Vigneshwaran, N. 2013 - Nanotechnology in Cotton Textiles and Composites presented at the National Convention on India Cotton: Gearing up for Global Leadership held during January 6-8, 2013 at MCRS, NAU, Navsari, Surat.
25. Basak, S., Saxena, S., Samanta, K., Arputharaj, A., Mahangade, R.R., Narkar, R.S. - Garments for Health and Well Being Poster presentation at the International Conference of Health, Well being and Sustainability held during January 10-12, 2013 at Nirmala Niketan, Mumbai.

26. Kartick K. Samanta, Sujata Saxena, Vigneshwaran, N., Sujata R. Kawlekar, Rajesh S. Narkar, and Gayatri, T. N. 2013 - Development of Flame Retardant Protective Textile using Nanoparticles presented at the International Conference on Enhancing Health, Wellbeing and Sustainability-Opportunities, Challenges and Future Directions organised during January 10-12, 2013 at Mumbai.

27. Arude, V.G., Shukla, S. K., and Jyoti Nath, 2013 - Energy Utilization and Measures for its Conservation in Cotton Baling Presses presented at the International Symposium on Bio-Energy-Challenges and Opportunities and 47th ISAE Convention held at Directorate of Rice Research held during January 28-30, 2013 at Hyderabad.

28. Nath, J.M., Shukla, S.K., Patil, P.G., and Arude, V.G., 2013 - Portable Moisture Instrument for Cotton Using Customized Sensor Designed for fixed Volume and Uniform Packing Density presented in 47th ISAE Convention and International Symposium on Bio-Energy - Challenges and Opportunities held during January 28-30, 2013 at Hyderabad.

29. Shukla, S.K., Arude, V.G., and Nath, J.M., 2013 - Pressure Drops in 2D2D Cyclone Separators presented in 47th ISAE Convention of ISAE and International Symposium on Bio-Energy - Challenges and Opportunities held during January 28-30, 2013 at Hyderabad.

30. Patil, P.G., Shukla, S.K. and Arude, V.G., 2013 - Spiked Cylinder Cleaner and Saw Band Cleaner for Processing of Cotton presented at the 47th Annual Convention of ISAE and International Symposium on Bio-Energy - Challenges and Opportunities held during January 28-30, 2013 at Hyderabad.

31. Chattopadhyay, S.K. and Bindu Venugopal, 2013 – Grading of Coconut Fibres and Development of Products with Improved Quality, presented at the International Conference on Technology Upgradation and Product Diversification organized during COIR KERALA 2013 organised by the National Coir Research and Management Institute (NCRMI), Thiruvananthapuram, Kerala, held during February 2-3, 2013 at Alapuzhha, Kerala.

32. Guruprasad, R., Prabhu, G.T.V., Chattopadhyay, S.K. - Futuristic Textiles using Newer Blends of Cotton presented at the National Seminar on Futuristic Fibres 2013 organised by The Institution of Engineers (India) held during February 2-3, 2013 at Bhopal.

33. Samanta, Kartick K., Saxena Sujata, Arputharaj, A. Gayatri, T. N. and Abdul H. Shaikh, 2013 - Textile Chemical Processing using Plasma to Reduce Water Pollution presented at the First International Conference on Bio-resource and Stress Management held from February 6-9, 2013 at Bose Institute, Kolkata.

34. Samanta, K.K., Saxena Sujata, Basak, S., Das, S., Gayatri, T.N. and Shaikh Abdul H- Surface Modification of Polymeric Substrates using Plasma to Improve Adhesion Strength presented at the International Conference on Rubber like Materials organized by Centre for Rubber Technology held during March 6 – 9, 2013 at IIT Kharagpur.

35. Samanta, K.K., Saxena, S., Arputharaj, A., Vigneshwaran, N., Gayatri, T.N., Shaikh, A.J, Narkar, Rajesh, and Chhagani, R.R. 2013 – Effect of Plasma and Cellulose Enzyme Pretreatments in Hydrophobic Finishing of Cotton Textiles presented at the International Conference on Recent Advances in Textile and Electrochemical Sciences organised by Alagappa University held during March 21-23, 2013 at Karaikudi, Tamil Nadu.

F. Status report

1. Samanta, Kartick K., Saxena Sujata, Arputharaj, A. Gayatri, T. N. and Abdul H. Shaikh, 2012 - A status report on Surface modification of textile using Cold Plasma

G. Compilations

1. AICCIP Annual Technological Report: 2011-2012, Quality Evaluation of Breeding Samples of Indian Cotton, April 2012
2. Technological Report on Standard Indian Cotton 2010-2011 & 2011-2012 Seasons. Technological Report No. 77 & 78, 2012
3. CIRCOT Technologies, Processes and Products, October, 2012
4. Post-Harvest Management of Cotton & Value addition to Crop Residues in English and French, January 2013
5. Enchiridion on "Entrepreneurship Development Programme for Technologies on Biomass Utilization, Focus: Particle Board and Nanocellulose, March, 2013.

H. Other Publications

1. CIRCOT News Vol. 14(1) April – September 2011
2. CIRCOT News Vol. 14(2) October 2011 – March 2012
3. CIRCOT News Vol. 15(1) April to Sept. 2012
4. CIRCOT Leaflet No.70 – Self Grooving Rubber Roller (An alternative to Chrome Composite Leather Roller) & Modified Double Roller Gin with Rubber Roller (September, 2012)
5. CIRCOT Leaflet No. 71 – Cotton Bale Tagging using Barcode and RFID Technologies (Sept., 2012)
6. Business Incubation Facility for Agropreneurs (December 2012)
7. NanoCellulose Production: Eco-friendly & Energy Efficient CIRCOT Technologies
8. CIRCOT Utility Card
9. Calendar 2013
10. Schedule of Fees for Tests
11. Shweta Sarinika , Issue no.31, April – September 2011
12. Shweta Sarinika Issue no.32, October 2011 – March 2012
13. Shweta Sarinika Issue no.33, April – September 2012

8
IRC, RAC and IMC Meetings

Institute Management Committee Meeting (IMC)

The Seventy-second and Seventy-third meeting of the Institute Management Committee were held on July 13, 2012 and March 22, 2013. Confirmation of the minutes of the previous meeting and action taken on the recommendations of the previous meeting were discussed in the meetings. The Heads of Divisions presented the progress of research made in the various core areas. The progress of works and report on the Official Language Implementation were discussed in the meeting.

Seventy-third IMC Meeting in Progress

Institute Research Council (IRC) Meeting

A Half-yearly IRC meeting was held on October 15 and 16, 2012 to discuss the progress of research during April – September 2012. The following two new projects were approved with suggestions/recommendations in the project proposals.

Core Area I: Improvement in Ginning of Cotton

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

Core Area II: Improvement and Quality Evaluation of Fibre, Yarn and Fabric

1. Development of High Performance Cotton Textiles by Electro Spraying / Spinning Technique

2. Improvement in Coconut Fibre Compatibility for Production of Superior Quality Fibre Reinforced Composites

Core Area IV: Utilisation of Cotton Plant Residues for Production of Value Added Products

Regeneration of discarded Polymerized frying oil and its Utilization

Research Advisory Committee (RAC) Meeting

The Nineteenth meeting of the Research Advisory Committee (RAC) was held on December 21 & 22, 2012. The Chairman Dr. R.P. Kachru and members Dr. K. K. Singh, ADG (PE), ICAR; Dr. K.R. Krishna Iyer, Former Director, CIRCOT; Dr. A.I. Wasif, Principle, DKTE, Ichalkaranji; CIRCOT IMC Members, Dr. Y.S. Nerkar, Former VC, MPKV, Rahuri; Shri Mani Chinnaswami, Managing Partner, Appachi Cotton Mills, Coimbatore and Dr. S.K. Chattopadhyay, Director, CIRCOT attended the meeting. Two institute publications titled, Cotton Bale Tagging Using Barcode and RFID Technologies and Business Incubation Facility for Agropreneurs, were released during the meeting. Further, the committee reviewed the research progress and gave recommendations on policy and research issues. Later, Dr. R.P. Kachru, Chairman, RAC delivered an informative lecture on 'Health Foods – Concept to Product.'

Dr. R.P.Kachru, Chairman, RAC, releasing the publication – Cotton Bale Tagging Using Barcode and RFID Technologies

Following major recommendations emerged from the RAC.

I. Policy Issues:

1. Appropriate Placement of Scientists

The discipline of Farm Machinery and Power (FMP) is more relevant to the R&D activities of GTC at Nagpur. Currently, all the three scientists belonging to this discipline are posted at CIRCOT, Mumbai. RAC suggests to review this issue and take appropriate action for their effective utilization.

2. Quality monitoring of seeds and varieties is a matter of concern

The issue was mentioned in the 18th RAC proceedings. However, SMD has pointed out that this issue is not under the mandate of CIRCOT.

The RAC, however, recommends once again that the matter may be diligently pursued. Director, CIRCOT may

seek views from the Director, CICR on 'Bt hybrid cottons developed by private seed companies and its release through ICAR-AICCIP channel and check-mechanism on the long term performance of already-released Bt Varieties'. Thereafter, CICR and CIRCOT may take up the matter with ICAR.

II. Research Issues:

1. The energy efficiency in Bale presses may be quantified in percentage terms. Also the economics may be worked out so that the ginning industry can make appropriate selection of the machine.
2. An early action is needed for commercialization of the moisture meter developed at GTC. It may be ensured that the cost advantage claimed in the prototype is comparable to the commercial model available in the market.
3. Although the use of Radio-Frequency Identification (RFID) technology in bale tagging is welcome, its adoption in the ginning sector as of now would be difficult due to lack of automation in baling. The Government Missions like the Technology Mission on Cotton (TMC) may educate and encourage the setting up of automated ginning units for effective implementation of this technology.
4. While commercializing the rubber roller technology, it may be ensured that CIRCOT's contribution is acknowledged appropriately, both in the modified machine and on the roller.
5. While designing new machines for extracting fibres from Banana Psuedostem project, the deficiencies in the existing machine may be duly kept in mind. RAC suggests to re examine the viability of the project.
6. In view of the interest shown by the Japanese investor in developing organic and environment friendly finishes for textiles, Shri Mani Chinnaswami, suggested seeking collaboration in Projects like, Fire Retardant Cotton Fabric using Herbal Extract and natural dyes, after ascertaining the market demand. RAC welcomed the initiative and suggested to go ahead with the collaboration.

Quinquennial Review Team (QRT)

A Quinquennial Review Team to review the work of the Institute for the period 01-01-2007 to 31-03-2012 submitted its report to the Council and was approved at the 225th Meeting of Governing Body of ICAR held on November 6, 2012. This was communicated to the Institute on January 11, 2013.

9
Participation of Personnels in Conferences and Seminars

Director, Scientists and Technical Personnel of CIRCOT participated in the following scientific/technical conferences and seminars besides attending meetings connected with the work of the Institute.

Sr. No.	Meetings / Conference / Seminar / Symposia etc.	Place	Date	Participant/s
1	All India Co-ordinated Cotton Improvement Project (AICCIP) Annual Group Meetings 2011-2012	Hyderabad	09-04-2012	Dr. A. J. Shaikh Dr. R. P. Nachane Er. Chitranayak Shri. R. K. Jadhav Shri. D. N. Moon
2	National Workshop on "Pollution Prevention Paradigm"	Noida,UP	11-05-2012	Dr. (Smt) Sujata Saxena
3	IBM Conference	Mumbai	01-06-2012	Shri D. R. Murthy
4	Seminar on Purification Media	Mumbai	12-06-2012	Smt. Veda Krishnan Dr. (Smt.) A. A. Kathe Smt. N.M. Ashtaputre Kum. C.P. D' Souza
5	International Conference on Bioscience and Bioengineering	Ghaziabad	06-07-2012 to 07-07-2012	Dr. (Smt.) A. A. Kathe
6	Challenges Facing Cotton Trade and Industry 2013	Coimbatore	01-09-2012	Dr. S. Venkatakrishnan
7	International Symposium on "Global Cotton Production Technologies *vis a vis* Climate Change"	Hisar	10-10-2012 to 12-10-2012	Er. Chitranayak Dr. (Smt.) Jyoti Nath Er. V. G. Arude Dr. S. K. Shukla Dr. Ravi Nagarkar Shri Manoj Ambare
8	Seminar on Convergence of Content and Technology in the Digital age	Mumbai	16-10-2012	Shri Deepak Meena Smt. Medha Kamble
9	3rd International Conference on Natural Polymers & Biomaterials (ICNP 2012)	Kerala	26-10-2012 to 28-10-2012	Dr. Kartick Kumar Samanta
10	Seminar on Cotton 2020-Roadmap for Sustainable Production	Bhatinda, Punjab	28-10-2012 to 29-10- 2012	Dr. S.K. Chattopadhyay

11	India Composite Summit 2012 Conference	Delhi	01-11-2012 to 03-11-2012	Er. G. Krishna Prasad
12	National Seminar on "Sports Textiles"	Mumbai	09-11-2012	Dr. R. Guruprasad Dr. Kartick Kumar Samanta
13	MAM-12: 6th International Symposium on Macro-and Supramolecular architectures and Materials with a Special Theme on Nanosystems and Applications	Coimbatore	21-11-2012 to 25-11-2012	Dr. N. Vigneshwaran Dr. S. Venkatakrishnan
14	International Conference on "Latest Developments in Vegetable Oil Processing"	Mumbai	23-11-2012 to 24-11-2012	Dr. (Smt.) Sudha Tiwari
15	10th International and 68th All India Textile Conference, Textile Association (India)	Mumbai	30-11-2012 to 01-12-2012	Dr. S. K. Chattopadhyay Dr. R.P. Nachane Dr. P.K. Mandhyan Shri R.K. Jadhav Smt. Bindu Venugopal
16	Texsummit – 2012	Mumbai	05-12-2012	Dr. (Smt) Sujata Saxena Dr. Kartick Kumar Samanta Er. A. Arputhraj
17	Sensitization meet of PME cell Incharge of ICAR Institutes	Karnal	7-12-2012	Dr. (Smt) Sujata Saxena
18	International Conference on Emerging Electronics	Mumbai	15-12-2012 to 17-12-2012	Er. Chitranayak
19	International Conference of Indian Society of Agricultural Statistics	New Delhi	18-12-2012 to 20-12-2012	Dr. Sundaramoorthy
20	NIABI-Mentorship programme organized at ICRISAT	Hyderabad	24-12-2012	Dr. N. Vigneshwaran
21	100th Indian Science Congress	Kolkata	03-01-2013 to 07-01-2013	Dr. Kartick Kumar Samanta
22	National Conference on Jute & Allied Fibres in Changing Times	Kolkata	03-01-2013 to 05-01-2013	Er. Santanu Basak

23	National Convention on Cotton "India Cotton: Gearing up for Global Leadership"	Surat	06-01-2013 to 08-01-2013	Dr. S.K. Chattopadhyay Dr. N. Vighneshwaran Er. Chitranayak Dr. R. Guruprasad Dr. Hamid Hasan
24	International Conference on Enhancing Health, Wellbeing and Sustainability, Opportunities, Challenges and Future Directions	Mumbai	10-01-2013 to 12-01-2013	Dr. Kartick Kumar Samanta Er. Santanu Basak
25	ICAR Chemists' Conclave	New Delhi	14-01-2013 to 15-01-2013	Dr. (Smt.) Sujata Saxena Dr. Virendra Prasad Er. A. Arputhraj Dr. Kartick Kumar Samanta Er. Santanu Basak
26	Annual Convention on Sustainable Agriculture and Food Security (SAFS) - 2013	Mumbai	18-01-2013 to 19-01-2013	Dr. V. Mageshwaran
27	47th Annual Convention of ISAE and International Symposium on "Bio-energy Challenges and Opportunities"	Hyderabad	28-01-2013 to 30-01-2013	Dr. P. G. Patil Er. V. G. Arude Dr. S. K. Shukla
28	*Sanyukta Kshetriya Rajbhasha Sammelan*	Ahmedabad	01-02-2013	Smt. Kiran Joshi
29	COIR Kerala 2013 and International Conference on Technology Upgradation and product Diversification	Alapuzhha, Kerala	01-02-2013 to 03-02-2013	Dr. S.K. Chattopadhyay Smt. Bindu Venugopal
30	7th Annual ISBA Conference	Bhubaneswar	07-02-2013	Dr. S.K. Chattopadhyay
31	XIth Agricultural Science Congress	Bhubaneswar	07-02-2013 to 09-02-2013	Dr. S.K. Chattopadhyay Er. Ashok K. Bharimalla
32	Seminar in Hindi: On Managing Organisational Change	Mumbai	15-02-2013	Smt. Kiran Joshi
33	National workshop on 'Foresight and Future pathways of Agricultural Research through involvement of Youth in India' at NASC Complex	New Delhi	01-03-2013 to 02-03-2013	Dr. N. Vigneshwaran

34	International Conference on Rubber and Rubber like Materials	Kharagpur	06-03-2013 to 09-03-2013	Dr. Kartick Kumar Samanta
35	International Conference on Recent Advances in Textile and Electrochemical Sciences	Karaikudi, Tamil Nadu	21-03-2013 to 23-03-2013	Er. A. Arputharaj

10

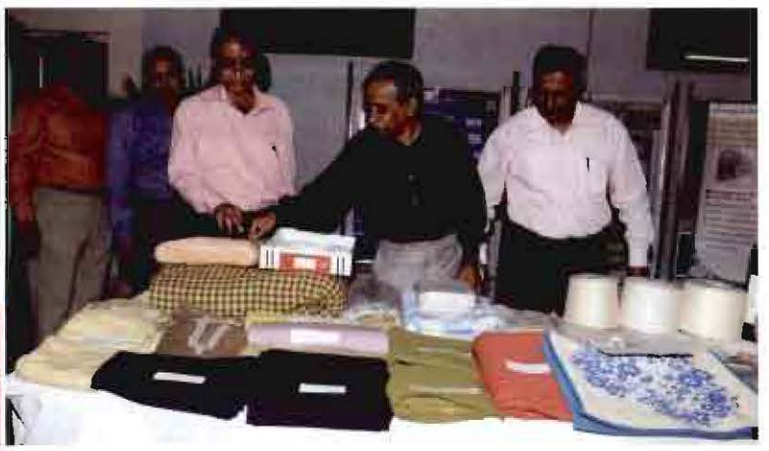
Events at CIRCOT

A. CIRCOT Foundation Day

The institute celebrated its 89th foundation day on December 4, 2012.

The day was celebrated by arranging a function for the staff to reminiscence about the journey of CIRCOT through nine decades. CIRCOT was honored to have Dr. R. Ramani, Director, Indian Institute of Natural Resins and Gums (IINRG), as the Chief Guest on this occasion. In his brief, Dr. Ramani complimented the Institute about it being one of the oldest under ICAR and appreciated the research work being done. He expressed his view that since CIRCOT Centenary is only 10 more years ahead, the Institute should start preparations for celebrating it on a grand scale. Dr. Ramani inaugurated the remodeled Nanotechnology Laboratory at CIRCOT and appreciated the institute's foray into the frontier areas of research like nanotechnology and plasma technology. Dr. S. Sreenivasan, former Director and the Guest of Honour on the occasion gave a nostalgic presentation titled, CIRCOT – A Panoramic View, a journey through nine decades. Many other retired personnel also attended the function.

An exhibition about research being done and achievements of the institute was organized for the students of schools and colleges in the vicinity of the Institute.



Dr. R. Ramani, Director, IINRG, Chief Guest at foundation day Celebration and viewing exhibition arranged

B. Interactive Meet of CIRCOT Scientists and Cotton Breeders of All India Coordinated Cotton Improvement Project (AICCIP)

An interactive meet of CIRCOT AICCIP team with cotton breeders of AICCIP was held on December 6, 2012 at Jubilee Hall. The meeting was presided by Dr. S. Sreenivasan, former Director, CIRCOT. Other dignitaries present were Dr. P. K. Chakraborthy, Principal Scientist and Head, Crop Improvement Division, CICR and Dr. A.J. Shaikh, Emeritus Scientist, CIRCOT. Dr. P.G. Patil (Head, Transfer of Technology Division) and Dr. R.P. Nachane (Head, Quality Evaluation and Improvement Division) represented CIRCOT. The interaction was to emphasize the relevance of CIRCOT in the AICCIP programme, and also to gather the views of the cotton breeders to further improve the significance of CIRCOT research, testing and analysis in AICCIP. The following views were highlighted from CIRCOT perspective for its improved participation in the AICCIP:

1. Role of CIRCOT in AICCIP should be of guiding rather than mere testing. Projections on industrial demand of various staple lengths of cotton should be provided by CIRCOT.
2. Industry norms and requirement projection for desi cotton should be provided by CIRCOT.
3. Dignitaries at the Interactive meet
4. As HVI mode of testing is now-a-days preferred by the industries, traders and exporters, there is need for gradual switch-over from ICC to HVI mode of testing of cotton fibre. To facilitate this transition and for comparison purpose, both the HVI and the ICC mode of testing should be done for some more time. It was suggested that samples received for micro-spinning or full spinning of pre-release culture/hybrid may be tested in both the HVI and the ICC mode.
4. Short fibre content (SFC) may be tested for those varieties that are due for release.
5. Single plant lint samples should be tested on Advanced Fibre Information System (AFIS).
6. Changes/Improvements should be made on the test data presentation format by CIRCOT to make the results more useful and meaningful.

Dignitaries at the Interactive meet

C. Sensitization Workshop about the ZTM-BPD Activities

A sensitization workshop about the ZTM-BPD activities was held at Dr. V. Sundaram Committee Room, CIRCOT on December 6, 2012. The workshop was conducted to discuss the plan of work for the extended period of the project and to create awareness among the newly constituted ZTM-BPD team. Shri Karrupanchetty, Chief Operating Officer, ABI-ICRISAT, Hyderabad, Dr. S. Sreenivasan, former Director, CIRCOT, Heads of Divisions of CIRCOT, In-charge of the six regional units of CIRCOT, CPIs & Co-PIs from headquarters and regional stations and the ZTM-BPD team of CIRCOT headquarters attended the meet. The newly appointed CPI of ZTM-BPDU, Er. Ashok Kumar Bharimalla informed about the extension of the project till March 2014. The newly constituted ZTM-BPD team was then introduced. The CPI informed about the integration of the ITMU, ZTM and BPD units at CIRCOT to a "single window system" for handling the technology management and intellectual property issues, as per the direction received from NAIP. The workshop in progress

Shri Karrupanchetty, Chief Operating Officer, ABI-ICRISAT, Hyderabad remarked that various problems faced by any BPD unit, like structural facility, policy matters, human resource, client intake, technology transfer and service, physical and financial performance should be clearly understood and addressed. He also gave several suggestions to improve the performance of ZTM-BPD. Recommendations on future activities to be undertaken by the CIRCOT ZTM-BPD were given by the experts.

The workshop in progress

In-house Lectures

1. Banana Fibre Extraction and Utilisation in Philippines by Dr. R.P. Nachane on July 6, 2012 – Impressions from his visit to Philiphines.
2. Global Food and Agri-Business Management Programme by Dr. P.G. Patil on July 6, 2012 – Impressions from his visit to Cornel University, NY, USA.
3. Infrared Thermography in Non-Destructive Testing and Fatigue Testing of Jute -Polypropylene Composite by Dr.-Ing. Debasish Banerjee, July 30, 2012.
4. Best Practices in Technology Commercialisation by Dr. N. Shanmugam on August 16, 2012 – Impressions from his visit to Michigan, USA for Technology Commercialization Workshop.
5. Finishing of Polyester with Silk Sericin by Shri K. Krishna Prasad, Scientist on August 25, 2012.
6. Fire Retardant Finish of Cotton Fabric by Herbal Extract by Shri Santanu Basak, Scientist on August 25, 2012.
7. Study of the Mechanical Properties of Natural Fibre and their Blend Reinforced Composites by Shri T. Senthilkumar, Scientist on September 29, 2012.
8. Evaluation of Top, Middle & Bottom Portion of a Jute Reed as Reinforcement for Unsaturated Polyester Resin by Shri Shekhar Das, Scientist on September 29, 2012.
9. Scientific Writing and Presentation by Shri Chitranayak on October 29, 2012 – Talk based on training received at NAARM.
10. Cotton Production and Technology in Egypt by Dr. Guruprasad on February 23, 2013 – Lecture based on his training at Egypt.

Guest Lectures

1. Dr. Anil Netravali, Professor of Fibre Science, Cornell University, New York, USA gave a lecture on Natural Fibre Reinforced Composite on December 17, 2012.
2. Dr. Anil Netravali, Professor of Fibre Science, Cornell University, New York, USA gave a lecture on Plasma Treatment of Textile on December 18, 2012.

Dr. Netravali explaining about research at Cornell University on NF Reinforced composites and Plasma treatment

3. Dr. Michael Van Waes, Li-Cor Biosciences, USA gave a lecture on Advancing Discovery with Near Infrared Imaging Specifically Focused to Protein Detection and Quantification with near Infrared Flurorescence Imaging on March 07, 2013.

Celebrations

Hindi Day Celebration

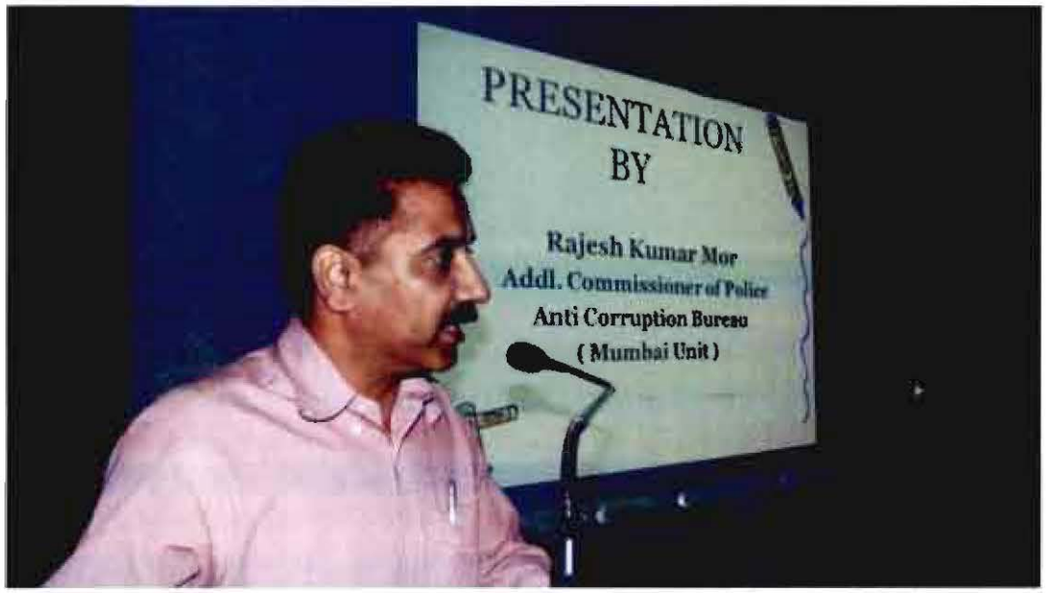
The official language Hindi celebrations were conducted for a fortnight starting from August 22, 2012. Shri Akshaya Jain, Dr. Rajnikant Mishra and Shri Dinesh Barwa, all eminent poets were the Chief Guests at the inaugural function. The guests appreciated the work carried out at CIRCOT in Hindi. The programme was telecast in Doordarshan's Sahayadri channel under the programme Aamchi Mumbai. From August 22 to September 14, various competitions in Hindi were conducted in which large number of staff members participated. On the concluding day of the celebration, Shri Aanand Singh from Aakashvani (All India Radio), Mumbai and Prof. Karuna Shankar Upadhyay, Dept. of Hindi, Mumbai University were the Chief Guests.

Dignitaries at the Official Language celebration

Shri Aanand Singh, Chief Guest giving a talk

- **Vigilance Awareness Week Celebration**

Vigilance Awareness Week was celebrated at the Institute from October 25 to November 3, 2012. Dr. S.K. Chattopadhyay, Director, CIRCOT administered the vigilance oath to the staff members on October 25. An essay competition on the topic, 'Transparency in Public Procurement' was held on October 30, 2012 in Hindi, Marathi and English. On the concluding day, Shri Rajesh Kumar Mor, IPS, Additional Commissioner of Police, Anti Corruption Bureau, Mumbai delivered a talk on the same topic and distributed the prizes to the winners of the essay competition, who are; In Hindi- 1st prize to Smt. K.R. Joshi and 2nd to Shri Anil Kumar Jeengar; In Marathi- 1st prize to Shri C.M. More, 2nd to Shri S.N. Bandre and Shri D.M. Raje; In English- 1st prize to Smt. Bindu Venugopal and 2nd to Shri Anand Jadhav.



Shri Rajesh Kumar Mor, IPS, Additional Commissioner of Police, Anti Corruption Bureau, Mumbai delivering the talk

- **Qaumi Ekta Week Celebration**

Qaumi Ekta Week was celebrated from November 19-23, 2012. Staff members were administrated the oath on Communal Harmony. An essay competition was organized during the week on the topic, Nation Building and Youth in Hindi, Marathi and English. Mr. Munaf Hakim, Chairman, State Minorities Commission, Govt. of Maharashtra was the Chief Guest on the concluding day, which was also observed as the Flag Day. In his address, Mr. Hakim stressed on the importance to have communal harmony for peace and progress in the country. Prizes were given to the winners of the essay competition by the Chief Guest. They are; In Hindi- 1st prize to Shri Anil Kumar Jeengar; In Marathi- 1st prize to Shri S.N. Bandre, 2nd to Shri C.M. More and consolation prize to Shri D.M. Raje; In English- 1st prize to Smt. Bindu Venugopal and 2nd to Dr. R. Guruprasad.

Mr. Munaf Hakim at the concluding function, Communal Harmony Week

The Chief Guest addressing the gathering after participating in the Flag Day on November 23, 2012

- **National Science Day Celebration**

The National Science Day was celebrated on February 28, 2013. A talk on 'The Role of Science and Technology in Society and Governance' by Dr. Arup Rakshit, Professor and Dean, R&D, Textile Manufacturing Department, VJTI was arranged at the Jubilee Hall, CIRCOT.

- **International Women's Day**

The institute celebrated the Women's Day on March 08, 2013, expressing solidarity with the theme communicated by the United Nations for year 2013, 'A Promise is a Promise: Time for Action to End Violence Against Women'. Smt. Pratima Havaldar, eminent Clinical Psychologist gave a talk on Time, Stress and Anger Management. A slide show on the life and times of the great ruler and social reformer of the Holkar dynasty of Indore, Punyashrlok Devi Ahilya Bai Holkar was presented by Shri Shreeram Shivdekar, retired civil engineer from BMC. Women staff members who won the prizes in the Inter Zonal Sports Meet held at IARI, New Delhi from January 18–21, 2013 were also felicitated during the occasion.

Dr. Rakshit speaking on Role of Science and Technology in Society and Governance

Smt. Pratima Havaldar, Clinical Psychologist delivering her talk on Women's Day

Director welcoming Shri Shreeram Shivdekar

11
Visitors to CIRCOT

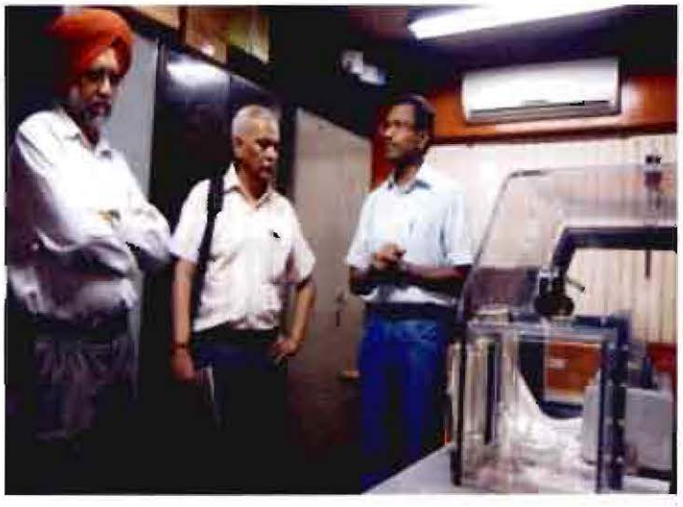
CIRCOT was honoured to host the following visitors this year.

1. Shri Paul Singh Sidhu, 11th Implementation Support Mission Team of the World Bank to review NAIP projects on June 6, 2012

2. Dr. A.P. Srivastava, National Coordinator, Component 3, NAIP on June 6, 2012.

Shri Paul Singh Sidhu

Dr. A.P. Srivastava



The two dignitaries visiting CIRCOT nanocellulose laboratory and going through the exhibition

3. 30 progressive farmers of Amreli, Gujarat visited CIRCOT Ginning Training Centre (GTC), Nagpur on September 12, 2012 under the Agricultural Growth of Rural India initiative.

4. 25 progressive farmers of Porbander, Gujarat visited CIRCOT GTC, Nagpur on September 20, 2012 under the Agricultural Growth of Rural India initiative.

5. Shri Tariq Anwar, Hon'ble Minister of State for Agriculture and Food Processing visited CIRCOT, Mumbai on November 12, 2012.

The Hon'ble MOS having interaction with scientists and later visiting the Mechanical Processing Division at CIRCOT

6. Dr. Anil Netravali, Professor of Fibre Science, Cornell University, New York, USA visited the research divisions at CIRCOT on December 17-18, 2012.

7. The 31 member Technical Assistance Programme (TAP) delegates from various countries of African continent visited the GTC-CIRCOT and CIRCOT facilities during the course of their training from January 13-25, 2013

TAP delegates at GTC, Nagpur and CIRCOT, Mumbai

8. Mr. Matthias Knappe, Programme Manager Cotton, Textiles and Clothing Sector Competitiveness, International Trade Centre, Geneva visited CIRCOT on February 21, 2013.

Mr. Matthias Knappe having an interaction with Director and other senior personnel

9. A team of 23 Afghan Delegates comprising farmers and traders visited on March 16, 2013.

The Afghan delegation visiting CIRCOT and curious observation of the exhibition on CIRCOT developed technologies

10. 40 progressive farmers of Jabalpur (M.P.), associated with Nanaji Deshmukh Vetinary Science University (NDVSU), visited CIRCOT-GTC, Nagpur on March 25, 2013

11. Dr. Michael Van Waes, from Li-Cor Biosciences, USA visited on March 7, 2013.

12

Infrastructural Facilities

CIRCOT Library

CIRCOT Library has been progressively upgrading its holdings of books, journals, electronic resources to provide state-of-the-art information related to research work and projects undertaken by the institute. It contains the latest information on Cotton fibre & fabrics testing and finishing, cellulose composites, non-woven & technical textiles in terms of books, journals and online databases. Good information on allied patents, standards and technical manuals are also available.

A significant achievement for CIRCOT library this year is acquiring the archives of renowned refereed textile journals, viz: Journal of The Textile Institute (JTI) and Textile Progress. CIRCOT now holds the archives of JTI from year 1910 to 1996 and of Textile Progress from 1969 to 1996. Other notable achievement is subscribing to the standard portal *Indiastat.com* which contains statistical database of various disciplines. Further, the library subscribed to 17 Foreign and 17 Indian journals with print as well as online access. 121 books have been purchased utilizing the Institute and project funds. The Library has renewed its Annual Institutional membership of ASTM and AATCC associations and annual subscription to online databases such as BIS standards (Textiles), ASTM standards (Textiles), AATCC Test Methods, World Textile Abstracts and Total Patents. An amount of Rs. 40,39,936/- has been utilized from the Institute Plan funds and various externally aided project funds operating in the Institute.

The CIRCOT Library books holding stands at an impressive 7557 as on March 31, 2013.

Besides, being a member of CeRA consortia of ICAR, the library can access full text research articles of more than 2000 international journals and annual reviews at *http://www.cera.jccc.in.*

Procurement of Equipments

The following major instruments were procured:

1. Laboratory Model Compact Ring Spinning Machine
2. Horizontal Tensile Strength Tester for paper
3. Temperature Controlled Orbital Shaker
4. KV Generator
5. Precision Balance
6. Electronic Thickness Micrometer
7. Turbidity Meter
8. Digital Copier Machine

13

PERSONNEL

LIST OF STAFF AT THE HEADQUARTERS

Scientific Personnel

Director (Acting)

Dr. S.K. Chattopadhyay, M.Tech. (Text.Engg.), Ph.D. (Tech), F.T.A., C.Engg., F.I.E., C.Text., F.T.I. (Manchester)

Principal Scientist & Head of Division

Dr. P.G. Patil, M.Tech. (Post Harvest Engg.), Ph.D. (Agriculture Structure & Process Engineering)

Principal Scientist

Shri R.M. Gurjar, M.Sc. (Textile Chemistry)

Senior Scientist

1. Dr. (Smt.) Sujata Saxena, M.Sc., Ph.D. (Organic Chemistry)
2. Dr. N. Shanmugam, M.Tech., MIE, D.T.T., C.Eng., Ph.D. (Tech) (Textile Manufacture)
3. Dr. N. Vigneshwaran, M.Sc. (Agri.), M.B.A., Ph.D. (Agricultural Microbiology)

Scientist

1. Shri Vishnu Govind Arude, M. Tech. (Farm Machinery & Power)
2. Shri Chitranayak, AMIETE., M.Tech. (Electronics & Instrumentation)
3. Shri Ashok Kumar Bharimalla, M.Tech. (Farm Machinery & Power)
4. Dr. Virendra Prasad, M.Sc., Ph.D. (Organic Chemistry)
5. Dr. C. Sundaramoorthy, M.Sc., Ph.D. (Agricultural Economics)
6. Shri P. S. Deshmukh M. Tech. (Farm Machinery and Power)
7. Dr. V. Mageshwaran, M.Sc., Ph.D. (Agricultural Microbiology)
8. Shri Manik Bhowmik, M.Tech. (Textile Manufacture)
9. Shri A. Arputharaj, M.Sc., M.Tech. (Textile Chemistry)
10. Dr. Kartick Kumar Samanta, M.Tech., Ph.D. (Textile Chemistry)
11. Dr. R. Guruprasad, M.Tech., Ph.D. (Textile Manufacture)
12. Shri G.T.V. Prabu, M.Tech. (Textile Manufacture)
13. Shri G. Krishna Prasad, M.Tech. (Textile Manufacture)
14. Shri T. Senthilkumar, M.Tech. (Textile Manufacture)
15. Shri Shekhar Das, M.Tech. (Textile Manufacture)
16. Shri Santanu Basak, M.Tech. (Textile Chemistry)

Technical Personnel

Technical Officer T-9

Smt. N.D. Nachane, B.Sc.

Technical Officer T (7–8)

1. Dr. (Smt.) A.A. Kathe, M.Sc., Ph.D.
2. Shri S. Sekar, B.Sc.
3. Dr. S.J. Guhagarkar, M.Sc., Ph.D.
4. Shri D. Radhakrishnamurthy, M.Sc., M.Phil.
5. Dr. P.K. Mandhyan, M.Sc., A.T.A., Ph.D.
6. Dr. R.D. Nagarkar, M.Sc., Ph.D.
7. Dr. (Smt.) Sheela Raj, M.Sc., Ph.D.
8. Shri M. Mohan, M.Sc., Dip.J.
9. Shri R.S. Prabhudesai, M.Sc., D.C.M.
10. Shri G.B. Hadge, M.Sc.
11. Dr. M.V. Vivekanandan, M.Sc., Ph.D.
12. Shri B.R. Pawar, M. Sc., LL.M.
13. Smt. N.M. Ashtaputre, M.Sc.
14. Shri R.K. Jadhav, M.Sc.

Technical Officer T-6

1. Shri R.S. Pathare, B.Sc.
2. Dr. (Smt.) Sudha Tiwari, B.Sc., Ph.D.
3. Shri S. Vancheswaran, B.Sc.
4. Shri T. Venugopal, B.E.
5. Shri S.M. Gogate, B.Sc.
6. Shri S. Banerjee, M.Sc.
7. Shri C.M. More, M.Sc.
8. Shri R.R. Chhagani, M.Sc.
9. Shri H.S. Koli, M.Sc., LL.B.
10. Shri D.N. Moon, B.Sc.
11. Dr. (Smt.) S.R. Kawlekar, M.Sc., P.I.M.R., Ph.D.
12. Dr. R.R. Mahangade, M.Sc., Ph.D.
13. Smt. P.S. Nirali, M.Sc.
14. Shri S.V. Kokane, M.A.
15. Shri P.N. Sahane, D.I.F.T.
16. Smt. Binu Sunil, M.Sc.

Technical Officer T-5

1. Shri D.U. Kamble, B.Sc.
2. Smt. Bindu Venugopal, B.Sc.
3. Smt. N.A. Sonkusle, B.Sc.
4. Smt. C.D. Prabha, M.Sc.
5. Kum. C.P. D'Souza, M.Sc.
6. Smt. K.R. Joshi, M.A. (Hindi Translator)
7. Shri R.S. Narkar, B.Sc., D.C.I.A.
8. Smt. P.R. Mhatre, B.Sc., M.Lib.
9. Shri V.D. Kalsekar, B.Sc.

Senior Technical Assistant T-4

1. Shri C.V. Shivgan, H.S.C., Cert. Wireman, Cert. Electrician, Cert. Elec. Supr. (PWD)., Cert. M. & A.W.(Technician)
2. Shri N.D. Kambli, M.Sc.
3. Shri M.G. Ambare, M.Sc.
4. Shri S. N. Patil, B.E.
5. Shri D.M. Correia, S.S.C., I.T.I., N.C.T.V.T. (Mechanic)

Technical Assistant T-3

1. Smt. H.R. Pednekar, B.A., B.Lib.
2. Shri R.P. Kadam, B.Sc.
3. Shri B.R. Jadhav
4. Shri A.R. Bane, Cert. Cot. Spin.
5. Smt. M.P. Kamble, B.A., M.Lib.
6. Shri A.R. Jadhav, B.Sc.
7. Shri Deepak Meena, B.A., M.Lib., M. Phil., PGDCA
8. Shri Krishna Bara, D.H.T.

Technician T-1-3

1. Shri M.Y. Chandanshive
2. Shri S.M. Sawant
3. Shri D.A. Salaskar
4. Shri S.K. Parab, Cert. Cot. Spin.

Technician T-2

1. Shri D.M. Raje
2. Shri R.R. Gosai
3. Shri N.K. Shaikh
4. Shri Mahabir Singh
5. Shri S.V. Kokane
6. Shri M.M. Kadam
7. Shri S.G. Phalke

Technician T-1

1. Shri D.G. Gole
2. Shri D.J. Dhodia
3. Shri Yogesh Nagpure

Administrative Personnel

Administrative Officer
Shri Sunil Kumar, B.A. (Hons.)

Assistant Finance and Accounts Officer
Shri S.V. Kasabe, B.Com, L.L.B.

Assistant Administrative Officers

1. Shri S.N. Salve
2. Smt. S. Koshy, B.Com.
3. Shri D.G. Kulkarni
4. Smt. V.V. Desai
5. Smt. T.P. Mokal, M.A.

Private Secretary
Shri Venu Thanikal

Jr. Accounts Officer
Shri J.R. Mangale, B.Com.

Assistant

1. Smt. S.M. Desai
2. Shri A.P. Natu
3. Smt. J.J. Karanjavkar
4. Shri K. Parleshwar
5. Smt. V.V. Janaskar, B.Com., M.A.
6. Shri R.K. Pallewad, B.A.
7. Smt. S.R. Shirsat, B.A.
8. Shri N.V. Kambli
9. Smt. N.M. Deshmukh, M.A., LL.B.
10. Shri S.D. Ambolkar

Personal Assistant

1. Smt. S.D. Dudam, M.A.
2. Smt. T.T. D'Souza

Stenographer Gr. III

1. Smt. U.N. Bhandari
2. Smt. R.R. Tawde, B.Com.
3. Smt. Viniya Rajesh Naik, B.A.

Upper Division Clerk

1. Shri P.V. Jadhav
2. Smt. S.G. Parab, B.A. (Sociology), B.A. (Hindi)
3. Smt. S.P. Paiyala
4. Smt. J.R. Chavkute
5. Shri V.M. Sable
6. Smt. B.D. Kherodkar
7. Shri S.S. Angane
8. Shri A.R. Gujar

Lower Division Clerk

1. Shri T. D. Dhamange, B. Com.
2. Shri S. N. Bandre
3. Smt. V. N. Walzade, B. A. (Telephone Operator)

Skilled Support Staff

1. Shri M.Z. Rathi
2. Shri M.B. Gurave
3. Shri B.R. Satam
4. Shri D.M. Chougule
5. Shri S.D. Gurav
6. Shri M.K. Ghadge
7. Shri D.B. Temgire
8. Shri C.S. Salvi
9. Shri K.T. Mahida
10. Shri M.M. Katpara
11. Shri M.A.A. Rashid
12. Shri G.N. Mayawanshi
13. Shri H.B. Vesmiya
14. Shri M.J. Sumra
15. Shri S.K. Bobate
16. Shri P.P. Patil
17. Shri R.G. Tak
18. Shri R.P. Karkate
19. Shri C.D. Acharekar
20. Shri M.K. Prabhulkar
21. Shri J.D. Sakpal
22. Shri V. Murugan
23. Shri S.D. Magar
24. Shri S.B. Worlikar
25. Shri S.R. Tondse
26. Shri V.B. Poojari
27. Shri M.N. Kamble
28. Shri S.S. Surkule
29. Shri S.P. Naik
30. Smt. Kamala Murugan
31. Shri D.K. Kasar
32. Shri S.R. Tondse
33. Shri D.R. Gawde
34. Shri S.M. Chandanshive
35. Shri P.E. Gurav
36. Shri Mahesh C. Solanki

LIST OF STAFF AT THE REGIONAL QUALITY EVALUATION UNITS

COIMBATORE

Technical Officer T-(7-8)	: Dr. S. Venkatakrishnan, M.Sc., Ph.D., A.T.A., F.T.A.
Technical Officer T-6	: Shri K. Thiagarajan, M.Sc.
Technical Officer T- 5	: Shri M. Bhaskar, Dip. Ref. & Air-Cond.

DHARWAD

Technical Officer T-6	: Shri K. Narayanan, B.Sc.
Technical Assistant T-4	: Smt. V.G. Udikeri, B.Sc.
Skilled Support Staff	: Shri C.J. Bagalkoti : Shri A.F. Gudadur

GUNTUR

Technical Officer T-(7-8)	: Shri S. Mukundan, M.Sc.
Technician T-1	: Shri Vijay Kumar Sutar
Skilled Support Staff	: Shri V. Subbaiah

NAGPUR

Sr. Scientist	: Dr. (Smt.) Jyoti M. Nath, M.Sc., Ph.D. (Electronics & Instrumentation)
Scientist	: Dr. Sujeet Kumar Shukla, M.Tech., Ph.D. (Mechanical Engineering)
Technical Officer T-(7-8)	: Shri V.M. Kulmethe, B.Sc. : Shri N.V. Bansode, M.Sc.
Technical Officer T-6	: Shri V.L. Rangari, M.Sc. : Shri U.D. Devikar, M.Sc. : Shri S.L. Bhanuse, B.Sc. : Shri R. G. Dhakate, B.Sc. : Shri S.N. Hedau, B.Sc.
Technical Assistant T-4	: Shri B.V. Shirsath, B.A., I.T.I.
Technician T-1-3	: Shri C.L. Mundale
Technician T-2	: Shri P.S. Panchbudhe, B.A.
Technician T-1	: Shri Umrao Meena
Assistant Administrative Officer	: Shri Yogesh Ram Pathare, M.B.A.

Assistant	: Shri S.A. Telpande, M.Com.
Stenographer (Gr. III)	: Shri R.D. Shambharkar, M.A.
Upper Division Clerk	: Shri B.D. Dhengale
Lower Division Clerk	: Shri R.G. Matel
Skilled Support Staff	: Shri M.P. Tohokar
	: Shri A.R. Chutale
	: Shri J.P. Patel
	: Shri R.B. Kautkar
	: Shri R.C. Rokde
	: Shri R.S. Umare

SIRSA

Technical Officer T-(7-8)	: Dr. Hamid Hasan, M.Sc., Ph.D.
Technical Officer T-6	: Dr. Jal Singh, M.Sc., Ph.D.
Skilled Support Staff	: Shri Satyanarayan Gope

SURAT

Technical Officer T-6	: Shri G.G. Mistry, B.Sc.
	: Shri M.B. Patel, B.Sc., L.L.B.
Skilled Support Staff	: Shri M.G. Sosa

DURING YEAR 2012-13

A. Promotions

Scientist

Dr. S.B. Jadhav, Sr. Scientist (now retired) got promoted to Principal Scientist through Revised Career Advancement Scheme w.e.f. 01-01-2009.

Technical

On the recommendations of the Assessment Committee the following staff members were promoted to the next higher scale.

S. No.	Name	Post to which Promoted	Effective Date of Promotion
1.	Smt. N.D. Nachane	Technical Officer T-9	01-01-2011
2.	Smt. N.M Ashtaputre	Technical Officer T (7-8)	01-01-2011
3.	Shri M.V. Vivekanandan	Technical Officer T (7-8)	01-01-2010
4.	Shri G.B. Hadge	Technical Officer T (7-8)	01-01-2010
5.	Shri R.S. Prabhudesai	Technical Officer T (7-8)	01-01-2010
6.	Shri B.R. Pawar	Technical Officer T (7-8)	10-07-2010
7.	Shri C.M. More	Technical Officer T-6	01-01-2006
8.	Shri Sanwarlal Saini	Technician T-2	19-10-2009
9.	Smt. K.R. Joshi	Technical Officer T-5	29-06-2008
10.	Shri V.D. Kalsekar	Technical Officer T-5	29-04-2011
11.	Shri D.M. Correia	Senior Technical Assistant T-4	18-09-2011
12.	Shri M. Bhaskar	Technical Officer T-5	21-09-2011
13.	Shri M.M. Kadam	Technician T-2	18-10-2011
14.	Shri S.G. Phalke	Technician T-2	18-10-2011
15.	Smt. Binu Sunil	Technical Officer T-6	27-10-2011
16.	Shri R. G. Dhakate	Technical Officer T-6	01-01-2012
17.	Shri S.N. Hedau	Technical Officer T-6	23-03-2012
18.	Shri M.B. Patel	Technical Officer T-6	01-01-2013

Administrative

On the recommendations of the Departmental Promotion Committee the following were promoted to the next higher scale.

S. No.	Name	Post to which Promoted	Effective Date of Promotion
1	Smt. V.V. Desai	Assistant Administrative Officer	02-07-2012
2	Smt. T.P. Mokal	Assistant Administrative Officer	02-07-2012

B. Training Programmes attended by staff

Sl. No.	Name of the Training Programme	Period and Place	Participant (s)
1	Science & Technologies for Rural Societies	20.08.2012 to 31.08.2012 Lal Bahadur Shastri National Academy of Administration, Mussoorie, Uttarakhand	Dr. Hamid Hasan
2	Handling of CAT Cases	03.10.12 to 05.10.12, ISTM, New Delhi	Smt. Sujata Koshy Smt. T.P. Mokal
3	Nonwoven Training Course	01.11.2012 to 02.11.2012 INDA, Mumbai	Shri V.G. Arude
4	SAS an Overview	13.1.2013 to 15.01.2013 CIFE, Mumbai	Shri Chitranayak
5	Testing and Calibration of Laboratories and Internal Audit	15.01.2013 to 18.01.2013 IDEMI, Mumbai	Shri G.B. Hadge Dr. (Smt.) Sheela Raj Shri S. Banerjee
6	Lab Quality Management System and Internal Audit as	15.01.2013 to 18.01.2013 Indian Institute of Quality Management (IIQM), Jaipur	Dr. Hamid Hasan
7	AATCC-ASTM Training Programme	17.01.2013 to 19.01.2013 Intertek, Mumbai	Shri R.R. Chhagani
8	Workshop for Finance Officers of ICAR Institutes	21.01.2013 CIFE, Mumbai	Shri S.V. Kasabe Shri J.R. Mangale
9	Researchers Training on SAS - Data Reduction and Multivariate Analysis	11.02.2013 to 16.02.2013 CIFE, Mumbai	Shri Manik Bhowmik
10	Workshop on fixation of Payment	18.03.2013 to 20.03.2013 ISTN, New Delhi	Shri J.R. Mangale

C. Deputation Abroad

Sr. No	Name of the Programme	Period & Place	Participant
1.	Technology Commercialization Workshop	08.07.2012 to 13.07.2012 Michigan, USA	Dr. N. Shanmugam
2.	Cotton Processing for Fine Quality Yarns	15.10.2012 to 28.10.2012 Cotton Research Institute, Giza, Egypt	Dr. R. Guruprasad
3.	Cotton Ginning	15.10.2012 to 05.11.2012 Cotton Research Institute, Giza, Egypt	Dr. S.K. Shukla

D. Achievements in Sports

- **ICAR Inter-Institutional Sports Tournament**

The Institute participated in the ICAR Western Zone Sports Meet at Central Camel Research Institute, Bikaner from February 27–March 2, 2013. The personnel who were winners in various tournaments are:

Name	Event	Winners
Smt. S.P. Paiyala	Carom	First
Smt. K.R. Joshi	Chess	First
Smt. S.P. Paiyala	Table Tennis (Singles & Doubles)	First
Smt S.K. Parab	Table Tennis (Doubles)	First
Shri Yogesh Nagpure	1500 M running	Second

- Smt. T.T. D'Souza, Personal Assistant won gold medal in 3000 m running, 3000 m walking and 400 m running in the 3rd Traingular Masters Athletics Championship 2013, organized on January 25, 2013 at Kandivali Poinsur Gymkhana and completed the Half Marathon (21 Kms.) held on October 14, 2012 and March 10, 2013 at the 2nd Vasai-Virar Mayor's Marathon, Virar and DNA Womens Day Marathon, Bandra-Kurla Complex, Mumbai respectively.

E. Retirements

Scientific

Dr. A.J. Shaikh, Director, retired on May 31, 2012.

Dr. R.P. Nachane, Principal Scientist and Head, QEID, retired on December 31, 2012.

Technical

Shri M.B. Chandanshive, Technical Assistant T-3, retired on May 31, 2012.

Smt. K.K. Kale, Technical Officer T-5, retired on June 30, 2012.

Shri B.K. Sawant, Technician T-1-3, retired on June 30, 2012.

Shri D.L. Upadhye, Technical Officer T-5, retired on January 31, 2013.

Administration

Smt. T. Padmavathi, Administrative Officer, retired on May 31, 2012.

Shri A.B. Dalvi, Assistant Administrative Officer, retired on June 30, 2012.

Skilled Supporting

Smt. B.R. Piwal, Skilled Supporting Staff, TTD, retired on August 31, 2012.

Shri N.J. Kharat, Skilled Supporting Staff, QEID, retired on November 30, 2012.

F. Transfer

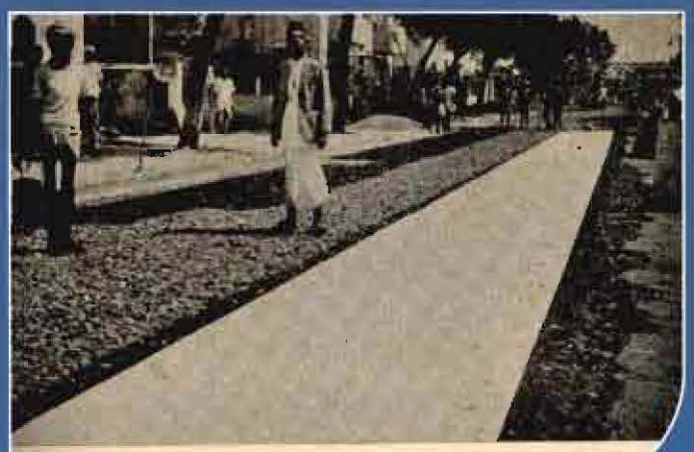
- Shri Achchhelal Yadav, Scientist was transferred from CIRCOT, Mumbai to IARI, New Delhi w.e.f. 21.05.2012.
- Dr. Matish Chandra, Technical Officer T (7-8) was transferred from CIRCOT, Mumbai to Central Soil and Water Conservation Research and Training Institute, Dehradun w.e.f. 11.05.2012.
- Shri Sunil Kumar, Administrative Officer was transferred from CIFE, Mumbai to CIRCOT, Mumbai w.e.f. 01.06.2012.
- Smt. Veda Krishnan, Scientist was transferred from CIRCOT, Mumbai to IARI, New Delhi, w.e.f. 04.10.2012.

G. Resignation

- Dr. Debasis Banerjee, Scientist resigned on 27-11-2012.

H. Obituary

- Shri J.I. Parmar, Assistant, QEID Unit, Sirsa, expired on November 14, 2012.
- Shri O.T. Thapa, Skilled Supporting Staff, Headquarters, Mumbai expired on January 19, 2013.



LAYING OF THE FIRST COTTON ROAD

भाकृअनुप
ICAR

हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

Agrisearch with a human touch