ANNUAL REPORT
2017-18

ICAR-NATIONAL INSTITUTE OF RESEARCH ON JUTE AND ALLIED FIBRE TECHNOLOGY

An ISO 9001-2015 Certified Institution

Annual Report
2017 - 2018

ICAR - National Institute of Research on Jute and Allied Fibre Technology
Indian Council of Agricultural Research
(An ISO 9001: 2015 certified institution)
12, Regent Park, Kolkata-700 040

राष्ट्रीय पटसन एवं समवर्गी रेशा प्रौद्योगिकी अनुसंधान संस्थान
भारतीय कृषि अनुसंधान परिषद
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(An ISO 9001: 2015 certified institution)

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FOREWORD

Indian government is committed to doubling farmers' income by 2022 in order to enrich their life with happiness and prosperity. To implement this strategy, Government aims to shift the priorities from production-led to income-led strategy. To achieve these objectives in jute sector, value addition through product diversification will play a major role.

Market Driven Innovation is another pathway for fulfilling the objectives and it will be implemented through the integrated value chains that connect fibre cultivators to marketing people and provide better remuneration to all stakeholders, across the value chain particularly farmers and entrepreneurs. To initiate this movement, Institute has organised a National Seminar on "Market Driven Innovations in Natural Fibres" during February 22-23, 2018 in collaboration with The Indian Natural Fibre Society (TINFS), National Jute Board (NJB) and National Bank for Agriculture and Rural Development (NABARD). Eminent researchers and academicians from all over India have participated and chalked out the strategies to meet the objectives.

India is the largest jute producing as well as consuming country and it accounts for about 60% of the world' jute production. Other than conventional products like hessian and sacking, jute is also used to develop diversified products. The export of jute products fetched Rs. 1892 Crores during 2015-16 in comparison to Rs. 1814 crores during 2014-15. It is a good indication that the exports of JDPs are in the right track.

During this period, institute have conducted sixteen frontline demonstration on Jute Power Ribboner, Accelerated retting on Jute and Mesta plant in different states of the eastern regions of our country; eight exhibitions in different meetings ; conducted one short course; three National level training programs sponsored by National Food Security Mission (NFSM); ten self-sponsored training program; seven externally sponsored training programs; three training programs on JDP in jute growing areas; one workshop on yak hair; one Technology Demonstration Mela and one scientists-farmers interface for the benefit of jute stakeholders.

One of the Institute's facilitated Start-up "Fulia Women and Youth Welfare Society" was selected for participation in Festival of Innovation and Entrepreneurship (FINE) at The President of India House campus, New Delhi during March 19-23, 2018 and got appreciation from the organisers.

It is my pleasure to share that institute got ISO 9001-2015 certification in this year. Institute is constantly working to develop the required technologies for the economic upliftment of stakeholders. I hope the Research and Developmental outputs combined with extension services will play a major role in doubling the farmers' income in the stipulated period.

I appreciate the efforts taken by the editorial team for bringing out this annual report.

Dr. Alok Nath Roy
Director

GLIMPSE OF 2017-18

ICAR-NIRJAFT is a premier R & D institute for developing processes and technologies on post harvest processing on jute and allied fibres. Over the years, institute has developed the following technologies to cater the need of the stakeholders. Among them, some have potential for commercialisation to enhance the remuneration of entrepreneurs, industries and farmers. Utilisation of agro-waste, advanced fibre extraction method, fibre and fabric evaluation, utilisation of lesser known fibres, processing for new/eco-friendly products and conductive polymer composites, functional finishing, sustainable chemical processing, eco-friendly dyes have been addressed by the developed technologies.

New Products / Process / Machine / Instrument / Technology Developed

- New grading system for Mesta and Bimli Grading System
- Electronic Fibre Bundle Strength tester, Electronic Fibre Fineness Meter and Electronic Colour and Lustre Meter for Ramie , Sunnhemp , Sisal and Flax fibre.
- Grading systems of Ramie, Flax, Sunnhemp and Sisal fibres
- Process to develop functional finished (flame retardant & UV-Protection) union fabrics from cotton yarn and jute /banana blended yarn
- Process to remove pesticide from effluent and removal of heavy metals from water by activated carbon
- Methodology to develop jute: polyaniline based conductive polymer composite for Electro Magnetic Interference Shield
- Jacket, overcoat and shawl using dyed and un-dyed jute/yak fibre blended yarns.
- Flame retardant jute blended textiles using Banana Pseudo Stem extract
- Recipe for accelerated retting of jute plant using desired ingredients and carrier materials
- Chitosan: Citronella oil and Chitosan : Jasmine oil based microcapsule for aroma finishing of jute textiles
- Eco-friendly oxidative bleaching of jute fibre using per acetic acid
- Jute based sound absorption material
- Methodology to extract alpha cellulose from jute caddies and jute sticks
- Improved Pineapple leaf fibre extractor
- Dyeing of coconut fibre with different class of dyes
- Hydrogen peroxide bleaching recipe for coconut fibre

Patents

- Granted = 04
- Filed = 03

Training / Workshop/ Extension activities

- Exposure visit to institute = 06
- Externally funded trainings = 07
- Field level demonstrations = 16
- ICAR Sponsored Short Course = 01
- In-house seminar = 08
- NFSM sponsored training programs = 03
- Participation in exhibition = 08
- Scientists-Farmers interface = 01
- Self-sponsored training programs = 10
- Training programs on JDP = 03
- Workshop on Yak hair = 01


BSCIC

BSCIC

CERTIFICATE OF REGISTRATION

QUALITY MANAGEMENT SYSTEM

This is to certify that

ICAR - NATIONAL INSTITUTE OF RESEARCH ON JUTE AND ALLIED FIBRE TECHNOLOGY

12, REGENT PARK, KOLKATA - 700 040
WEST BENGAL, INDIA

ISO 9001:2015

Undertaking Basic and Technological Research on Jute and Allied Fibres, Development of Value Added Products, Quality Assessment, Skill Development and Dissemination of Technologies

Institute activities

- Honourable Prime Minister Shri. Narendra Modi was felicitated by Shri. Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' welfare with a *jute/yak blended shawl* on February 19, 2018.
- 80th Foundation Day of the institute was celebrated on January 3, 2018 and foundation lecture delivered by Dr. Nawab Ali, former DDG (Eng), ICAR.
- Institute executed all works as per the norms of ISO 9001:2008 and it is recently certified for ISO 9001:2015.
- Arranged to show Live telecast of *Honourable Prime Minister of India address* to the farmers in Krishi Unnati Mela 2018 at IARI, New Delhi on March 17, 2018
- *Shri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' Welfare*, visited the institute on June 13, 2017
- Institute's facilitated Start-up "*Fulia Women and Youth Welfare Society*" has participated in Festival of Innovation and Entrepreneurship (FINE) at The President of India House, New Delhi during March 19-23, 2018
- Independence day and Republic day were celebrated in the Institute Campus.
- Two NITI meeting , One RAC meeting, one IMC Meeting and three QRT Meetings were conducted
- Seven programs under MGMG were organised at different adopted villages of West Bengal
- Two days National Seminar on "*Market Driven Innovations in Natural Fibres*" was organized by TINFS in collaboration with the ICAR-NIRJAFT, NJB and NABARD during February 22-23, 2018.

- ICAR-Sponsored Short Course on "*Recent Advances in Processing Technologies for Value Addition of Jute and Allied Fibers*" organized during December 11-20, 2017.
- ITMU conducted two ITMC meetings on December 14, 2017 and March 23, 2018 respectively and three patents were filed.
- Institute observed the "*Agriculture Education Day 2017*" on December 4, 2017.
- *Technology and Machinery Demonstration Mela 2018* organised on February 17, 2018 at institute' campus.
- One-day *Awareness Workshop cum IPR Clinic* was organized on November 18, 2017
- Celebrated the *Swachh Bharat Pakhwada* during May 16-31, 2017 and *Swachhta Hi Sewa* during September 15 to October 2, 2017.
- International Yoga day celebrated on June 21, 2017
- Institute observed the *Vigilance Awareness Week* during October 30 to November 5, 2017
- *World Soil Day* was celebrated on December 5, 2017 in Babpur village, Barasat-1, North 24-Parganas, West Bengal.
- Organized a *Brainstorming Workshop on Sisal Grading and Electronic Instrumentation* on August 25, 2017 at Sisal Research Station, Bamra, Odisha.
- Conducted three NFSM sponsored training programs on "*Production and retting technology of Jute/Mesta/Ramie/Sunnhemp including other related aspects*" on July 17-19, July 24-26, and August 1-3, 2017 respectively.
- Official Language (Hindi) Implementation Committee meeting for the four quarters were held on 21.06.2017, 22.07.2017, 14.12.2017 and 24.03.2018 respectively
- Four Hindi Workshops were organised on June 24, 2017; August 19, 2017; December 23, 2017 and March 24, 2018 respectively
- Hindi training through a video conferencing in collaboration with Central Hindi Training Institute, New Delhi on July 13, 2017
- Hindi fortnight was celebrated during September 1-15, 2017 with the arrangement different competition among staff members
- "*Parangat*" Training for 22 staff members was organized from July, 2017 to November, 2017.
- Basic Training Programme for working in Hindi on Computer for 7 staff members was organised during July 17-21, 2017.
- "*Praveen*" Training for 09 staff members was organised from January-May, 2018.
- Eight in-house seminar lectures were organised
- Ten self-sponsored training and seven externally funded training programs were conducted
- Institute participated and displayed the R&D products in eight different Exhibitions / Mela.
- The institute budget was ₹ 21,60,00,000/= out of which the actual expenditure was ₹ 20,83,48,184/= (96.5% utilisation).
- Resource Generation of the institute was ₹ 31,45,455/=.

Awards

- Best Paper / Poster = 03
- Appreciation = 03
- Team Award = 01
- Commendation Medal = 01

Publications

- Research Papers = 39
- Popular article = 11
- Book Chapters = 07
- Invited/Seminar papers = 06
- Compilations /Books = 07
- Technical bulletins = 02

Research paper presentation = 30
Invited paper presentation = 05
MoU/MoA signed = 03

Project details

Division	Number of projects			
	Ongoing	*Completed*	*Extended*	*Started*
Quality Evaluation and Improvement (QEI) Division	6	1	--	1
Mechanical Processing (MP) Division	4	--	1	2
Chemical and Biochemical Processing (CBP) Division	4	1	2	1
Transfer of Technology (TOT) Division	2	--	--	--
External funded projects*	2	--	4	2

** The projects are sponsored by Coordinated Research Project (Fibre Platform), ICAR; National Agricultural Science Fund, ICAR and Ministry of Textiles, Govt. of India.*

ICAR - National Institute of Research on Jute and Allied Fibre Technology

The institute was formerly known as Jute Technological Research Laboratory (JTRL) and was set up by the Indian Central Jute Committee, Government of India on the recommendation of the Royal Commission on Agriculture in 1936 at Calcutta. The institution was officially established on January 3, 1939 by Lord Linlithgow, the then Viceroy and Governor-General of India. In 1965, it became a constituent unit under the centralized administrative control of the Indian Council of Agricultural Research (ICAR), New Delhi, and has been renamed as the National Institute of Research on Jute and Allied Fibre Technology (NIRJAFT) on 1996, to carry out basic and applied researches related to post harvest processes of jute and allied fibres such as Mesta, Linseed/Flax, Sisal, Ramie, Banana, Sunnhemp, Pineapple Leaf, Dhaincha, Coconut fibre and other lesser known long vegetable fibres. Institute is also committed to pursuit the knowledge transfer and economic development activities that benefit the local, regional and national constituents.

The institute is located on the southern fringe of Kolkata, known as Tollygunge, with a total plot area around 17,628 square meters. During last seven decades, the institute was flourished with multifarious disciplines and carved a niche as a centre of excellence for research on jute and allied fibres catering to farmers, entrepreneurs and industry people. The institute is adequately equipped with the state of the art laboratories having sophisticated tools, instruments and processing machinery. Institute is also recently certified for ISO 9001:2015 QMS for a period up to January 5, 2020.

Mandate

- Basic and strategic research on processing jute and allied fibres and their agro-residues, development of value added products and quality assessment.
- Skill development and business incubation service on jute and allied fibre technologies

The administration is headed by the Director and he manages the system with the help of Institute Management Committee, Institute Joint Council and Grievance Cell. The R and D programs are being managed by Research Advisory Committee and Institute Research Council. The R & D programs of the institute are implemented through the following four divisions.

Quality Evaluation and Improvement (QEI) Division:

QEI division engages in the area of fibre extraction, evaluation, quality assurance and grading. Up gradation of quality, evaluation of physiochemical properties of jute and allied fibres are the major

contributions of this division including extraction of useful chemicals from agricultural by-products of fibre crops.

Mechanical Processing (MP) Division:

MP division carries out basic and applied research on mechanical processing, quality control and product development from long vegetable fibres. Improvement of process, productivity and product quality; design and development of product, machinery and instrument; quality assessment on geo-textile, agro-textile, apparel, packaging, automotive and industrial textiles are the main areas of research of this division.

Chemical and Biochemical Processing (CBP) Division:

CBP division works in the area of chemical/ biochemical processing, quality control and product development from jute and allied fibres. It has major contributions on pulp and paper; bleaching, dyeing and finishing; particle and fibre board; composites from jute and allied fibres. Nano technology and biomass utilization are also important areas.

Transfer of Technology (TOT) Division:

ToT division transfers the institute's technologies, develops entrepreneurship providing the technical training and capacity building, arranges the front line demonstrations and participate in different exhibitions, fairs and Mela for promoting the developed technologies. It is also developing the project profile of viable technologies and rendering technical assistance for incubators.

Design, Development and Maintenance (DDM) Section:

DDM section assists in design and development or modification of machinery/prototype, equipment, and instruments for institutional purposes. It is also engaged in customary maintenance of machines and instruments; civil and electrical infrastructure of campus; security aspects, new infrastructure building activities, water supply, sanitation and monitoring of logistics.

Priority setting, Monitoring and Evaluation (PME) Cell

PME cell helps to design and monitor the R & D programs of the institute. It is responsible for convening meetings of the Institute Research Council, Research Advisory Committee, in-house lectures and compiling the monthly, quarterly, half-yearly and annual technical reports of the institute. This unit also coordinates in technical inquiries from the council as well as Parliament questions from time to time.

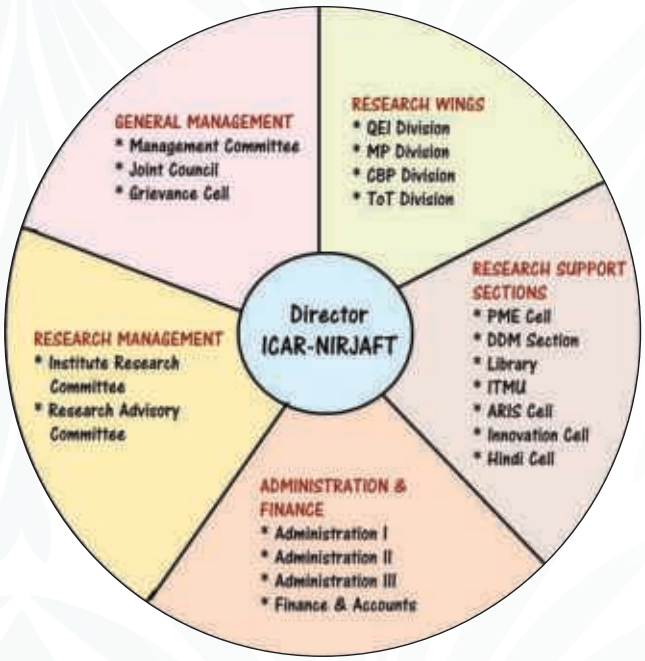
Library

Library acts as a centre of repository for scientific and technological information of jute and allied fibres including other ancillary disciplines by maintaining a large number of books, journals, reports, reprints, pamphlets. The library has developed suitable infrastructure for computerized operation.

Staff position as on March 31, 2018

Category	Sanctioned Posts	Post filled	Posts Vacant
RMP	01	00	01
Scientific	44	22	22
Technical	60	42	18
Administrative	35	20	15
Skilled Support Staff	41	17	24
Auxiliary(Canteen Staff)	04	02	02
Total	**185**	**103**	**82**

The institute has efficient administrative sections to support the research and dissemination activities. It also contains well managed guest house called Scientists' Home, Trainees' Hostel, and Farmers' Hostel. It is also equipped with Auditorium, Conference hall, Committee room, Meeting room and air conditioned dining room to organise seminar, meetings, training and other programmes regularly. In addition Business Incubation centre and two pilot plants are fully operative to boost new entrepreneurs.






INSTITUTIONAL PROJECTS

QEI 17: LACCASE FROM MICROBES FOR VALUE ADDITION IN JUTE

Dr. A. Das and Dr. B.Saha

The P26 fungus collected from rotten wood was characterized for cultural requirements for optimum laccase activity. The fungus produced highest laccase activity on the 11th day of growth on solid-state fermentation. Medium containing peptone as N source gave higher enzyme activity than the one having ammonium tartarate as N source. Addition of Zn^{2+} to the medium showed positive effect while Fe^{2+} had negative effect on laccase activity. Withdrawal of Zn^{2+} drastically reduced enzyme activity. Laccase activity was found to be highly pH sensitive and showed maximum activity at pH of 4.5. Enzyme activity was high at high temperatures - incubation between 60°C to 70°C showed maximum activity.

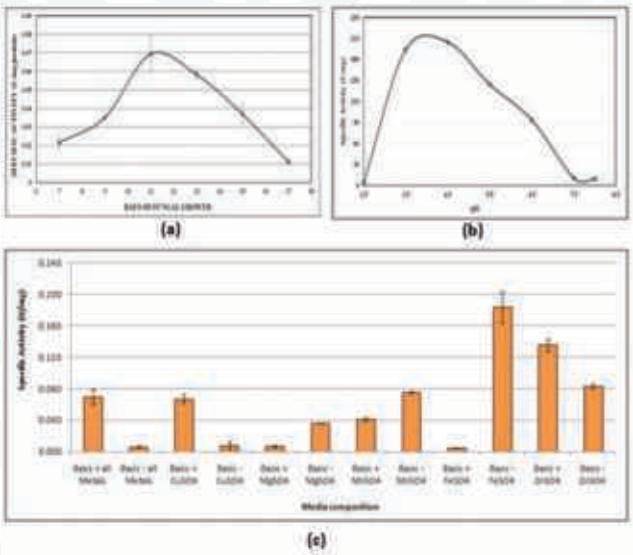


Figure QEI 17.1: (a) Laccase activity after different days of growth of P26, (b) Effect of pH on laccase activity and (c) Effect of different cations on Laccase activity.

	Fold	Yield (%)
Crude	1	100
AS (60-80%)	18.01092	72.5542
Dialysis	27.99967	76.55388
P-100	56.12004	86.92025

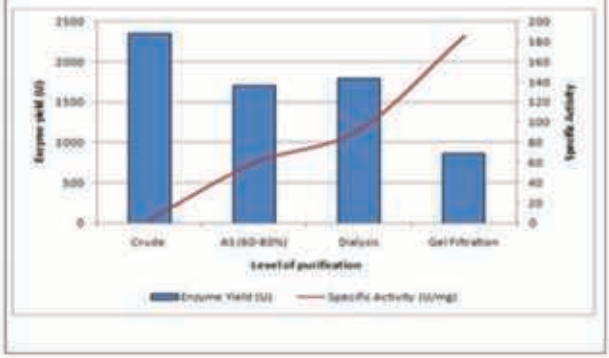


Figure QEI 17.2: Yield and fold purification of laccase after different stages of purification.

Ammonium sulphate precipitation gave about 18 fold purification of the crude laccase followed by dialysis which resulted in 28 fold purification. Gel permeation chromatography with P100 Biogel column resulted in 56 fold increase in specific activity. Among the three substrates, P26 laccase showed higher activity with 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid than guaiacol and syringaldazine but very high K_m value and low V_{max} value indicated that it has low affinity towards this substrate and hence it might not be its preferred substrate.

QEI-18: Comprehensive Mesta and Bimli Fibre Grading System

Dr. S. C. Saha and Sh. A. Sarkar

The present Mesta and Bimli grading system was formulated to ensure remunerative prices to the growers as well as to meet the jute mills' requirement. But in the commercial transaction, subjective assessment i.e., "Hand and Eye Method" is still in practice. Keeping this situation in mind, the comprehensive Mesta and Bimli grading system was developed after simplifying the existing system to make it easy, attractive and popular among the stake holders.

In the present BIS Mesta and Bimli grading specification (IS: 9846-1981) and (IS: 11596-1986), there are 6 and 4 grades respectively and 6 physical parameters with different sub-groups where marks are asymmetrically distributed among sub-groups. Attempt has been made to make necessary rectification of the specifications for easy and prompt grading system. Practically there is non-

availability of grade 1 fibre in the existing grading system. Moreover, 6 physical parameters along with their sub-groups are not followed in all 6 and 4 grades respectively. In the present proposed comprehensive Mesta and Bimli grading system weight-age of the each parameter is being reassessed with reference to fibre quality. All the stake holders like Jute Corporation of India, Jute Mills, Jute Farmers, Jute based Co-operatives and Jute/Mesta Balers' Association will get their legitimate and hard earned share in the price paid by the consumer. The profile of existing grading system is specified as follows.

Existing grades and physical parameters

- There are six grades for Mesta fibre and four grades for Bimli fibre
- Six physical parameters i.e. strength, root content, defects, fineness, colour and bulk density are considered for both the fibres
- Each physical parameter has several sub-groups
- Total 100 marks have been distributed among the 6 physical parameters
- There are 20 and 30 marks difference between the grades for Mesta and Bimli fibre respectively.

Drawbacks in the existing grading system

- Grade-1 did not exist in reality
- Six parameters are not considered for six grades for Mesta fibre and four grades for Bimli fibre
- Several sub-groups for each parameter and each is overlapping with the adjacent one
- Mark allocation between the sub-groups is not proper
- For grade-1 to grade-3, only 6 (six) physical parameters are considered for Mesta fibre and grade-1 and grade-2, only 6 (six) physical parameters are considered for Bimli fibre
- For grade - 4 to 5 only 3 (three) parameters are considered for Mesta fibre and for grade - 3 only 3 (three) parameters are considered for Bimli fibre without assigning any condition

Proposed comprehensive Mesta and Bimli grading System

To get relative importance of different physical parameters for the proposed Mesta and Bimli grading system, feedback from farmers, mill personnel and analysis of Mesta and Bimli fibre samples collected from different places of West Bengal, Andhra Pradesh and Tripura were carried. It has been resolved that grades and sub-groups of each parameter are to be reviewed. Simultaneously parameters are to be minimized with emphasis on defects, strength, root content. Bulk density has a close linkage with fineness and strength and hence can be omitted. It is also resolved that all parameters assigned are to be considered for all proposed grades, which was not followed in existing grading system. It is further opined that the grades proposed would help to minimize subjective assessment, quality based price fixation for both farmers as well jute mills to develop quality product.

Essential features of proposed grading system

The following important salient points are taken:

- Six grades, but effectively five grades for Mesta and five grades, but effectively four grades for Bimli fibre
- Five physical parameters are considered instead of existing six physical parameters for both the fibres
- All the parameters are considered for all the grades
- Total scores 100

Strength: For comparing strength of fibre a bundle of 10 – 15 fibres from the middle region of the fibre reed is gripped between thumb and forefinger of both the hands and broken longitudinally without jerk. It gives an idea of fibre strength.

Fineness: The fineness is a measure of the diameter (width) or weight per unit length of fibre filament. Fineness is a genetic property and also that depends on plant age at harvest. Fineness can be estimated simply by a close look at the fibre. Finer fibre shows better spinning quality.

Root Content: The hard barky region at the lower end of the reed is called root. The roots are cut at the mill before processing of fibre and in commerce they are known as 'Cuttings'.

Colour: Colour means the property of a fibre, which distinguishes its appearance as redness, yellowness, greyness etc. It is largely dependent on retting conditions, water and washing.

Sub Groups for Mesta	*Description*	*Sub Groups for Bimli*	*Description*
Good	Creamy to whitish	Good	Creamy to whitish
Average	Light grey	Average	Light grey
Poor	Greyish to dark	Poor	Greyish to dark

Defects: Factors causing serious or partial damage to the quality of fibre are commonly known as defects. In all, 12 defects have been identified in the body of fibre, which are broadly classified in two groups, namely Major defects and Minor defects

Major defects

- *Over-retted fibre*: When plants are retted for longer period than required, over-retted fibre is produced which has lost its strength and brightness.
- *Dazed fibre*: If fibre is stored in moist condition or fibre having excess moisture if stored for longer period, it becomes dazed. The fibre is weak in strength and dull in appearance.

- *Centre root*: Fibre, which is more or less clean and soft at both ends but contains hard barky strips (periderm) in the middle region. This is caused when the middle region of the plant gets exposed to sunlight during retting.
- *Runner*: Hard barky fibre running from the lower end to the middle region of the reed more or less continuously. Proper retting and washing can remove this.
- *Knots*: These are stiff spots often barky and black to brown in colour appearing in the body of the strand, which break continuity of the fibre, when opened. Proper plant protection measures are the remedy in such causes.
- *Entangled sticks*: Entangled sticks are broken pieces of sticks, which are linked with the fibre mass and are not easily removable.
- *Mossy fibre*: The green moss, which grows in stagnated water in the field, gets attached to the jute plant and remains with the fibre even after retting and washing. This may be removed by hand or by combing. This defect is generally found in crop in the low-lying areas during flood condition.

Minor Defects:

- *Loose leaf*: Small pieces of dark grey leafy or paper like substances appearing on the body of the fibre. Proper washing may significantly remove loose leaf.
- *Loose sticks*: Loose sticks are small broken pieces of wood, somehow attached with the fibre at the time of extraction or drying and are easily removed by shaking.
- *Specks*: Oval shaped dark grey to brown colour barky spots found on the fibre body are called specks. Improper retting and washing sometimes give rise to such barky spots. Fibres can be separated at specks with some efforts without breaking their continuity though they may remain as weak spots. Adequate plant protection measures and proper retting and washing may remove this defect.
- *Gummy fibre*: Fibre held together by un-dissolved pectinous or gummy material. Proper retting and washing may remove this defect.
- *Croppy fibre*: Fibre with top ends rough and hard (but not barky) caused by careless retting and washing.
- Effective five grades for Mesta and effective four grades for Bimli fibre with five physical parameters instead of existing six parameters for both fibres with total score of 100

Notes:

1. The minimum reed length should be 150 cm, or the effective reed length should not be less than 100 cm except for M-6 and B-5
2. The fibre should be in dry storable condition.
3. The fibre should be free from HUNKA, mud and other foreign materials.
4. Natural dust may be allowed in grades M-4 to M-6 and B-3 to B-4 with proportionate discount.
5. Root content will include hard barky croppy ends.

6. A parcel of mesta which would not secure full marks for a particular grade shall still be considered for that grade with suitable discount to be settled between the buyer and seller, provided its score is not less, by 50 (or more) percent of the difference, between the maximum scores for that and the next lower grade. When the score is less by 50 (or more) percent of the difference, the buyer will have option to reject or settle with a suitable discount. Scores on the table may be taken as guidance for determining the discount.
7. For instrumental determination of various characteristics like strength, defects, root content, fineness, etc, reference to the relevant part of IS 7032.

Table QEI-18.1: Proposed grading table for Mesta Fibre

Grade	Strength	Defects	Root content by (Length %)	Colour	Fineness	Total Score
M-1	Very Good **25** (≥25g/tex)	Free from major and minor defects but 10% minor defects may be allowed **25** **(0.5% by weight)**	(≤ 6) **25**	Good **10**	Very Fine **15** (≤ 2.5 tex)	**100**
M-2	Good **20** (<25-21g/tex)	90% free from major defects but 20% minor defects may be allowed **18** **(1.0% by weight)** 80% free from major defects	**(> 6 to ≤ 10) 17**	Good **10**	Very Fine **15** (≤2.5 tex) Fine	**80**
M-3	Good **20** (<25-21g/tex)	and 30% minor defects may be allowed **10** **(1.5% by weight)** 80% free from major defects	**(>10 to ≤15) 10**	Good **10**	**10** (>2.5-3.5tex) Coarse	**60**
M-4	Average **10** (<21-15g/tex)	and 30% minor defects may be allowed **10** **(1.5% by weight)**	**(>10 to ≤15) 10**	Average5	**5** (>3.5tex)	**40**
M-5	Poor **5** (<15g/tex)	70% free from major defects **04** **(>1.5% by weight)**	(>15) **3**	Poor **3**	Coarse **5** (>3.5tex)	**20**
M-6	**All Mesta not conforming to any of the above grades but of commercial value**					

Table QEI-18.2: Proposed grading table for BIMLI fibre

Grade	*Strength*	*Defects*	*Root content by (Length %)*	*Colour*	*Fineness*	*Total Score*
B-1	Very Good **25** (≥ 25g/tex)	Free from major and minor defects but 10% minor defects may be allowed **25** **(0.5% by weight)**	**(≤ 6) 25**	Good **10**	Very Fine **15** (≤ 2.5 tex)	**100**
B-2	Good **20** (<25-21g/tex)	90% free from major defects but 20% minor defects may be allowed **18** **(1.0% by weight)**	**(> 6 to ≤10) 17**	Average **5**	Very Fine **15** (≤ 2.5 tex)	**75**
B-3	Average **15** (<21-15g/tex)	80% free from major defects and 30% minor defects may be allowed **10** **(1.5% by weight)**	**(>10 to ≤ 15) 10**	Average **5**	Fine **10** (>2.5-3.5tex)	**50**
B-4	Poor **7** (<15g/tex)	70% free from major defects **5** **(>1.5% by weight)**	(>15) **5**	Poor **3**	Coarse **5** (>3.5tex)	**25**
B-5	**All Bimli not conforming to any of the above grades but of commercial value**					

QEI19: DEVELOPMENT OF TECHNOLOGY FOR EXTRACTION AND CHARACTERIZATION OF NANOCELLULOSE FROM JUTE CADDIES/ JUTE STICK

Dr. D.P.Ray and Dr. R.K.Ghosh

Jute caddis has a limited application and used for this study. The alpha cellulose obtained through delignification of jute caddies was subjected to chemical pre-treatment for development of nanocellulose. 2 g of alpha cellulose was treated with concentrated sulphuric acid (64%) and hydrochloric acid for defibrillation and fragmentation for 4-5 hours. The viscous mass thus obtained were subjected to centrifugation using a high capacity centrifuge to bring it to normal reaction. A viscous mass was then ultra-sonicated till it turns to be colloidal mass. The mass was characterized through FT-IR and particle size analyzer. The SEM and TEM study confirms the formation of nanocellulose. The study reveals that pre-treatment with concentrated sulphuric acid is better approach to yield the nanocellulose than the treatment with hydrochloric acid. The present project aims to develop nanocellulose, a high-end value product from the low cost jute stick and jute caddis.

Chief findings

- ✓ Optimization of acid hydrolysis of α-Cellulose
- ✓ Yield of α-Cellulose from jute caddies and jute stick were 61 and 42% respectively
- ✓ The yield of nanocellulose was 30%.

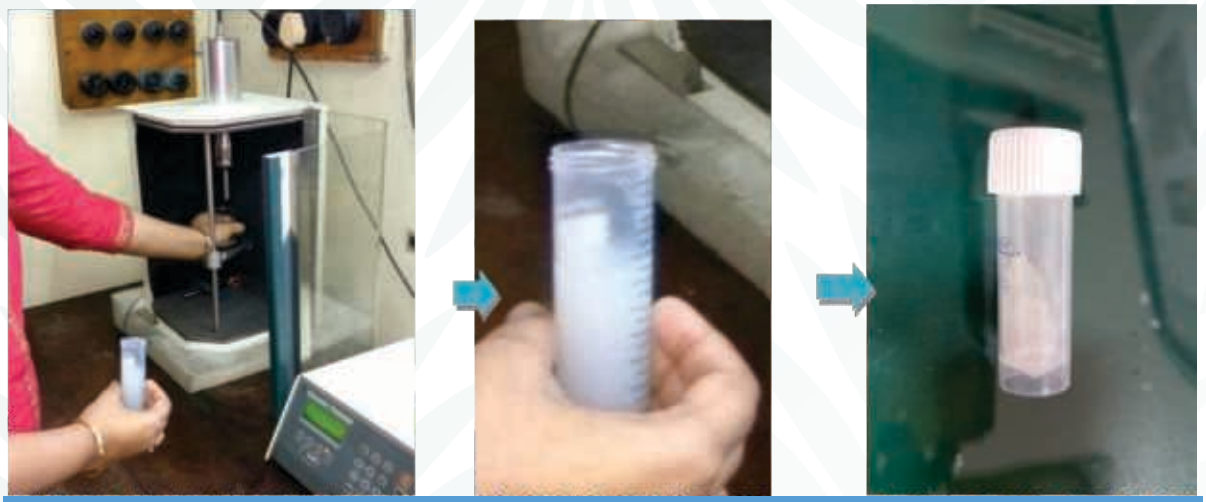


Figure QEI-19.1: Conversion of alpha cellulose to nanocellulose

QEI-20: DEVELOPMENT OF THE DIGITAL HAIRINESS METER FOR JUTE YARN

Dr. G. Roy, Dr. S.C. Saha, Dr. G. Bose and Sh. G. Sardar

The main drawback of the jute yarn is the presence of long hairiness. So, an instrument is required to test the length and number of hairs present in its unit length with the statistical data. Uster Tester 3 and Zwingle Hi 400 Tester are mainly used to count the hairiness of cotton yarn only; however they are very costly instruments and so it is the need of the hour to develop a indigenous hairiness instrument for jute and allied fibres.

During this period, designing of the instrument, procurement of components and fabrication of power supply and sensor systems were completed. Fabrication of other mechanical and electronic units like development of control unit , moving arrangement with two gear motors, arrangements for movement of yarn, development of platform, pivots, development of mechanical arrangements for fixing the sensors and gadgets, development of ports, display system and computation unit is in progress. The feasibility of the circuit and sensors are shown in the figures.

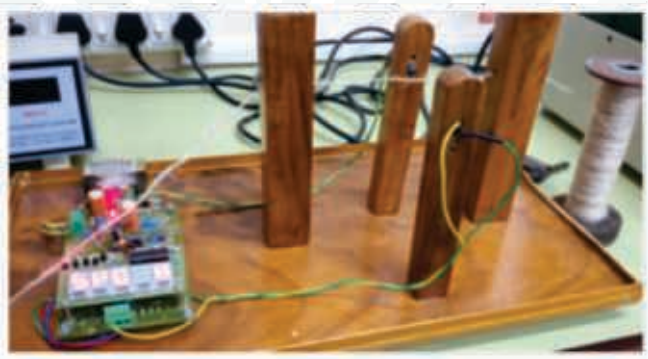


Figure QEI 20.1: Feasibility of the circuit and sensors

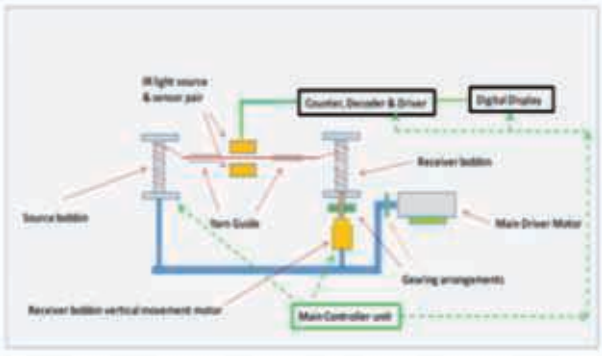


Figure QEI 20.2:Schematic Diagram of Digital Hairiness Meter

QEI-21: HANDY JUTE FIBRE BUNDLE STRENGTH TESTER FOR FARMERS

Dr. S.C. Saha and Sh. A. Sarkar

Strength of jute fibre is very important factor for evaluation of quality. Presently, purchaser and farmers' are determining their fibre strength by manual methods, which is not correct in most of the cases. The available bundle strength tester is desk top type and its operation costly and need some expertise. To overcome this drawback, institute has developed a handy bundle strength tester to overcome the long standing problem in strength determination at local markets. This instrument is a simple mechanized modification of the existing laboratory grade instrument. This instrument will help farmers' to assess the strength of Jute/ Mesta fibre in the range of Very good, Good, Average and Poor strength as per BIS /CACP grading. Mechanisation of the instrument has been completed and calibration of the instrument is in progress.

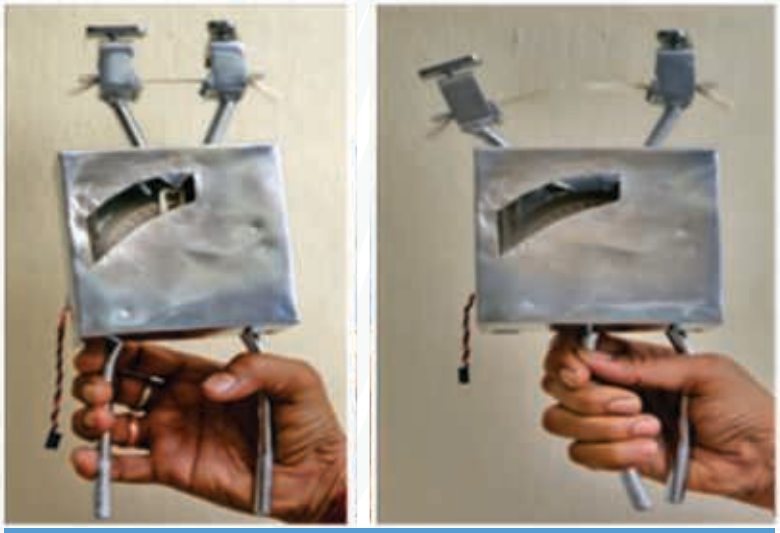


Figure QEI-21.1 :Testing in handy jute fibre bundle strength tester

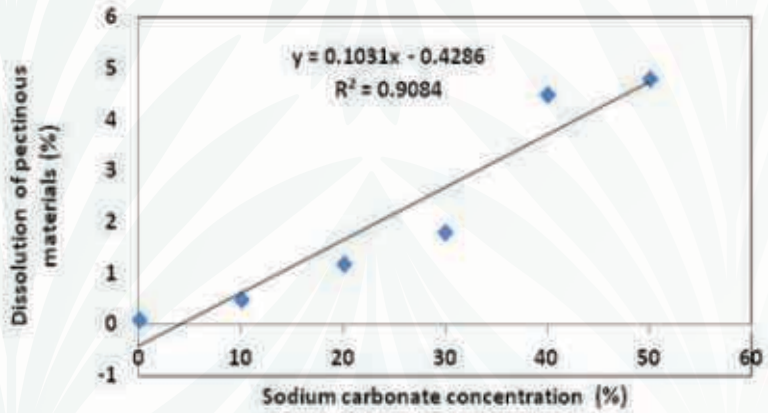
QEI 22: DEVELOPMENT OF ACCELERATED RETTING TECHNOLOGY FOR JUTE AND MESTA PLANTS

Dr. D.P. Ray, Dr. R.K. Ghosh, Dr. A. Singha and Sh. A. Sarkar

One of the most important post-harvest technologies of jute is retting, upon which the quality of fibre depends. The presence of slow flowing, clear, iron-free soft water is suitable for retting and it takes about 18-21 days to complete the process, depending on suitable temperature and other physical parameters. The scarcity of clear, free flowing natural water bodies is a major problem for jute cultivation in India. The repeated retting of jute and Mesta in same the stagnant water led to production of inferior quality of fibre.

Moreover, the long time span of 18-21 days weaken the strength of jute stick for further use and few plant parts are over retted leading to permanent rotting. The unequal retting of jute plant resulting in

incomplete retting or over retting causes monetary loss to the jute cultivators. Thus aiming towards reducing the number of days required for retting and obtaining superior quality of fibre, a project has been undertaken to develop a suitable chemical accelerator. Initially, the recipe for accelerated retting has been prepared using desired ingredients and carrier materials which was screened through lab level testing. A part of the formulation has been tested in field trials. The results revealed the improvement of fibre quality of jute.



QEI-22.1: Effect of Sodium carbonate concentration on fibre pectin dissolution in development of Retting accelerator

Chief findings

- ✓ Recipe for accelerated retting has been formulated
- ✓ The developed formulation (SS) has been tested in field trials and obtained encouraging results
- ✓ Fibre quality has been improved by 1-2 grades
- ✓ The retting water has been collected and tested in lab level
- ✓ Bacterial isolates have been identified and purified for further development

QEI: 23- JUTE MAPPING AND ESTIMATION OF FIBRE QUALITY

Dr. B.Saha, Dr. S.C.Saha, Sh. S Das and Sh. K.Manna

Major jute growing blocks of seven different jute growing districts of West Bengal were surveyed in respect of bio-physical and socio-economic parameters. Soil chemical properties like pH, EC, organic carbon, available nitrogen, available phosphorus, potassium, calcium, magnesium and micronutrients like copper, iron, aluminium were analysed. Jute fibres collected from the blocks were tested for its strength, fineness, colour, bulk density, root contents and defects. Jute fibre grades of those blocks have been estimated and thematic maps of the fibre quality parameters of the blocks have been developed (Figure QEI-23.1).

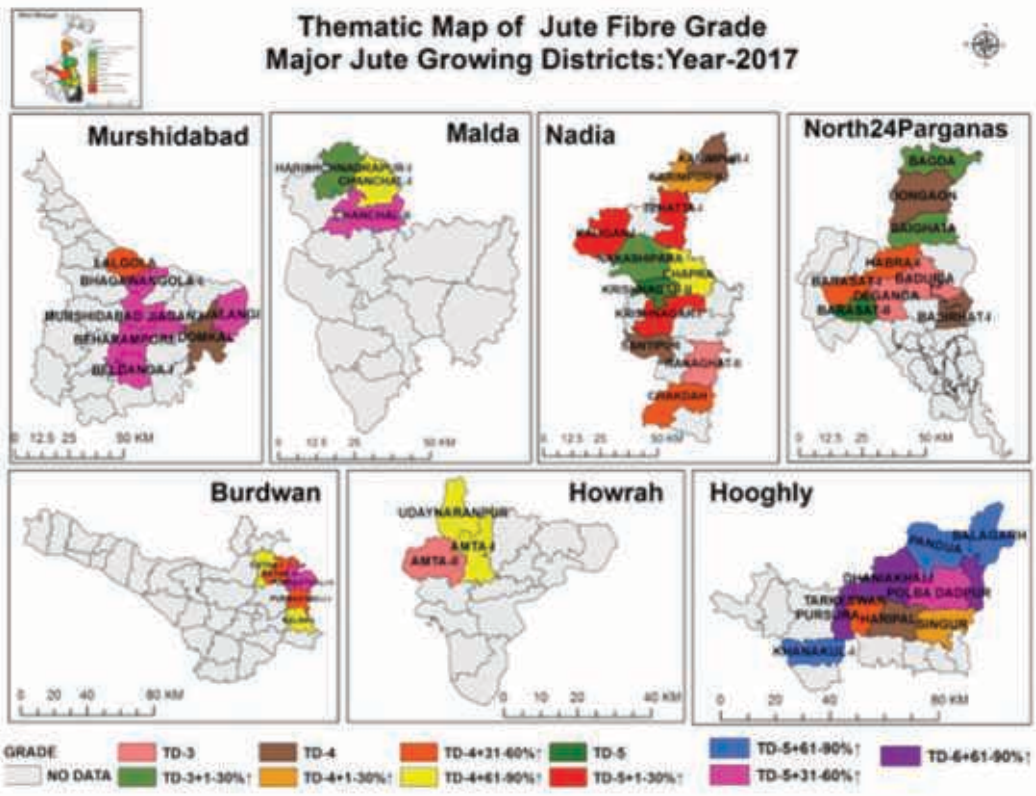


Figure QEI-23.1: Thematic maps

Thematic maps of all soil chemical parameters, soil, water and fertilizer management practices and sources of retting water in the villages have been developed. The natural resources and their management practices were linked with the fibre quality parameters (on the basis of data and regression models) in respect of strength; fineness and root content have been developed. It has been observed that the grade of fibre varied from TD3+30% ↑ to TD6+60% ↑ . Jute fibres of higher grades were mostly observed in the Bagda, Baduria and Gaighata blocks of North 24 Parganas district and Ranaghat, Chakdah and Karimpur blocks of Nadia districts. The regression models revealed that increase in nitrogen content reduced strength of jute fibre. However, the strength has found to have direct positive correlation with available phosphorus, potassium and calcium content in soil. Fineness of the jute fibre has directly proportional to the organic matter (%) and phosphorus content of soil. Root content had direct relationship with available nitrogen, available potassium and magnesium content of soil.

QEI-ADHOC: MICROBIAL TREATMENT OF BARKY ROOT PORTION OF JUTE FIBRE FOR IMPROVEMENT OF SPINABILITY

Dr. A.Singha

Forty six bacterial strains had been isolated from jute retting water and soil samples. Out of them six strains had been shown positive in pectinase enzyme activity. Two best strains viz. AS11 and AS20

recorded potency index of 4.1 and 4.0 respectively. An 87.5% reduction in barky jute (20g sample) had been achieved in unsterilized medium with the bacterial consortium consisting of strain AS11 and AS20 in 10 days.

MP 14 : DEVELOPMENT OF YARN FROM INDIAN FLAX FIBRE FOR TECHNICAL TEXTILES

Dr. S.Debnath and Dr. G. Basu

Till date, the flax fibre processed in India is being imported from Europe for development of linen-based cloth and fashion textiles. India is one of the largest producers of flax seed oil in the world. However, the Indian flax fibre has not been explored to greater extent for textile application. This project may cover to some extent the research gap in this area of spinning of yarn from Indian flax fibre.

Decorticated flax fibre (variety Tiyara) was procured from Sunnhemp Research Station- ICAR-CRIJAF, Pratapgarh, Uttar Pradesh. It contained 40-45% broken sticks, which are adhering with the fibres. These foreign particles were cleaned using a manual hackling system which has been designed and fabricated under this project. It is found that may be due to wrong handling, opening and processing the fibre got damage, as detected from SEM.

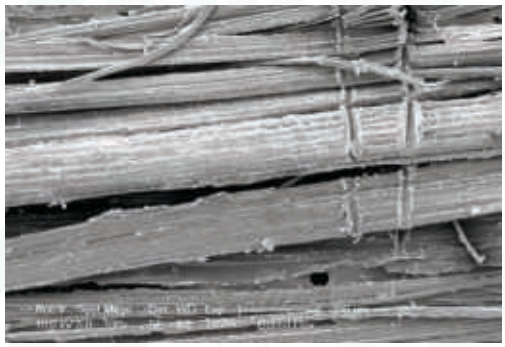


Figure MP-14.1: Fibre damage due to wrong handling, opening and processing

The fibre after hackling, different pre-treatment (boiling water, non-ionic detergent, mild alkali between 1-3%, combination of alkali treatment followed by detergent treatment) has been applied to ensure better opening and cleaning of pectinous/gummy material present in the scutched fibre. Water spray as well as vegetable oil (castor) emulsion has been applied on these pre-treated fibres. There are total eight different samples have been prepared with different combination of pre-treatments and emulsion application and they are in the range of 113-148 Tex with yarn strength of 4.8-6.3 cN/tex. Overall the spun flax yarn quality ratio obtained was below 50%. With all the pre-treatments followed by application of oil emulsion, results in roller lapping largely in spinning and to some extent in drawing stages. However, the roller lapping of fibres in case of only water spray results comparatively better processability in spinning. In all cases the spun flax yarn was very

uneven. It has been observed that, application of oil-water emulsion causes processing difficulties rather only water application before piling for 24 hours gives comparatively better spinning performance with average yarn strength (6.3 cN/tex). Hence it is possible to spin the yarn from Indian flax fibre with water spray application prior to piling process. It has been found from the FTIR analysis that the presence of oil (around 6.8%) in the Indian Flax fibre which hinders the processing during the spinning. Pre-treatment with sodium salt of iodine followed by non-ionic soap has been applied and found comparatively better performance during spinning. Further optimization of the chemical treatment and spinning parameters are in progress.

MP 15: DEVELOPMENT OF LOW AREA DENSITY JUTE NON-WOVEN FABRIC FOR CARRY BAGS

Dr. S. Sengupta and Mrs. P. Ghosh

To determine the effects of the factors (variables) on the response parameter, a 20 point central composite design , which consists of a full factorial design 23 (8) plus 6 centre points and 6 star points, 20 experimental runs thus allowed the estimation of the linear, quadratic and two-way interactive effects of the various factors on properties as per Table 15.1. Final fabric was made from 30% PLA content, 15 kg/cm2 calendar roller pressure and 170°C calendar roller temperature.

Table MP-15.1: The actual and coded values of different factors for Jute-PLA thermal bonded fabric

Factors	Symbol	Code				
		-1.682	-1	0	+1	+1.682
PLA percent	X_1	10	16	25	34	40
Calendar roller temperature, ^{0}C	X_2	120	136	160	184	200
Roller pressure, Kg/cm^2	X_3	10	12	15	18	20

After analysing the data, the optimised parameters are as follows

Optimised parameters

Attributes	PLA content %	Calendar Roller Pressure kg/cm²	Calendar Roller Temperature °C
Higher Energy to break	45	15	150-155
Higher Porosity	Low	14-15	170-165
Higher Extrinsic sorptive capacity	22	15	150
Lower Creep	45	15	170
Higher Tear Strength	high	16	high

(b) Jute Adhesive bonded fabric

Similarly above, a 20 point central composite design , which consists of a full factorial design 23 (8) plus 6 centre points and 6 star points, 20 experimental runs thus allowed the estimation of the linear, quadratic and two-way interactive effects of the various factors on properties as per Table MP-15.2

Table MP-15.2: The actual and coded values of different factors for Jute adhesive bonded fabrics

Factors	Symbol	Code				
		-1.682	-1	0	+1	+1.682
Adhesive concentration, %	X_1	8	10.5	14	17.5	20
Squeezing pressure, Kg/cm^2	X_2	10	11.6	14	16.4	18
Curing temperature, ^0C	X_3	100	110	125	140	150

After analysing the data, the optimised parameters are as follows

Table MP-15.3: Optimised parameters

Attributes	*Adhesive concentration (%)*	*Squeezing Pressure kg/cm²*	*Curing Temperature (⁰C)*
Higher air permeability	17-18	15	120
Lower Creep	17	14	110
Higher moisture	15	14	120

MP16: DEVELOPMENT OF INTERLINEAR/GARMENT STIFFENER/FILLER FROM SUNNHEMP AND BANANA NONWOVEN

Dr. S. Sengupta and Mrs. P. Ghosh

The significant independent variables of banana and sunnhemp based thermal bonded nonwoven fabric with respect to different properties were identified and those variables are: Calendar roller temperature, Roller pressure and Polypropylene percent. The useful limits of the three variables stated above were selected based on the information available in literatures and also by conducting a number of preliminary experiments.

(a) Banana adhesive bonded fabric

The 20 point central composite rotatable design has been adopted for optimisation as per in the Table.

Table MP-16.1: The actual and coded values of different factors for Banana PP thermal bonded fabric						
Factors	Symbol	Code				
		-1.682	-1	0	+1	+1.682
Adhesive concentration, %	x	8	10.5	14	17.5	20
Squeezing pressure, Kg/cm^2	y	10	11.6	14	16.4	18
Curing temperature (^{o}C)	z	100	110	125	140	150

Results

Samples were prepared for product with 18% adhesive concentration, 13kg/cm2 squeezing pressure and 1300c curing temperature. After analysing the data, the optimised parameters are as follows.

Table MP-16.2: Optimized parameters			
Attributes	*Adhesive concentration (%)*	*Squeezing Pressure kg/cm^2*	*Curing Temperature (^{0}C)*
Bending load max.	High	Low	No effect
Bending load min.	Low	12 kg/cm^2	High
Energy max.	High	High	Low
Energy min.	Low	No effect	120-130^{o}C
SAP max.	Low	No effect	Low
SAP min.	18%	15 kg/cm^2	130^{o}C
Moisture max.	16%	13 kg/cm^2	120^{o}C
Thermal resistance max.	12%	No effect	130^{o}C

(B) Sunnhemp –PP thermal bonded fabric

The 20 point central composite rotatable design has been adopted for optimisation as per in the Table.

Table MP-16.3: The actual and coded values of different factors for Sunnhemp : PP thermal bonded fabric						
Factors	Symbol	Code				
		-1.682	-1	0	+1	+1.682
PP percent	x	10	16	25	34	40
Calendar roller temperature (^{o}C)	y	110	126	150	174	190
Roller pressure, Kg/cm^2	z	10	12	15	18	20

Results

- As PP% increases, bending load initially increases, then decreases.
- As temperature increases, bending load initially increases then decreases. Bending load is maximum at 25% of PP , pressure 16 kg/cm^2 and 155^{o}C.
- As PP increases, minor increase in Energy as temperature increases, energy initially decreases, then increases. Energy is minimum at 160^{o}C and PP% above 15%.
- As PP increases, minor decrease in energy. As pressure increases, energy initially decreases, then increases. Energy is minimum at pressure 13 kg/cm^2 and PP 25%.

Samples were prepared with 25% PP, 1500C roller temperature and 16kg/cm2 roller pressure. After analyzing the data, the optimized parameters are as follows

Table MP-16.4: Optimised parameters for Sunnhemp: PP thermal bonded fabric

Attributes	*PP content (%)*	*Roller temperature(^{o}C)*	*Roller pressure (Kg/cm^2)*
Bending load max.	25	155	16
Energy max.	high	low	high
Energy min.	25	160	13
SAP max.	low	low	low
SAP min.	high	high	high
Moisture max.	high	120	20
Thermal resistance max.	low	low	high
Thermal resistance min.	high	low	high

The photographs of the Sunnhemp and banana Thermal bonded fabric before and after breakage of adhesive failure are given below.

(a) Sunnhemp PP Thermal bonded fabric

(c)Banana Adhesive bonded fabric

(b) Sunnhemp Thermal bonded fabric breakage: Adhesive failure

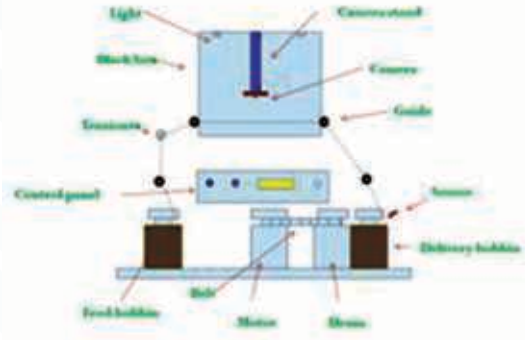
(d) Banana adhesive bonded fabric breakage: Fibre and adhesive failure

Figure MP-16.1: Fracture morphology of bonded fabric

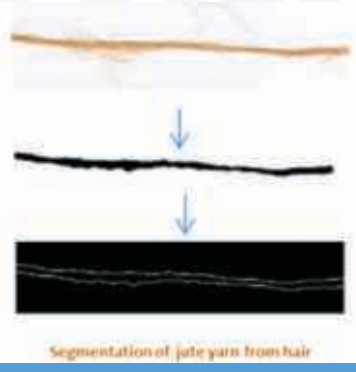
MP-17: DEVELOPMENT OF JUTE YARN DIAMETER IRREGULARITY TESTER

Sh. S.Das, Sh. M. Bhowmick and Sh. T.K. Kundu

Yarn evenness is a key factor to influence the performance and properties of the yarn. The presence of defects in a yarn results in the deterioration of the quality and usability of the yarn. Yarn without defects helps to create a fabric of good quality. A machine vision method which uses a cost-effective image capture device and image processing algorithms to process the captured images, generate a diameter variation plot and analyze the same to count the number of thick and thin places in the yarn.



MP 17.1: Block diagram of yarn winding machine



MP 17.2:Protocol of the instrument

Figure MP-17.3: Measure the diameter of moving yarn in real time using video image processing and finally calculate CV (%)

The yarn images are continuously captured via an image acquisition system in real time. Software is continuous measure the yarn diameter, then coefficient of variation (CV %) of the diameter is calculated to characterize the yarn diameter irregularity. Extra macro lens has been used for focus of camera on yarn area. Some portion of fabrication of yarn winding machine with USB camera arrangement has been completed. A portion of software development which measures the yarn diameter and finally calculates diameter irregularity CV (%) in real time has been completed. Measurement of diameter of sample jute yarn using image analyzer and projectina has been completed.

Block diagram of yarn winding instrument with camera adjustment has been completed. The moving jute yarn images are continuously captured by USB based camera in real time. Video image processing in real time has been done by continuously by features like extraction, histogram equalization and filtration. ANN algorithm has helped to find exact identify the edge of yarn for diameter measurement. For the contrast adjustment of image, proper threshold value has been applied for remove the excess hairiness of the yarn.

Software which detects the exact edge of jute yarn has been done. This software is removing the hairiness part of jute yarn and finally gives exact yarn area in black. Processed image of a yarn and the equivalent diameter variation plot and analyze the same to count the number of thick and thin places in the yarn have been done. Software is continuous measure the yarn diameter, coefficient of variation of the diameter is calculated to characterize the yarn diameter irregularity. An integrated intelligent evaluation system is replacing the conventional manual inspection for the objective and automatic evaluation of jute yarn surface appearance with computer vision technology.

MP18: DEVELOPMENT OF DIGITAL DRAPE METER

Sh. M. Bhowmick, Dr. G. Roy, Dr. G. Bose, Sh. I. Mustafa and Sh. B. Das

Drape is the fabric quality used to describe the way a fabric hangs under its own weight. Fabric drape is measured as per BIS standard IS: 8357-1977. Under this project, drape co-efficient will be measured digitally. The initial mechanical design of the super structure of the digital drape meter was carried out using computer aided design. The instrument is designed to accommodate all the component of the digital drape meter. Fabrication of the first prototype of super structure was carried out at DDM section of the institute.

The Super structure was painted in black from inside to avoid any interference from outside light during measurement in future. The prototype of the sample holder was fabricated as per BIS standard IS: 8357-1977. For sensing the area under draped fabric, a sensor assembly was designed and fabricated, which has two components i.e. one array of emitters and another array of receiver sensors. Whenever a fabric sample came in-between the emitter and receiver, voltage in the circuit changes measuring the presence or absence of a fabric and this phenomenon will be used to measure the draped area of a circular fabric sample as per the BIS standard.

During designing of the sensor elements, it is critical to keep the distance between the sensors as minimum as possible to keep the measurement error as small as possible. Also the dimension of the sensing element was determined keeping in view the sample size and the standard testing procedure. Mechanism for precise rotation in a measured manner of the sensor assembly has been designed and fabricated.

CBP 12: PREPARATION OF ACTIVATED CARBON FROM JUTE STICKS BY CHEMICAL ACTIVATION

Dr. R.K. Ghosh and Dr. D.P. Ray

The global demand for activated carbon is expected to rise 10.3% annually through 2016 to 1.9 million metric tons. Due the expanding nature of the global activated carbon market, the source of raw material has gained severe attention. The conventional raw material for activated carbon is wood, however, global concern of deforestation and environmental sustainability has severely affected the wood industry and the availability of wood is facing a serious challenge. In search of a new source of activated carbon, for the first time, jute stick biomass (JSB) has been explored in the present project.

Removal of natural impurities from samples

Generally, commercial activated carbons or GCB (graphitized carbon black) are used to remove natural pigments and other naturally occurring compounds which may interfere with the pesticide residue analysis and it is known as matrix clean-up.

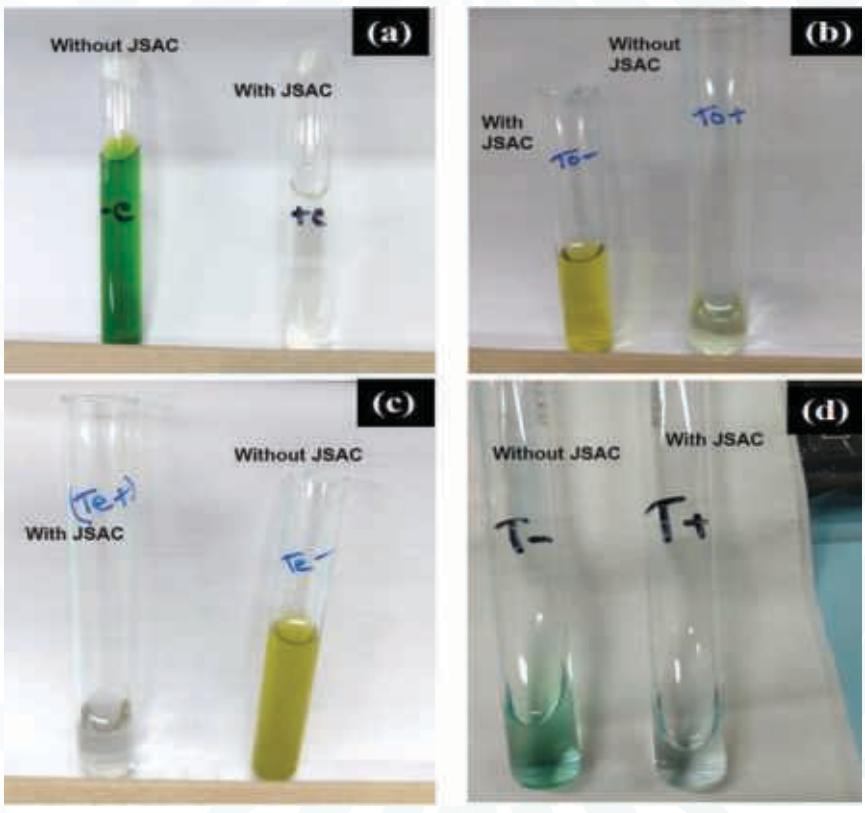


Figure CBP-12.1: Sample extracts of (a) jackfruit leaves, (b) tomato, (c) tea and (d) tobacco, before and after treating with JSAC

Removal of heavy metals from water

Batch adsorption studies were carried out for evaluating the heavy metal removal efficiency of JSAC. 100 ml distilled water was fortified at 20 ppb concentration and agitated with 0.1 mg JSAC for 3 h at 150 rpm on an orbital shaker (27 ^{0}C).

The samples were centrifuged at 8000 rpm for 20 min and supernatant was collected for analysis by atomic absorption spectrophotometer. The result indicated that JSAC has PD and Cd removal capacity. Hence, detail investigations for estimating metal-wise maximum adsorption capacity is under progress.

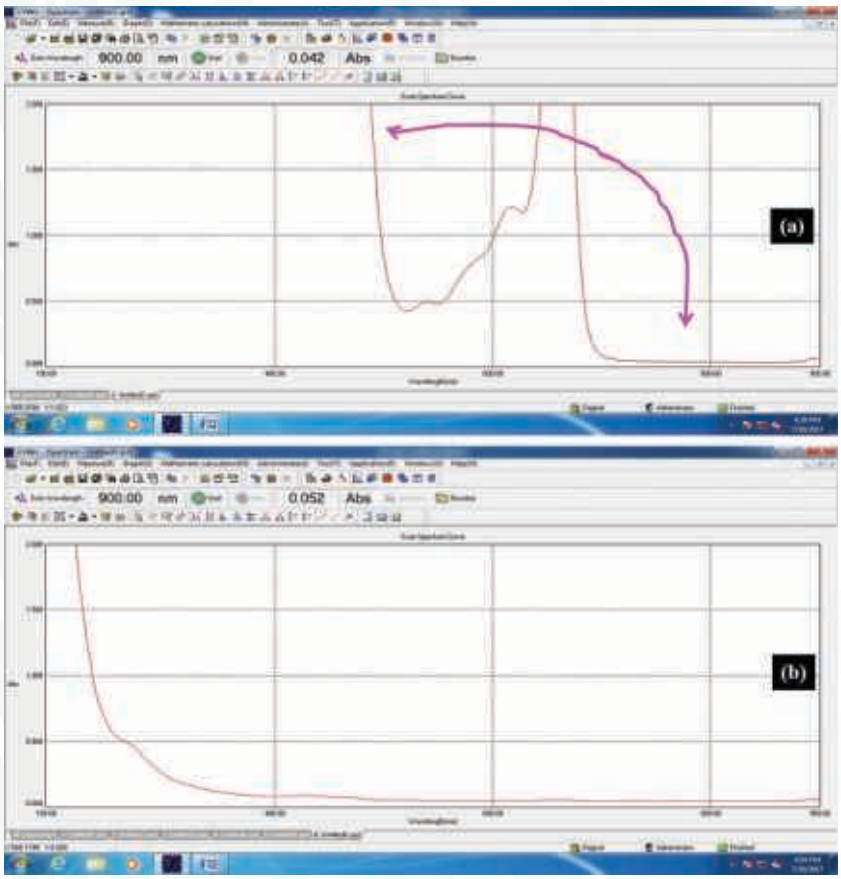


Figure CBP-12.2. UV-Vis scan of jackfruit leaf extracts (a) before and (b) after treatment with JSAC

Removal of reactive dye from aqueous medium

The reactive dye, reactive orange 16, removal capacity was investigated at SRL= 1g/L, time= 3h, rpm= 200 at 500 ppm contamination. The matrix was centrifuged at 7000 rpm and supernatant was analysed at 492 nm for dye concentration.

The dye removal varied from 30-65% as compared to 50-70% of some commercial activated carbons. The maximum dye (reactive orange 16) removal capacity, for JSAC (~300-320 mg/g) was comparable with some commercial products (250-370 g/g).

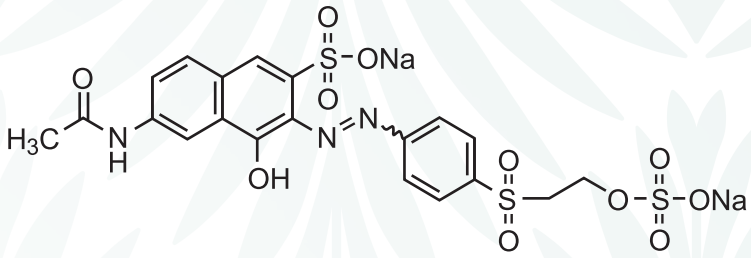


Figure CBP 12.3: Molecular structure Reactive orange 16

Removal of pesticides from water

Batch adsorption studies were carried out for pesticide removal efficiency of JSAC. 100 ml distilled water was fortified at 50 ppb concentration and agitated with 0.1 mg JSAC for 3 h at 200 rpm on an orbital shaker (27^{0}C). The samples were centrifuged at 7000 rpm for 15 min and supernatant was collected for analysis. The result indicated that atrazine removal at 50 ppb was 95% for JSAC as compared to 99.5% by commercial products. Whereas, 99.8% removal were observed for pendimethalin, an aniline group of herbicide, for both JSAC and commercial products as per Figure CBP-12.4.

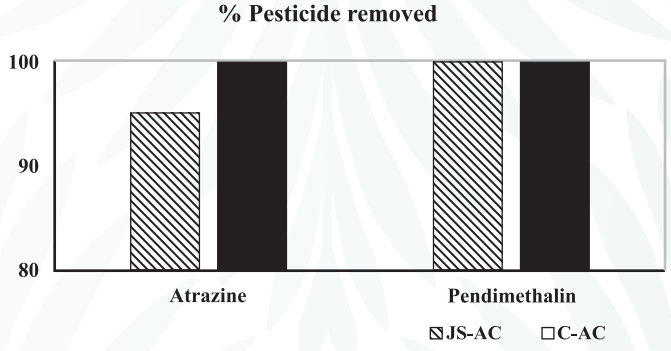


Figure CBP 12.4: Comparative removal of pesticides by JSAc and commercial product

CBP 13: JUTE BASED CONDUCTIVE POLYMER COMPOSITE FOR ELECTROMAGNETIC SHIELDING

Dr. L.Ammayappan and Dr. G.Roy

Conductive polymer composites (CPC) have been introduced by using Polyaniline (PANI). Smart textile is one of the important technical textile and conductive polymers are widely applied to impart electric functionality.

Effect of pre-treatment on surface resistivity of polyaniline coated jute fabric

Jute fabric (twill weave) was subjected to non-ionic detergent cleaning, scouring and peroxide bleaching as per conventional method and then coated with polyaniline in three different

concentrations (10, 100 and 250 mM) as per optimized condition. Results inferred that without PANI coating, the surface resistivity of the twill jute fabric is increased with increasing in removal of impurities since there is an increase in the defibrillation of the jute fibre that leads to increase in entrapment of air in between ultimate cells. IT is also revealed that PANI coating significantly reduced the surface resistivity of the jute fabric @ 97, 98 and 99% with respect to NID treatment, scouring and peroxide bleaching respectively.

EMI Shielding of optimized PANI coated jute fabric

Electrical conductivity is one of the important characteristics that mainly determine reflection and absorption of the incident EM wave. Samples with high value of electrical conductivity are good reflectors, while conducting polymers with medium level of conductivity are good microwave absorbers. It is reported that polyaniline based electromagnetic shields attenuate undesirable electromagnetic waves and substantially dismiss electromagnetic radiation. EMI shielding effectiveness of different PANI coated jute fabrics were evaluated as per ASTM D 4935-99 Standard (dB) in which EMISE of the optimized PANI (10, 100 and 250 mM) coated jute fabrics were ranged from 14.5 to 18.8 dB in the S-Band electromagnetic wave (2.65 to 3.95 GHz).

EMI Shielding of nano metal-PANI coated jute fabric

10 mM silver nanoparticle was coated on the surface of the jute fabric by in-situ synthesis method and subsequently 10, 100 and 250 mM polyaniline was coated and their EMI shielding effectiveness were evaluated as per ASTM D 4935-99 Standard. It is reported that the polyaniline prevent the transition of waves by interacting with electromagnetic waves and then absorbing them owing to the dipoles rather than reflecting while they perform shielding. Similarly prior silver nanoparticle coated in the jute fabric shown improvement in the EMI SE in the post-PANI coating in the range of 20.5 to 21.3 dB . This behaviour was attributed to increased reflection of EM waves due to formation of dense, uniform, and percolated network of conductive silver nanoparticle with increasing in the concentration of the AgNO3.

CBP 14: MODIFICATION OF YAK FIBRE FOR MAKING IT SUITABLE FOR BLENDED YARN PRODUCTION IN JUTE SPINNING SYSTEM

Dr. K.K. Samanta, Dr A.N. Roy, Dr. S.Debnath, Sh. K. Patra and Sh. K. Mitra

Yak hair fibre is used in making clothing, blankets, bags, implements rugs and tents. Two types of fibres, namely the coarser and fine fibres are harvested once in a year during early summer by manual shearing and cutting process. Subsequently, those fibres are separated out manually. Combing out the down fibre prior to shearing can increase the yield of fine fibre from the total fleece by about 10% compared with shearing alone.

A yak can produce 500 – 1500 g of coarser fibre and 250- 750 g of finer fibre per year. It was found

that the coarser fibre comes with blackish in colour, whereas the fine fibre comes with brownish in colour.

Chemical analysis

FTIR spectra of untreated and treated yak fibres were analysed. It is inferred that peak present in between 1200-1250 cm^{-1} in the untreated samples was merely reduced in all the three treated samples and there was appearance of new peaks at around 1174 and 1040 cm^{-1}. The broad intensity band in between the wavelength of 3090-3430 cm-1 in the untreated and treated samples may be associated with stretching and absorption peak of carboxylic (–COOH), alcohol (–OH) and –NH groups.

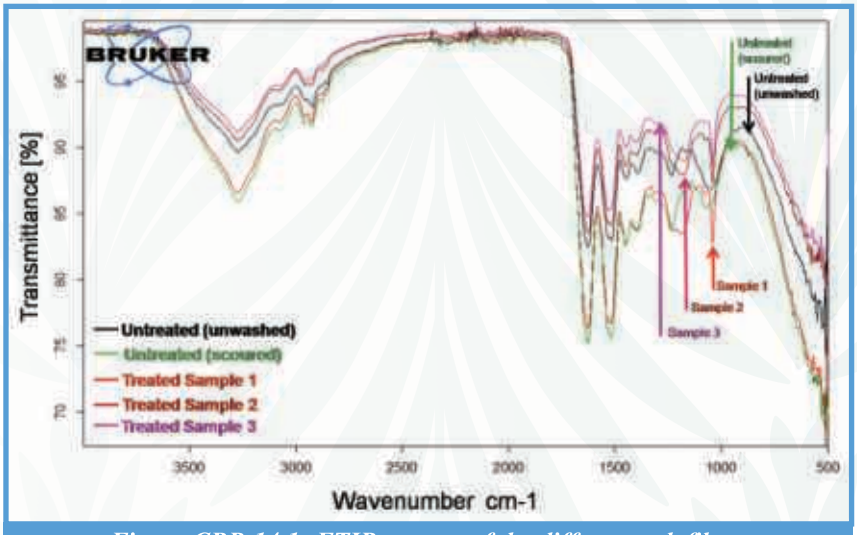


Figure CBP-14.1: FTIR spectra of the different yak fibres

In both the untreated and treated fibre samples, the major characteristic absorption peaks of the peptide bond are seen at 1623 cm-1 for Amide I (1690 - 1600 cm^{-1}), at 1515 cm-1 for Amide II (1575 – 1480 cm^{-1}), and 1235 cm-1 for Amide III (1320 – 1210 cm^{-1}). It can be seen that the peak for Amide III present in the untreated samples was merely reduced in the treated samples. The other vibrations visible in the spectra are amino acid chain deformation and bending modes for CH_2 and CH_3 at 1453 cm-1 and 1394 cm^{-1}.

The cystine monoxide stretch visible at 1077 cm^{-1} in the untreated samples disappeared or shifted to 1040 cm^{-1} in the treated samples owing to cystine oxide stretches, consisting of both asymmetric and symmetric cysteic acid stretches at 1171 cm^{-1} and 1040 cm^{-1}, respectively.

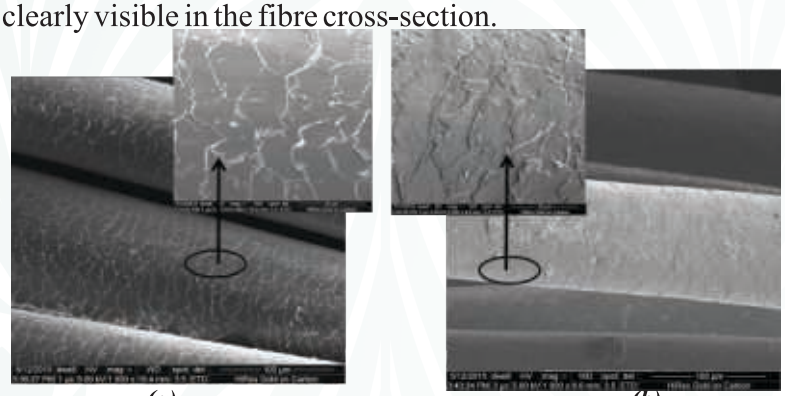
SEM of surface and cross-sectional morphology

Untreated and chemically treated yak fibres were observed under SEM. Yak hair also possesses scale on the surface and in the treated sample, the scale seems to be slightly smoother. The changes in fibre morphology may be due to adverse interaction of dilute sodium hydroxide and sodium bi-carbonate

with yak protein. It is seen that, yak hair does not have any medulla i.e. internal hollow space in the fibre cross-section.

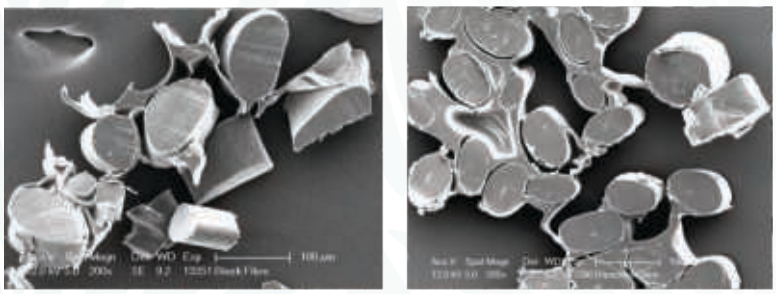
The cross-section looks like elliptical in shape with a large variation in the fibre diameter from bottom (coarser) to top (tip) of the fibre. The diameter of the coarser yak fibre varies in the range of 50-120 µm. It is also visible that after treatment, there is no significant change in the fibre cross-sectional morphology. Figure CBP-14.4 depicts the surface as well as cross-sectional morphology of jute fibre. Unlike the yak fibre, the jute fibre looks like pillar-shaped with elliptical cross-section. The individual jute fibre cross-section seems to be polygonal and longitudinal flutes are clearly visible on the fibre surface.

The presence of a longitudinal flutes and absence of hydrophobic fatty layer on the surface helps it to possess higher co-efficient frictional value. Similar to other cellulosic fibres, the central hollow space i.e. lumen is clearly visible in the fibre cross-section.



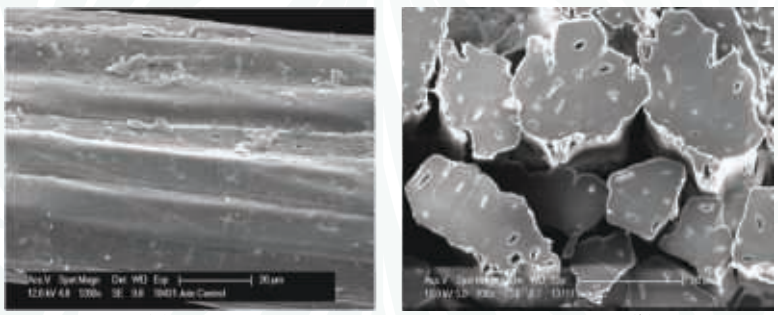
(a) *(b)*

Figure CBP-14.2: Scanning electron surface micrographs of the untreated (a) and treated (b) yak fibres.



(a) *(b)*

Figure CBP-14.3: Scanning electron cross-sectional micrographs of the untreated (a) and treated (b) yak fibres.



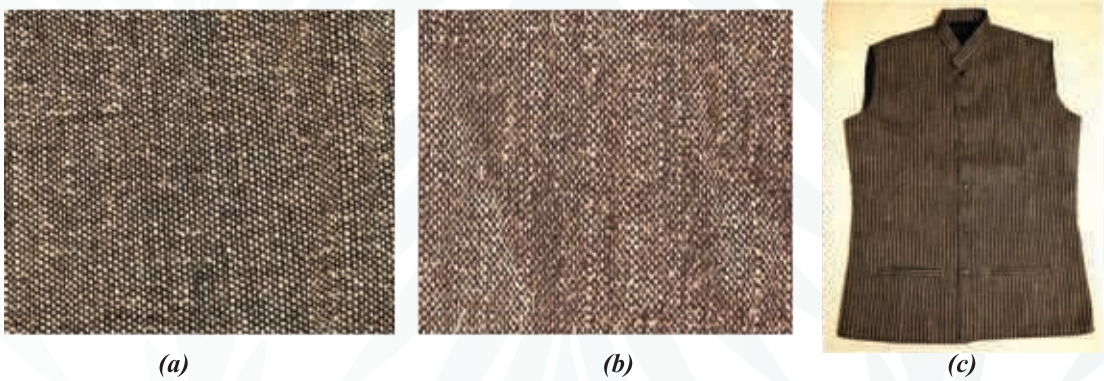
(a) *(b)*

Figure CBP-14.4: Surface and cross-sectional micrographs of the jute fibre

Fabric from jute/yak fibres blended yarn

Jute/yak fibres blended yarn of count 275 Tex was produced from the untreated black colour coarser yak and jute fibres with jute to yak fibres blend ratio of 75:25 and 50:50 in jute spinning system. It was noticed blends containing more than 50% untreated yak fibre component, not possible to spin due to instability and slippage of the blended sliver attributed to low co-efficient of friction (0.28) of untreated yak fibre. After chemical modification of yak fibre, it was possible to blend with jute fibre to produce 25/75 jute/yak fibres blended yarn. Tenacity and tensile strain at break of the 25:75 jute/yak fibres blended yarn were 3.4 cN/tex and 1.9%, respectively.

The 50:50 and 25:75 jute/yak fibres blended yarns was finally used as weft yarn to produce plain weave (1×1) fabrics, where the black colour polyester spun yarn (29.5 tex) was used as a warp. Additionally, jute/yak fibres blended warm garments, such as jacket and over coat were also developed using dyed and un-dyed jute/yak fibre blended yarns.



(a) *(b)* *(c)*

Figure CBP-14.5: Pictures of fabric and product produced from (a) jute/yak (50/50) and (b) jute/chemically treated yak (25/75) fibres blended yarns and (c) product

CBP 15: SUSTAINABLE FLAME RETARDANT FINISHING OF JUTE AND JUTE-COTTON FABRICS USING PLANT EXTRACTS

Dr. K.K. Samanta, Dr. S.N. Chattopadhyay and Sh. K. Patra

Natural fibre based textiles like jute, cotton, flax, ramie, banana, silk and wool are mostly used in apparels and home-furnishing applications. Cellulosic fibres are mostly used in apparel application, however, such fabric suffers from the low limiting oxygen index (LOI) value of 18 and catches flame readily in an open atmosphere. If LOI value of a textile could be improved to ≥ 27, it is generally considered as flame retardant textile.

Jute fabric either scoured or bleached shows the LOI value of approximately 21 thus, it needs to be processed with flame retardant formulation for specific end applications. Apart from its usage in the form of sacking and hessian, diversified jute products like wall covering, carpets and furnishing materials, where flame retardant property is desirable. In our present research an agro-waste i.e. banana stem sap was used for flame retardant finishing of jute fabric in the context of sustainable processing.

Flame retardant finishing of jute and its thermal analysis

A jute fabric of 520 GSM with 37 ends and picks per inch was scoured with non-ionic soap and alkali solution. Successively, the fabric was bleached with hydrogen peroxide before application of banana pseudo-stem sap (BPS). The BPS was applied in both the scoured and bleached jute fabrics. The effect of pre-mordanting with alum and tannic acid prior to BPS application was also studied in terms of improvement in flame retardant property.

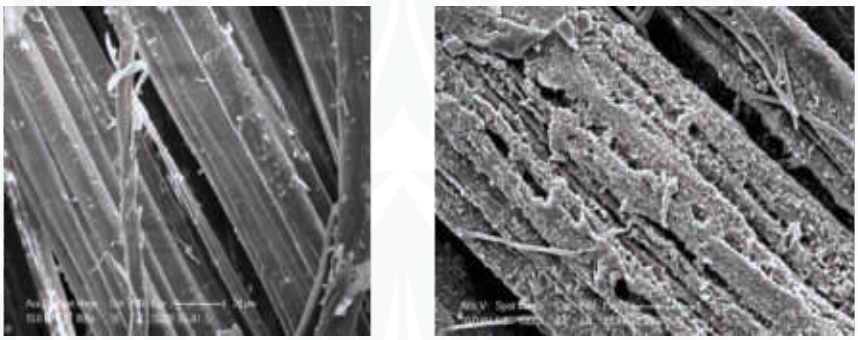


Figure CBP-15.1: SEM surface micrographs of (a) untreated and (b) BPS treated jute fabrics

It was observed that after application of BPS, the fabric did not catch flame and its limiting oxygen index (LOI) value increased significantly from 22 to 30 (only BPS treated) and 34 (mordanted+BPS treated). Similar results were also observed in the bleached jute fabric after the application of BPS, where the LOI value increased from 21 to 30 respectively. The SEM image of untreated sample showed a smooth surface, where the individual fibre with surface longitudinal flutes are easily visible. After application of BPS, a lot of deposition is clearly visible on the surface as shown in Figure CBP-15.1.

The heat release rate was measured in cone calorimeter in terms of maximum average rate of heat emission (in kW/m2) and the values were 76.0 and 69.4 kW/m² in the untreated and treated samples, respectively. The total smoke release value was lower in the treated sample compared to untreated sample. The carbon dioxide and carbon monoxide release in the untreated and BPS treated samples were almost similar, however their peak value i.e. maximum emission at any particular time was much more in the untreated sample compared to treated sample. Similar to flame retardant finishing of jute fabric, the scoured jute/cotton union fabric was also treated with BPS.

Figure CBP-15.2: Picture of burning of BPS treated jute/cotton union fabric

In vertical burning, an untreated sample burnt completely within 70 s with flame, whereas the BPS treated sample brunt very slowly with afterglow (without any flame) with much longer time of 1578 s. The burning behaviour of the BPS treated jute/cotton union fabric is shown in Figure CBP-15.2. The LOI value in jute/cotton union fabric after application of BPS improved to 31 from 22 in the untreated sample.

Ultraviolet protection and Antimicrobial effect

It was seen that after application of BPS in the bleached jute fabric, the ultraviolet protection factor (UPF) rating increased from 95 in the untreated sample to 130 and 150 in the only BPS and the mordanted + BPS treated samples, respectively measured as per the AATCC 183:2000 standard.

As a result of this, the UVA transmission percentage gets decreased from 1.4% in the untreated to 0.58% and 0.45% in the above BPS treated samples respectively. Similarly the UVB percentage is also reduced from 0.77% to 0.63% and 0.54% in the treated samples respectively. This indicates that the BPS can be used as a natural UV protective agent for jute textile.

Bleached jute fabric shown an increase in the CFU before ($7.4x10^4$) and after ($3.1x10^7$) incubation period, while BPS treated jute fabric did not shown any reduction in CFU against *Staphylococcus aureus* (Gram positive Organism) before ($2.8x10^5$) and after ($1.8x10^5$) incubation period, however it shown 100% reduction in CFU against Klebsiella Pneumonia (Gram negative Organism) from 4.1 x 10^6 CFU to 0 CFU. Results inferred that BPS treated jute fabric shown flame retardant, UV-Protection and anti bacterial properties.

CBP 16: AROMA FINISHING OF JUTE TEXTILES

Dr. N.C. Pan, Dr. L.Ammayappan and Sh. A. Khan

Preparation of microcapsules and its characterization

During this period, Chitosan: citronella oil based microcapsule, Sodium Alginate/Polyvinyl Alcohol: Citronella Oil based microcapsule and Gum Arabic: citronella oil based microcapsule was prepared as per standard procedure. After preparation, the production yield of the microencapsulation system was calculated. Results inferred that the yield of microcapsule is ranged from 62.3 to 81.4% in which the highest yield is observed in Sodium Alginate/Polyvinyl Alcohol: Citronella Oil based microcapsule and lowest is observed in Chitosan: Jasmine oil based microcapsule.

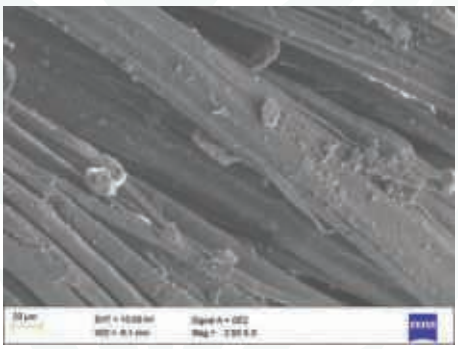
It may be due to good encapsulation of the citronella oil in this polymer system. The particle sizes of the different microcapsules were analyzed and it ranged from 6 to 30 micron, in which the higher size microcapsules were observed in the Chitosan: citronella oil based microcapsule and lower size were observed in Sodium alginate/Polyvinyl alcohol: citronella oil based microcapsule. Similarly, the release kinetics inferred that all wall materials have potential to release the citronella oil gradually, which may be due to its hydrophobic nature and it led to separation of chitosan/citronella oil into two layers.

Dyeing of jute fabric with a synthetic and natural dyes

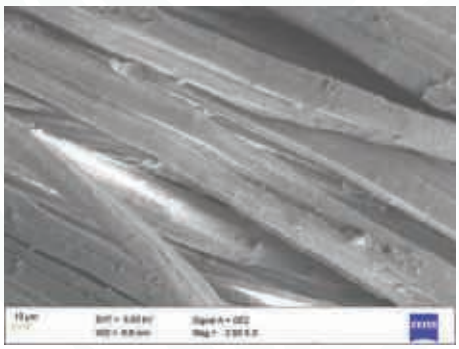
Bleached jute fabric was dyed with 4% reactive dye (Procion Green) and 4% direct dye (Direct Orange) separately. Similarly jute was dyed with Cochineal dye with pre-mordanting with three metallic mordants, such as potash aluminium sulphate, ferrous sulphate and two organic mordants citric acid and potassium hydrogen tartarate in single and combination mordanting. Among ten mordant combinations, the ferrous sulphate mordanted followed by cochineal dyed jute fabrics shown very good aesthetic appearance than other combinations, so that it is selected for further aroma finishing.

Fragrance finishing of dyed jute fabrics

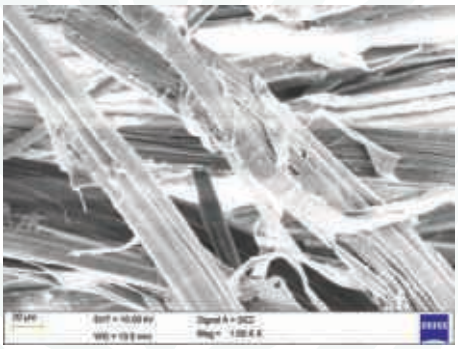
10 gpL microcapsule stock solutions were prepared and the pH of the stock was adjusted to 6.0 by adding dilute acetic acid solution. Dyed jute fabric of dimension 30cm x 30cm was taken and impregnated in the finishing solution for 5 minutes and padded with 95±5 % expression using a laboratory padding mangle. After padding, the fabric was dried at 70°C for 10 minutes. After drying, finished fabric was kept in a standard atmospheric condition and they were assessed by fragrance grade, FTIR Spectra and SEM study



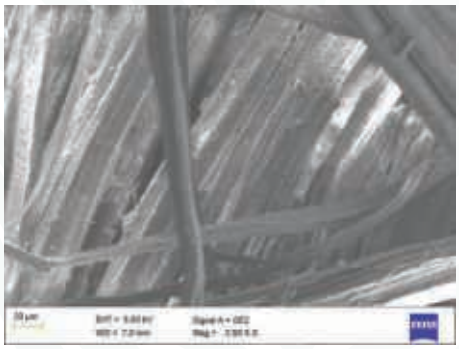
(a) Chitosan: Citronella oil microcapsule applied jute fibre



(b) Chitosan: Citronella oil microcapsule applied jute fibre]after five domestic washes



(c) Sodium alginate –polyvinyl alcohol : Citronella microcapsule applied jute fibre



(d) Sodium alginate/polyvinyl alcohol : Citronella microcapsule applied jute fibre after five domestic washes

Figure CBP-16.1: SEM photographs of jute fibres

Characterisation of finished jute fabrics

Dyed jute fabric does not have any smell / fragrance due to removal of the added and adhered impurities from the jute fabric. After fragrance finishing, obviously all judges gave excellent grade to finished jute fabric (0 washes), while after washing the finished fabric, the fragrance grade is significantly reduced with increasing in the washing cycles.

After 5 home laundering washes, there is a mild fragrance was available in the jute fabric. However, the fragrance grade is better in natural dyed jute fabric than reactive dyed fabrics and it may be due to the presence of additional metallic mordants which can make strong bonding with wall material.

It is also revealed that the fragrance grade of the finished jute fabric is significantly decreased with increasing in exposure days. However the release of fragrance from natural dyed jute fabric is slower than reactive dyed fabrics and both last up to 25-30 days.

The presence of the microcapsule is also visualized by taking the scanning electron microscopy images of the different fragrance finished jute fibre (before and after washing) and given in Figure CBP-16.1. After fragrance finishing, the surface of the jute fibre is coated with the agglomerated microcapsules and are clearly visible while after home laundering process, the microcapsules are detached from the jute fibre and hardly few microcapsules present on the surface of the jute fibre. It may be due to weak chemical interaction between microcapsule and the functional groups of the jute fibre.

Achievements

- Chitosan: Citronella oil based microcapsule has been prepared successfully in laboratory condition by coacervation method
- Sodium Alginate/Polyvinyl Alcohol: Citronella oil based microcapsules has been prepared successfully in laboratory condition with 6 to 12 micron particle size.
- Gum Arabic: Citronella oil based microcapsules were prepared successfully in laboratory condition with 8 to 16 micron particle size.
- Fragrance finishing is sustained up to five repeated home launderings.

CBP 17 DEVELOPMENT OF JUTE BASED COMPOSITE PRODUCTS

Dr. L.Ammayappan, Dr. K.K.Samanta and Sh. K.Patra

Jute fibre has desirable properties for reinforcement like impact strength and specific strength for the development of composites. Literature information on the development of moulded products from jute non-woven with high fibre load and low void content is still scanty.

Optimised condition

Jute nonwoven fabric of four different GSM (150, 200, 300, and 400 GSM) in 60 X 60 cm dimension was selected and prepared for biocomposite with unsaturated polyester resin by hand laying cum

compression moulding method. Jute composite of 300 GSM in three layers shown 22.8 % fibre loading, 53 MPa Tensile Strength, 85 MPa Flexural Strength, 8 MPa ILSS and 8.2% void content and this composite was selected as a optimum condition for further research works

Physical and chemical modification of jute fibre

Jute nonwoven fabrics were exposed to dry heat of temperature 100, 110, 120, 130, 140, 150 and 160°C for 2 hours. Chemical modification of jute nonwoven fabric was carried with acrylonitrile as per conventional process in 0.25, 0.5, 1 and 2% concentration. Physico-chemical, morphological and mechanical properties of modified jute fibre were assessed by FTIR spectroscopy, XRD spectroscopy, SEM and TGA spectroscopy.

Characterization of Physically modified jute fibre

It is known that during dry heat treatment, low molecular weight impurities present in the jute fibre can be degraded initially followed by removal of moisture at around 100°C. After removal of moisture, the fibrils of the jute fibre came closer to each other and it can increase the inter-molecular hydrogen bonding between cellulose polymers when increase in the dry heat temperature. The formation of the additional bonding between cellulose micro fibrils of jute fibre can increase the crystalline region as well as orientation.

TGA spectra informed that the residual charred mass (1.8 to 4.8%) of dry heat is higher than control jute fibre (0.87%). FT-IR spectra inferred that intensity of band at 3320cm-1 in dry heat jute fibre is smaller than control jute fibre and is due to the removal of adhering moisture and decrease in the amount of free hydroxyl groups of hemicellulose polymer. In addition, there is a reduction in the intensity of the band at 1030cm-1 which is assigned to >C=O ester stretching vibrations in methoxyl and β-O-4 linkages in lignin and it confirmed the partial cleavage in hemicellulose and lignin polymer.

SEM photographs visualised the defibrillation of the ultimate cells of the jute fibre as well as forms, cracks and roughness on the surface of the jute fibre. Further, XRD spectra appended that there is enhancement of crystallinity of the jute fibre after dry heat treatment which may be due to increase in crystallite sizes of cellulose, i.e. the crystallites surface corresponding to amorphous cellulose regions diminished

Characterization of chemically modified jute fibre

After acrylonitrile treatment, the amount of polymer add-on was ranged from 0.15 to 1.8%, while at lower concentration acrylonitrile covers the grooves on the surface of the jute fibre, and at high concentration it fills the grooves, which is also mainly responsible for improvement in the spreading of resin as well as mechanical interlocking / anchoring with the resin. XRD Spectra revealed that degree of crystallinity of the jute fibre is decreased with increase in the acrylonitrile grafting. TGA spectra informed that poly-acrylonitrile deposited on the surface of the fibre enhanced the thermal stability. The coating of the poly-acrylonitrile was confirmed in the FTIR spectra by appearing band at 2203 cm-1 and the peak at 1460 cm-1.

Physical properties of nonwoven fabric from modified jute fibre

Jute nonwoven fabric of 300 GSM was exposed to dry heat of temperature 100, 120, 140 and 160oC for 2 hours. Their physical properties inferred that on increasing in the dry heat temperature, there will be decrease in the packing density of the fabric due to increase in the pores between inter fibres and inter layers. Similarly jute nonwoven fabric of 300 GSM was treated with acrylonitrile (0.25, 0.5, 1 and 2%) as per standard procedure. The physical properties of the chemically modified jute nonwoven fabrics inferred that on increasing in the concentration of the acrylonitrile, there will be increase in the packing density of the fabric due to polymer add-on as well as decrease in the pores between inter fibres and inter layers due to padding process during the removal of the excess liquor.

Characterization of composite from modified jute fibre based nonwoven fabric

Physically and chemically modified jute nonwoven fabrics of 300 GSM were used for the preparation of composite sheet. The physical properties of the dry heat treated jute nonwoven fabric based composites inferred that on increasing in the dry heat treatment, there will be an increase in the fibre load up to 150oC and then it will be reduced.

The amount of fibre in composite from dry heat treated jute nonwoven ranged from 22.6 to 26.4% in comparison with 21.7% control sample.Similarly in chemically modified jute nonwoven fabric based biocomposites, there will be a gradual increase in the fibre load up to 5gpl and then it will be reduced. The amount of fibre in the biocomposite ranged from 23.0 to 24.7-% and it is also higher physical modification.

CBP-18: DEVELOPMENT OF UNIVERSAL BLEACHING PROCESS OF JUTE FOR TEXTILE AND NON-TEXTILE APPLICATIONS

Dr. S.N. Chattopadhyay, Dr. N.C. Pan, Sh. A. Khan and Sh. S. Bhowmick

During the period, jute fibre was subjected to per-acetic acid (PAA) treatment. Initial studies revealed that mild alkaline condition is needed for obtaining better whiteness of the fibre. Jute fibre was first pre-treated for soft scouring using 0.5% Na_2CO_3 and commercial non-ionic detergent at 50°C for 30mins. Both the grey and pre-treated fibre was then bleached with PAA. One bath was made alkaline with sodium carbonate only and the other set was made alkaline with sodium carbonate + tri-sodium pyro-phosphate.

Evaluation of the result revealed that pre-treatment produces better whiteness (77-78 in Hunter Scale) after PAA bleaching and buffering with TSPP produced better whiteness along with 90% retention of strength. Hence, alkaline pH, soft scouring and addition of TSPP as buffering agent in the bleach bath is necessary for obtaining bright bleached fibre after PAA bleaching.

Study was also carried to find out the effect of different bases like Sodium carbonate, sodium hydroxide and magnesium carbonate along with TSPP to maintain the pH of the bath for PAA bleaching of jute fibre. Treatment was carried out using 1:20 material to liquor ratio at 70oC and pH 8

with 20 ml/litre PAA (30% strength). The bleached fibres were evaluated for optical and physical properties. Results revealed that conventional peroxide bleaching resulted in maximum strength loss with marginally higher whiteness index (83). In case of PAA bleaching, strength retention is maximum when sodium carbonate is used; however whiteness indices are similar in all the cases (77-79 in Hunter Scale).

In order to standardize concentration of TSPP, to be used for buffering three different concentration like 1gm/lire, 3gms/litre and 5gms/litre was used keeping other conditions same for PAA bleaching of jute fibre. The evaluation of results indicates that buffering of PAA bleaching bath using 3gms/litre TSPP produces the maximum whiteness (78 in Hunter Scale) with maximum retention of strength (22 g/tex).

Table CBP-18.1: Box Behnken design for optimisation of per-acetic acid bleaching

Sample name	*PAA (gm/litre)*	*Time (hour)*	*Temperature (^{o}C)*
BBM-1	30	2	50
BBM-2	10	2	70
BBM-3	20	2	60
BBM-4	20	2	60
BBM-5	20	1	50
BBM-6	30	3	60
BBM-7	30	1	60
BBM-8	20	1	70
BBM-9	20	3	70
BBM-10	20	3	50
BBM-11	30	2	70
BBM-12	10	2	50
BBM-13	20	2	60
BBM-14	10	3	60
BBM-15	10	1	60

From the earlier experiments, it has been realised that bleaching of jute fibre at pH-8, 1:20 MLR, TSPP concentration of 3gms/litre as buffer and soft scouring is needed. For optimisation of PAA concentration, temperature, and duration of treatment time, Box-Behnken Model was used with the three variables and three level of treatment and 15 numbers of experiments were performed (Table CBP-18.1), followed by evaluation of physical and mechanical properties. Evaluation of results revealed that use of 20ml/litre PAA, 70^{o}C temperature and 2 hours of treatment time produces the best results in terms of whiteness as well as brightness index with maximum retention of tensile properties.

Achievements

- Soft scouring of jute fibre is needed before PAA bleaching for better whiteness.
- 3gms/lire TSPP should be used as buffer for better whiteness and strength retention.
- PAA bleaching of jute fibre using 20ml/litre PAA, 70°C for 2hours produces the best result with respect to whiteness index and strength retention
- Eco-friendly oxidative bleaching of jute fibre can be done using PAA for bright as well as white jute fibre with maximum retention of tensile strength and minimum weight loss.

TOT 10: DEVELOPING AND UNDERTAKING OF EXTENSION SERVICES FOR EFFECTIVE DISSEMINATION OF INSTITUTE TECHNOLOGIES

Dr. S.B. Roy, Dr. L.K. Nayak, Dr. D.P. Ray, Dr. V.B. Shambhu, Dr. S.C. Saha, Sh. S.Das and Sh. K.Mitra

Externally Funded Training Programs

Seven Skill Development Training Program on "Jute Handicrafts, Jute Bag Design Development and Bleaching Dyeing" sponsored by Office of The General Manager, District Industries Centre, Uttar Dinajpur, Raiganj, West Bengal under Jute Diversified Products Cluster of Uttar Dinajpur scheme, have been organized at seven different venue in Uttar Dinajpur District, West Bengal. The details of the program are given in Table ToT-10.3

Table ToT-10.1: Details of programs

Venue	*Duration*	*Participants*
Shergram, Kaliyaganj, Uttar Dinajpur, West Bengal	January 8-February 4, 2018	24
Mudafat, Kaliyaganj, Uttar Dinajpur, West Bengal	January 8-February 4, 2018	24
Karandighi, Uttar Dinajpur, West Bengal	February 5-March 1, 2018	24
Palsa, Karandighi, Uttar Dinajpur, West Bengal	February 5-March 1, 2018	24
Arthagram, Uttar Dinajpur, West Bengal	March 7-31, 2018	24
Kulator, Itahar, Uttar Dinajpur, West Bengal	March 7-31, 2018	24
Islampur, Uttar Dinajpur, West Bengal	March 21-April 14, 2018	24

Figure ToT-10.1:Address by Director

Figure ToT-10.2:Training in progress

Front line demonstration of Power Ribboner

Front line demonstration on power ribboner for improved jute retting technology through extraction of ribbons/barks from jute/mesta plants were conducted at six different places covering four jute growing districts of West Bengal in collaboration with KVKs, and Farmers clubs of West Bengal. About 280 farmers were actively participated and they have operated the machine for extraction of ribbons from green jute/ Mesta plant. After extraction, the ribbon retting was conducted by vertical hanging on bamboo in open ditch and pond. It is observed that ribbon retting was completed within 6-8 days against 16-18 days in the conventional process. Farmers' queries on ribboning capacity, fibre quality, cost of machine, labour requirement, power consumption and weight of the machine were clarified.

Table ToT-10.2: Details of the FLD programs

Date of Demonstration	*Village*	*Block*	*District*	*No. of Participants*
02.08.2017	KVK Hooghly	Chinsura	Hooghly	35
03.08.2017	KVK Hooghly	Chinsura	Hooghly	55
16.08.2017	Ranigachi	Bhangur - I	24 Parganas (S)	40
24.08.2017	Mathur Gachhi	Chakdah	Nadia	45
26.08.2017	Barkul Beria	Kaligunj	Nadia	45
30.08.2017	Ariala	Barasat -I	24 Parganas (N)	60




Figure ToT-10.3: Demonstration and Leacture class of power ribboner in different locations

Participation of institute in exhibition/ seminar/Mela

Institute participated in various programs and displayed / demonstrated the products and technologies of the institute to various stakeholders. Officers from the institute had actively disseminated the technologies to different stakeholder who attended the programs and made awareness on jute and allied fibre and their products.

Table ToT-10.3: Details of exhibitions participated

Program	*Organized by*	*Venue*	*Duration*
Krishi Mela 2017	ICAR-Research Complex for Eastern Region, Patna	Motihari, Bihar	April 15-19, 2017
3rd National Handloom Day	Weavers Service Centre, Development Commissioner of Handloom, Ministry of Textiles, Govt. of India	Indian Council for Cultural Relations (ICCR), Kolkata	August 7-8, 2017
Technology Week cum Rabi Kisan Sammelan 2017	KVK, Howrah	KVK, Howrah	January 18-20, 2018
6th Agro Protech	Indian Chamber of Commerce, Kolkata	Kolkata	February 12-14, 2018
Technology Demonstration Mela	ICAR-NIRJAFT, Kolkata	ICAR-NIRJAFT	February 17, 2018
National Seminar on Market Driven Innovation in Natural Fibres	TINFS in collaboration with ICAR-NIRJAFT, NJB and NABARD	ICAR-NIRJAFT	February 22-23, 2018
Regional Agriculture Fair for Eastern Region	Bihar Agricultural University, ICAR	Sabour, Bhagalpur, Bihar	February 24-26, 2018
Krishi Unnati Mela 2018	Indian Council of Agricultural research, New Delhi	ICAR-IARI, New Delhi	March 16- 18, 2018

Figure ToT-10.4:Stall at Krishi Mela 2017

Figure ToT-10.5:Particpation in 3rd National Handloom Day at at Indian Council for Cultural Relations (ICCR), Kolkata

Figure ToT-10.6:Stall at KVK, Howrah

Figure ToT-10.7:Foreign delegates at 6th Agro Protech

Figure ToT-10.8:Stall at National Seminar

Figure ToT-10.9:Stall at Sabour, Bhagalpur, Bihar

Figure ToT-10.10:Stall at Krishi Unnati Mela 2018

Figure ToT-10.11:TV talk for Krishidarpan program

Self-sponsored Trainings

Self-sponsored skill development training programs on jute handicrafts, jute handbags, bleaching and dyeing of jute and Jute Jewellery have been organized at ICAR-NIRJAFT.

Table ToT-10.4: Details of programs

Subjects	*Period*	*Numbers of Trainees*
Bleaching and Dyeing of Jute Fabric	April 17-21, 2017	12 (07M+05F)
Bleaching and Dyeing of Jute Fabric	May 1-5, 2017	12 (06M+06F)
Jute Hand Bags / Shopping Bags	May 22-June 3, 2017	25 (14M+11F)
Advanced Jute Handicrafts	June 12-24, 2017	27 (05M+22F)
Jute Handicrafts and Jute Jewellery	July 10-22, 2017	24 (06M+18F)
Jute Hand Bags / Shopping Bags	July 17-29, 2017	22 (12M+10F)
Skill development program on Bleaching and Dyeing of Jute	July 26-29, 2017	24 (10M+14F)
Skill development program on Bleaching and Dyeing of Jute	August 28 – September 1, 2017	12 (05M+07F)
Jute Handicrafts and Jute Jewellery	November 13-25, 2017	26 (05M+21F)
Jute Hand Bags / Shopping Bags	December 11-23, 2017	24 (10M+14F)
Advanced Jute Handicrafts	February 12-24, 2018	22 (05M+17F)

M-Male & F- Female

Figure ToT-10.12:Training on jute based shopping bags

Figure ToT-10.13:Lecture on bleaching

Figure ToT-10.14:Certificate distribution by Director

Figure ToT-10.15:Certificate dirtibution by course director

Figure ToT-10.16:Certificate distribution by Director

Figure ToT-10.17:Training on jute handicraft

Figure ToT-10.18:Valedictory function on November 25, 2017

Figure ToT-10.19:Products developed by the trainee

Figure ToT-10.20:Training on advanced handcrafts

Figure ToT-10.21:Certificate distribution by Director

Front line demonstration on Accelerated Retting of Jute

Front line demonstration on accelerated retting were conducted at 11 different places mainly in Farmers Field, Krishi Vigyan Kendra (KVKs), University farms and NGOs in West Bengal and Assam in collaboration with Universities, KVKs, NGOs and Govt. of India. In each FLD programme, about 0.25 hectare crop area was selected of which a part of the crop amounting to about 2-3 quintals was retted after harvesting by ICAR-NIRJAFT's Accelerated Retting Technology and it was also compared with conventional retted jute fibres. The following FLDs have been carried

Table ToT-10.5: Details of FLD Programs

Date	*Place*	*In collaboration with*	*No. of participants*
15.07.2017	Barrackpore	Nuziveedu Seed Company	23
25.07.2017	Bakshagarh	Hooghly Farmer Producer Company Ltd	76
	Motukpur	Hooghly Farmer Producer Company Ltd	82
31.08.2017	Nagaon Assam	Dep't of Agriculture, Govt. of Assam and RARS, Assam Agricultural University, Assam	51
01.08.2017	Morigaon, Assam	Dep't of Agriculture, Govt. of Assam and RARS, Assam Agricultural University, Assam	49
03.08.2017	Chinsura	KVK, Hooghly	52
18.08.2017	Tamaghata	Hooghly Farmer Producer Company Ltd	32
	Dhamas		60
04.09.2017	Bhavanipur, Murshidabad	IFFCO(Indian Farmers Fertiliser Cooperative)	60
05.09.2017	Ramchandrapur, Murshidabad	IFFCO(Indian Farmers Fertiliser Cooperative)	32
07.09.2017	Chinsura	KVK, Hooghly	24

Figure ToT-10.22:Conventional Jute retting in Hooghly West Bengal

Figure ToT-10.23:Farmers meeting at Tamaghata in makeshift tent

Figure ToT-10.23:FLD meeting on retting Accelerator

Figure ToT-10.24:Deliberation by Sh. A. Sarkar to the farmers

Figure ToT-10.25:FLD meeting on accelerated retting at Dhamas

Figure ToT-10.26:Feedback from IFFCO authority in Social media

Figure ToT-10.27:FLD in collaboration with IFFCO at Lalgola

Figure ToT-10.28:Fibre produced through FLD at Chinsura

TOT-11: IMPROVEMENT, UPSCALING AND POPULARIZATION OF POWER RIBBONER

Dr. V.B. Shambhu, Dr. A K. Thakur, Dr. L.K. Nayak, and Sh. B. Das

Jute and Mesta are the two important fibre crops in India and they are extracted from the bark or bast of the plants by retting the whole plants. During this period, farmer's feedback under front line demonstrations (FLD) and participatory technology development program were collected for necessary improvement in power ribboner.

Data found that about 90 percent farmers were in favour of the use of power ribboner with easy transport from one field to another field; more than 95 percent farmers suggested to enhance the capacity of the ribboner. They also suggested that machine should also run by diesel / kerosene engine. Accordingly, necessary modification has been incorporated in the designing of new improved ribboner machine.

A platform for collection of peeled ribbons has been designed and fabricated to collect the separated ribbons and reduces the man hour requirement for collection of peeled ribbons. It was tested in actual field condition and found that the desired collection of separated ribbons was not achieved at a satisfied level. Therefore, a new approach for the collection in arranged manner will be tried in modified ribboner machine. Some of components like fluted rollers, gears, gear block, bearing housing, various types of slots, parts of delivery rubber roller of ribbons system and frame Parts were fabricated.

Under this period, front line demonstration on power ribboner with farmers' participation under National Food Security Mission, 2017-18 were conducted satisfactorily at six different places covering four jute growing districts of West Bengal in collaboration with KVKs, and Farmers clubs of West Bengal.

About 280 jute/mesta growing farmers were actively participated during deliberation of a lecture and they themselves have operated the machine. The ribbon retting was also conducted in vertical hanging on bamboo in open ditch and pond. The retting was completed within 6-8 days whereas convention whole plant was retted in 16-18 days. Farmers have shown keen interest and their queries on ribboning capacity, fibre quality, cost of machine, labour requirement; power consumption and weight of the machine were answered satisfactorily.

Chief findings

- The collection platform for separated ribbons/barks needs to be modified for better collection and arrangement of ribbons.

- On the basis of farmers' feedback, a new prototype has to be fabricated incorporating all the suggested parameters.
- The retting time for ribbons was reduced to about 8 days as compared to about 20 days in conventional retting with whole plants in farmers' fields.

Figure ToT-11.1:Demonstration of power ribboner in fields

EXTERNALLY FUNDED PROJECTS

NASF-ME-5016: INVESTIGATION OF EFFECT OF STRUCTURE OF JUTE AND ALLIED FIBRE PRODUCTS ON SOUND INSULATION PROPERTY

Dr. G. Bose, Dr. S.Sengupta, Dr. K.K.Samanta, Mrs. L. Mishra, Mr. S.Debnath, Mr. S. Middya (NIRJAFT), Dr. M Datta (GCETTS), Mr. S. Mukherjee (IIESTS)

During this period, seventeen natural fibers were tested for their acoustic properties and compared with the commercial counterpart keeping same densities (g/cm3) in the sample holder. Jute and some allied fibre showed much comparable absorption performance with glass wool and rock wool. This fibre database would be instrumental in selection of natural fibers for use as noise absorber.

Jute felt of even as low as 27.5 mm thick showed comparable sound absorption property to commercially available 40 mm thick conventional sound absorbers viz. glass wool and rock wool. This indicates that thickness of the jute based sound absorber could be reduced by 12.5 mm.

Natural fiber extracted from the bast of "Abelmoschus Esculentus", popularly known as "Okra" fiber showed best noise absorbing trend. Roselle (*Hibiscus sabdariffa*) fiber shows much similar value as jute. It is much cheaper than jute fibre.

A database of acoustic performance of all the commercially available jute based woven and nonwoven clothes are also prepared in the reporting time. Entire range of commercially available jute woven cloth was tested for their noise absorption property. No conventional woven cloth shows any notable absorption property in the audible range of frequency. Average NAC = 0.01. Thicker pile cloth (carpet like texture, 3mm pile height) using low twisted yarn was prepared. Pile showed 0.1 average NAC.

It is found that thickness and bulk density of nonwoven fabric are responsible for sound absorption and transmission loss respectively. Using jute nonwoven, thickness of absorbers can be reduced up to 55% at 40 mm. So, performance of 90 mm material can be achieved by 40 mm thick jute nonwoven.

To achieve the maximum absorption of a specific wave length, the absorber should have thickness equal to the $1/4^{th}$ of the wave length. Nonwoven structures offer elongated non-linear air channels inside the material (commonly called as "tortuosity"). This nonlinear air channels cause to obtain so, 1/4th wave length is obtained in the nonwoven structure even in the thinner cloths.

The bulk density on the other hand co-relates more to the barrier property of jute felt. Increase in fibrous mass in a given volume reduces the air channel, thus, sound waves starts In a constant volume of space if we start stuffing with fibre, the porous channels occupied with air becomes narrower to a certain limit. To this extent the absorption performance is improved. Co-relation of NAC with porometry analysis of four specially produced jute felt having area densities of 500 g/m^2,

1000 g/m^2, 1500 g/m^2 and 2000 g/m^2 showed that the structure having minimum pore size produced better absorption. It is clear, as the area density is increased successively; the maximum pore size increased indicating easy fluid flow. On the other hand, the steady decrease in minimum pore size indicating a "bottle neck" as per Figure 1 in the structure that effectively resists the easy fluid flow.

Figure NASF.1: Idealised fluid flow in capillary flow porometer through jute felts

The acoustic property evaluations of these materials are also in line with the results obtained in "Porometry". As the minimum pore size and mean pore size reduces, the absorbing nature of felts increases significantly.

Jute filled perforated rigid panel absorber can provide transmission loss as well as sound absorption over complementary frequency range. That is, it absorbs the lower frequencies and hinders the transmission in the higher frequencies. So, entire range of frequency is insulated by two different means, viz. Absorption and transmission loss. Specially conceptualized and designed fiber holders are fabricated to make special type sound insulation product that can act both as effective absorber and barrier depending on the position of its use.

CRP/NIRJAFT- 01: DEVELOPMENT OF MACHINERIES FOR EXTRACTION OF FIBRE FROM SISAL, FLAX AND PINEAPPLE

Dr. L.K. Nayak, Dr. S.Debnath and Dr. V.B. Shambhu

In case of available/existing sisal fibre extractor, it was observed that the separation of fibre by the beating action of the roller needs human drudgery during feeding of green leaves into the machine and also the backward dragging. Hence, the output from the extractor got affected due to this human labour. To avoid human drudgery involved during feeding, a new extractor was designed and fabricated as first prototype. After trial runs on first prototype extractor, an improved extractor with the provision of feeding the whole length of green leaves was developed (Figure 1). The green sisal leaf and the extracted fibre are shown in Figure 2 and Figure 3 respectively. The extractor runs by a 2 hp motor and having capacity of 50 kg leaves/h with average fibre yield of 4 percent/leaf weight.

In case of pineapple leaf fibre extractor, it was observed during the trial run on the first prototype extractor that scrapping and serration action is in-adequate in giving the necessary changes on the

surface of green leaves before subjecting it to retting. Hence, the extractor was modified with the replacement of combing roller in place of serration roller (Figure 4). The combination of actions i.e. *scrapping and combing* facilitates easy penetration of microbes thus reducing the time of retting along with the production of uniform and quality fibre. The extractor has the provision of multi-leaf arrangement where, three (03) green leaves are fed simultaneously to the extractor. The green pineapple leaf and the processed leaf are shown in the Figure 5 and Figure 6 respectively. The extractor runs by a 1 hp motor and having capacity of 30 kg leaves/h with average fibre yield of 2 percent/leaf weight.

Figure CRP/NIRJAFT- 01.1: Sisal leaf fibre extractor with clamped green leaf

Figure CRP/NIRJAFT- 01.2: Green sisal leaf before extraction of fibre

Figure CRP/NIRJAFT- 01.3: Extracted sisal leaf fibre

Figure CRP/NIRJAFT- 01.4: Improved Pineapple leaf fibre extractor

Figure CRP/NIRJAFT- 01.5: Green pineapple leaf fed to the extractor

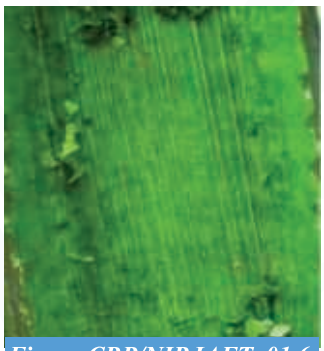


Figure CRP/NIRJAFT- 01.6: Processed pineapple leaf from the extractor

RP/NIRJAFT 02: DEVELOPMENT OF GRADING SYSTEM AND INSTRUMENTS FOR JUTE and ALLIED FIBRES

Dr. G. Roy and Dr. S.C. Saha

There are important natural fibres available and they can be used to manufacture diversified products. However, there is no specific grading system and grading instruments for those fibres in India. Being the leading research institute, ICAR-NIRJAFT has taken the research activities on grading and instrument development.

The main objective of this project was to design and development of the instruments to measure bundle strength, fineness and colour of the fibres for grading purposes. Institute has developed Electronic Bundle Strength Tester for multiple fibres, Digital Fineness Meter for multiple fibres and Digital Colour and Lustre Meter for multiple fibres. Similarly grading systems of Ramie, Sunnhemp, Sisal and Flax fibres were also developed. Sufficient number of tests are going on with those instruments and also verification of grading tables are going on to finalize the both. Statistical analysis was done on Ramie, Sunnhemp, Sisal and Flax fibres for strength, fineness and colour.

Table CRP/NIRJAFT- 02.1: Statistical analysis data

Fibre	*Property*	*Testing method*	*Average*	*Variance*	*Std Dev*	*CV%*
Ramie	Strength (189)	Manual	22.3	21.9	4.7	21.0
		Electronic	23.2	23.9	4.9	21.1
	Fineness (189)	Gravimetric	1.2	0.1	0.4	29.7
		Electronic	1.2	0.2	0.4	31.6
Sunnhemp	Strength (189)	Manual	19.1	19.8	4.5	23.4
		Electronic	17.7	20.6	4.5	25.7
	Fineness (97)	Gravimetric	5.5	1.1	1.0	18.9
		Electronic	5.8	1.5	1.2	21.0
Sisal	Strength (136)	Manual	22.4	24.3	4.9	22.0
		Electronic	22.3	25.6	5.1	22.7
	Fineness (116)	Gravimetric	2.2	0.3	0.5	22.3
		Electronic	2.3	0.3	0.5	23.4
Flax	Strength (209)	Manual	29.3	35.6	6.0	20.4
		Electronic	29.4	38.1	6.2	21.0
	Fineness (110)	Gravimetric	15.1	15.7	4.0	26.2
		Electronic	16.1	19.2	4.4	27.2

The value in the parenthesis is the number of samples tested

Under the project, three MOU have been signed with the fabricators and the developed instruments were sold to the different stake holders.

Details of buyer	Instrument(s) sold
Dr. Y.S.R. Horticulture University, A.P.	1. Thermal Insulation Value Tester 2. Digital Colour and Lustre Meter 3. Digital Fineness Meter for Multiple Fibre 4. Automatic Electronic Fibre Bundle Strength Tester 5. Portable Single Fibre Strength Tester

Raymond Luxury Cottons Ltd., Amravati Industrial Area, Nandgao Peth, Amaravati-444901, Maharashtra	Automatic Electronic Fibre Bundle Strength Tester for Multiple Fibre
M/S VIN Group, New Delhi	Digital Moisture Meter (Handy Type)
ICAR-CRIJAF, Barrackpore	1. Automatic Electronic Fibre Bundle Strength Tester For Multiple Fibres (With PC Interface) - 2 2. Digital Fineness Meter For Multiple Fibres (With PC Interface) - 2 3. Digital Fineness Meter For Jute - 1

CRP / NIRJAFT-03: ECO-FRIENDLY CHEMICAL PROCESSING OF LIGNOCELLULOSIC FIBRES FOR THE PREPARATION OF HOME TEXTILES

Dr S.N. Chattopadhyay, Dr. N.C. Pan, Dr. A.N. Roy and Dr K.K. Samanta

During this period, raw jute and banana fibres were blended in three different proportions like 50:50 (A), 75:25 (B), and 25:75 (C) and 8 pound yarn was produced. These yarns have been bio-scoured using 2% Texbio M + 2% Texzyme J (60°C/8.5 pH/ 1:10 MLR/120 minutes) and then bleached using hydrogen peroxide. Union fabrics were produced using different jute / banana blended yarns as weft and cotton yarn as warp. Three different blended yarns were used A-50: 50 Jute / Banana, B- 75:25 Jute / Banana and C- 25:75 Jute / Banana. The fabrics were first bio-scoured then bleached by hydrogen peroxide method , dyed with 4% Direct Green dye and 4% Procion Yellow HER respectively of 4% shade. In order to improve the functional properties of jute /banana blended fabric they were subjected to eco-friendly chemical treatments for improvement of UV- Protection, Fire retardation and Crease recovery properties. For UV Protection finish, fabrics were treated with commercial eco-friendly finishing agent ECOFINISH UV 500 (a Benzotriazole based emulsion) in different concentrations (20, 40, 50, 60 g/L) by pad-dry-cure process at pH 6. For flame retardant property, fabrics were treated with ECOFLAME CT-6 in different concentrations (50, 100, 200, 300, and 400 gpL) by pad→dry→cure process. For crease-resistant finish, fabrics were treated with ECOFIN 480 (eco-friendly modified DMDHEU finishing agent) in three different concentrations (40, 50, 60 g/L) by pad –dry – cure process. The following outcomes came from the work:

- The banana fibres become finer, whiter and brighter after the bleaching treatment with about 20% loss in tenacity.
- Good whiteness (82 in the HUNTER scale) is achieved in case of all the blended yarns after bio-scouring followed by bleaching irrespective of the blend ratio of the yarns.
- Solid shades with good wash fastness properties were obtained in all types of blends using reactive as well as direct dyes.
- The dyed yarns were used to produce fabrics in handloom which can be utilised for making different home textile items.

- The tenacity of jute/ banana blended yarn produced from bio-scoured-bleached fibres are much higher than that produced from grey fibres irrespective of blend ratio. The fabric produced from these yarns shows better tensile properties than the corresponding bleached fabric produced from yarns made from grey fibres.
- UV protection property of jute / banana blended fabric is very good (> 25 UPF rating) and treatment with 40 g/L UV protective agent (Ecofinish 500UV) makes it excellent (>35). Banana rich fabric shows better performance.
- Fire resistance property of jute / banana blended fabric improves with increase in proportion of banana fibre (LOI value > 20-24). Treatment with 200 g/L flame retardant agent (Ecoflame CT-6) produces excellent flame resistance property (LOI value 33-40).
- The fabric produced using jute / banana blends are of coarse type i.e., the fabric GSM is about 400 and draping quality is poor. The fabric can be used for curtains and a few bags only.

Hence, preparation of ternary blended finer yarns using jute, banana and regenerated plant fibres may produce finer quality yarn, so that the full potential of the lignocellulosic fibres can be exploited. The fabric thus produced can be utilised for making variety of home textile items.

Figure CRP/NIRJAFT- 03.1: Products developed from Jute/Banana fibre blends

DMCC (1008269): DEVELOPMENT OF MICROCRYSTALLINE CELLULOSE FROM JUTE CADDIES/STICKS

Dr. R.K. Ghosh, Dr. S.N. Chattopadhyay and Dr. D.P. Ray

Microcrystalline cellulose (MCC) is partially depolymerised cellulose prepared by treating α-cellulose, obtained as a pulp from fibrous plant with mineral acids. The most common form is used in

vitamin supplements or tablets for pharmaceutical application. The global demand of MCC was around 50,000 T in. Out of which 40 and 60% were shared by the food and pharmaceutical industries, respectively.

In India, a huge quantity of jute caddies, 40000 tonnes as processing waste and jute stick, around 4 Mt per annum as primary by-product of jute fibre cultivation, are produced. However, the common practice in vogue is to burn such waste materials/residues as firewood for domestic energy purposes. Hence, jute caddies and sticks can be explored as a source of raw material for preparation of MCC.

The industrial caddies and jute stick were characterized and found to contain ~41 and 62% cellulose, respectively. Extraction of alpha cellulose from caddies and jute sticks were optimized. The identified extraction methods yielded 38 and 58% of cellulose from stick and caddied, respectively. The extracted alpha cellulose was subjected to acidolysis treatments for conversion to microcrystalline cellulose. The preliminary studies yielded various MCC with degree polymerization (DP) varying from 90-850. The work is under progress.

AGRI BUSINESS INCUBATION

Dr. A.N. Roy, Dr. S.B.Roy, Dr. S.Debnath and Dr L.K. Nayak

Under this project, three training programs in the area of wet processing of jute textiles and development of jute handicrafts, one workshop on Yak Resource towards Doubling Highland Farmer's Income and the participation in Innovations for Festival of Innovation Entrepreneurship (FINE) Exhibition were successfully arranged.

Training Program on Jute Handicrafts

A four days training program on "Natural Dyeing and Bleaching of Jute and Allied Fibres" was organized under Agri-Business Incubation (ABI) Project in association with Ramakrishna Mission Ashram, Sargachi, Murshidabad from July 26-29,2017 at RKM, Sargachi. Dr.A.N. Roy, Director (Acting) and PI, ABI has inaugurated the program and briefed about the objectives of the training program. Twenty one trainees were participated and were given hands on training on bleaching and dyeing of jute textiles. Dr. N.C. Pan, PS and Head-CBPD, Dr. S. N. Chattopadhyay, PS, Dr. S. Debnath, PS and Sh. A Khan, STO were resource persons for this program.

Figure ABI-1:Inauguration of training program

Figure ABI-2:Theory class is in progress

A five days skill development training program on "Manufacture of jute Handicrafts" under Agri Business Incubation (ABI) Project, ICAR-NIRJAFT, Kolkata was conducted at KVK Jajpur, Odisha during Nov 14-18, 2017. In the inaugural session, Dr. Laxmikanta Nayak, Principal Scientist, ICAR-NIRJAFT, Kolkata has briefed the trainees about the ABI project. In valedictory session, Dr. S.Debnath, Principal Scientist and Co-PI, ABI briefed about the marketing of jute products as well as source of raw materials. Twenty progressive female farmers of Jajpur district, Odisha associated with agro-based craft works have participated in this program.

Figure ABI-3:Inaugural session of the training

Figure ABI-4:Training for farmers at Jajpur in progress

A six days training program on "*Manufacture of jute Handicrafts*" under Agri Business Incubation (ABI) Project was organized at KVK, Mayurbhanj-I (OUAT), Baripada, Odisha. In the inaugural program, Dr.S.Patnaik, Senior Scientist and Head, KVK, Mayurbhanj-I has highlighted upon the role of KVK in developing rural entrepreneurs through Jute handicrafts. Mrs. Jhunilata Bhuyan, Scientist has complemented the effort of ICAR-NIRJAFT for jointly organizing the program. In the valedictory program, Dr. A.N. Roy, Director and PI-ABI has briefed about the marketing of jute products as well as source of raw materials. Twenty two progressive female farmers associated with agro-based craft works of Mayurbhanj district, Odisha have participated in this program. Dr. LK. Nayak, Principal Scientist has coordinated the program.

Figure ABI-5:Training on jute handicraft at Mayurbhanj-I

Figure ABI-6:Certificate distribution by Director

Workshop at NRC-Yak

ICAR-NIRJAFT, Kolkata in collaboration with ICAR-NRC on Yak, Dirang has organized a Workshop on 'Yak Resource towards Doubling Highland Farmer's Income' at ICAR-NRC on Yak, Dirang during March 14-16, 2018 under ABI Project of ICAR-NIRJAFT, Kolkata. Around 20 tribal progressive yak farmer and entrepreneurs' have participated in this workshop. Theory classes on post harvesting processing of yak hair have been covered with suitable demonstration. Times of India, Arunachal Pradesh edition has covered the program and published the details in the daily newspaper on March 19, 2018.

Figure ABI-7:Inaugural of the workshop at Dirang

Figure ABI-8:Address by Director, NRC-Yak

Participation in FINE

The Festival of Innovation and Entrepreneurship (FINE) is a unique initiative of the Office of the President of India to recognize, respect and reward grassroots innovations and foster a supportive ecosystem. It has been organized at Rashtrapati Bhawan from March 19-21, 2018. FINE helped the innovators to build the linkages with potential stakeholders as well as to promote the lateral linkages among the innovators to enrich the ecosystem for new India.

Figure ABI-9:The First Lady of India Smt. Savita Kovind visited the Stall

Institute's facilitated start-up namely "Fulia Women and Youth Welfare Society" selected for participation in Festival of Innovation and Entrepreneurship at The President of India House, New Delhi during March 19-23, 2018 and have received good appreciation.

Figure ABI-10:Stall of Fulia Women and Youth Welfare Society at The President of India House, New Delhi

Figure ABI-11:Product of Fulia Women and Youth Welfare Society was honoured to DG, ICAR and Secretary, DARE

AINP 1.01: QUALITY EVALUATION OF JUTE AND ALLIED FIBRES UNDER VARIOUS AGRICULTURAL TRIALS

Dr. S. C. Saha, Sh. A. Sarkar and Sh. J. Mondal

Jute, Mesta, Sunnhemp and Flax fibre samples grown under different agronomical conditions at CRIJAF and its participating research centres were received under this Network project. The total numbers of samples tested were 514. Physical parameters like, strength, root content, defects percentage, fineness, colour and bulk density values were evaluated.

Entries	No of samples tested
Capsularis jute	100
Olitorius jute	144
Roselle (Bimli)	101
Kenaf	88
Sunnhemp	45
Flax	36
Total	514

During the Annual Workshop of AINPJAF held on 10-11 March, 2018 at BCKV, Kalyani, Nadia, the quality of the fibre were presented and the following suggestions were emerged in the workshop.

- Samples not to be sent in haphazard manner and pack each project samples in a separate packing.
- Samples for quality estimation should be sent following proper guidelines. NIRJAFT will provide definite guidelines for preparation of fibre samples.
- CRIJAF and NIRJAFT should conduct training programme for ideal retting process and quality evaluation. Retting condition should be standardized for uniform result.
- CRIJAF "Sona" will be used in retting process for all AVT trials for proper understanding of fibre quality and improved cultivation practices.

INSTITUTIONAL ACTIVITIES & VISIBILITY

FELICITATION TO HONOURABLE PRIME MINSTER

Department of Agriculture, Cooperation and Farmers' Welfare has organized a two-day workshop cum National Conference on "Agriculture 2022- New Initiatives" during February 19-20, 2018 at A.P.Shinde Symposium Hall, NASC Complex, Pusa, New Delhi. During this event, Shri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' Welfare has felicitated the Prime Minister Shri.Narendra Modi with jute/yak blended shawl which was developed at NIRJAFT.

LIVE TELECAST OF SPEECH OF HONORABLE PRIME MINISTER OF INDIA

ICAR-NIRJAFT arranged a web telecast of Honourable Prime Minister's address to the farmers in Krishi Unnati Mela 2018 at Indian Agricultural Research Institute, Pusa, New Delhi. Forty-two (42) farmers of different Jute growing districts of West Bengal have participated in the programme. After completion of live telecast, they have participated in Front Line Demonstration (FLD) of Fibre Extraction Machinery and Grading Equipments. The event was arranged in the institute premises on March 17, 2018.

An aerial view of the Live telecast of Honourable Prime Minister of India in ICAR-NIRJAFT

Front Line Demonstration of Fibre Extraction Machinery and Grading Equipments to farmers

VISIT OF UNION MINISTER OF AGRICULTURE AND FARMERS WELFARE

Shri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' Welfare, Government of India, visited the institute on June 13, 2017.

Honourable Minister Sh. Radha Mohan Singh visiting the lab

Honourable Minister addressing the audience

The Hon'ble Minister interacted with all the representatives from different ICAR institutes located in the eastern region viz. ICAR-ATARI, ICAR-CRIJAF, ICAR-CIFRI, Regional Stations of ICAR-CSSRI, ICAR-NDRI, ICAR-CIFE and KVKs). In his address, minister emphasized that the Krishi Vigyan Kendra's (KVK) should play an important role for betterment of farming community. He also stressed that KVKs field extension work has to be more systematic way so that the farming community will get maximum benefit by the technologies developed by the ICAR. He stressed upon the digital technologies for rapid improving livelihood of the farmers.

80TH FOUNDATION DAY CELEBRATION

Institute celebrated its 80th foundation day on January 3, 2018 in the institute premises and present and retired employees have attended the programme along with the other invited guests. Ex-employees have intermingled with each other and exchanged their memories gathered over the year.

The serving employees rejoiced after uniting with their old colleagues and brought the past into a present form inside the buzzing campus. The event began with a chorus song by Smt. Leena Mishra, Smt. Chandra Karmakar, Smt. Ipsita Das, Dr. Deb Prasad Ray and Sh. Syco Manna followed by lightening of the auspicious lamp by the dignitaries.

Address by Director

Chorus song by staff members

Lighting of auspicious lamp by dignitaries

Chief guest Dr. Nawab Ali delivered the lecture

Dr. A.N. Roy, Director has welcomed the dignitaries on dais, invited guests, retired employees and present staff members. He has reminded the august gathering about the great achievements of our glorious organization with the hope of taking it to the further level by the present employees. Dr. Nawab Ali, former DDG (Engineering), ICAR and Chief Guest of the event has delivered the foundation day lecture. He has emphasized upon the research on frontier areas for diversification and value addition to natural fibres. Dr. D. Sur, former Senior Deputy Director, IJIRA and Guest of Honour of the event in his address urged the scientists to take forward the legacy of the past researchers in doing research and extension for the up-liftment of jute growers and jute industry. Dr. G. Bose, Head, Mechanical Processing Division has presented last year's achievements of the institute and new R & D programmes initiated. The latest issue of the annual Hindi magazine of the

institute "DEVANJALI" was released by the dignitaries on dais. Distribution of certificates and trophies to the winners of the Quiz Competition held in connection with this event was part of this annual event.

INSTITUTE RESEARCH COUNCIL MEETING

NITI-I Institute Research Council Meeting was held on September 16, 2017. The meeting was chaired by Dr A.N.Roy, Director (Acting) in presence of Prof. P.K. Das, Former Professor, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia and Dr. Debanjan Sur, Former Senior Deputy Director, IJIRA, Kolkata.

NITI-1 meeting

NITI-2 meeting

NITI-II Institute Research Council Meeting was held on March 19-20, 2018 and it was chaired by Dr A N Roy, Director (Acting) in presence of Prof. P.K. Das, Former Professor, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia and Dr. T.K.Guha Roy, Ex- Deputy Director and Head, IJIRA, Dr Debasis Nag, Former Director, ICAR-NIRJAFT and Prof. Sadhan Chandra Ray, Former Professor, Department of Fibre Science and Technology, IJT, Kolkata. The ongoing research projects were discussed and the new projects in the emerging areas were presented by the scientists. Dr Samir Baran Roy, Principal Scientist and In-Charge, PME Cell was coordinated the meeting.

XXVII RAC MEETING

The XXVII Research Advisory Committee (RAC) Meeting was held during March 26-27, 2018 under the Chairmanship of Dr. B.C. Mal, Vice Chancellor, JIS University. Dr. S. N. Jha, ADG (PE), ICAR, Dr. K. K. Satapathy, Ex-Director, ICAR-NIRJAFT, Dr. D. Chakraborty, Ex-Professor, University of Calcutta, Prof. A. K. Agrawal, Professor, IIT Delhi, Sh. S. N. Lahoti, Group President (Works), The Empire Jute Co. Ltd., Kolkata, Dr. A.N. Roy, Director , ICAR-NIRJAFT, Dr. S. N. Chattopadhyay, Principal Scientist and Member Secretary, RAC were

present in the meeting. Dr. A.N. Roy, Director, ICAR-NIRJAFT welcomed Chairman, all the RAC Members, panellists of the Brain Storming Session and the staffs of ICAR-NIRJAFT.

A brainstorming session on Market Prospects and Innovations of Natural Fibres under the Chairmanship of Dr. B.C. Mal was also conducted. The speakers in this occasion were Dr. D. K. Kundu, Head, Plant Production Department, ICAR-CRIJAF, Sh. B. Saha, Group General Manager (Planning and Development), Murlidhar Ratanlal Exports Ltd., Kolkata, Dr.S.C.Ray, Ex-Professor, DJFT, CU, Kolkata, Dr. D Sur, Ex Sr. Deputy Director, IJIRA, Mr. S. K. Chandra, Chief Executive (Works) and Director, Hooghly Infrastructure Ltd. Kolkata. RAC Chairman appreciated the institute for its working in diversified application areas of all natural fibres with the existing facility.

Dr. S.N. Jha, ADG (PE) emphasized that project should have three components, basic research, product/ process/ machinery development and technology transfer. RAC stressed that QRT report might be given top importance for formulation of new projects which should be industry-friendly and easily adaptable. The action taken report was presented by Dr S N Chattopadhyay, Member Secretary. The Progress Report, divisional activities and ongoing R & D projects were presented by respective Head of the Divisions. At the end, Dr. S. N. Chattopadhyay expressed his sincere thanks to the Chairman and all the members for active and rewarding participation in the meeting.

QUINQUENNIAL REVIEW TEAM MEETING

Planning Meeting

With the objective of apprising the QRT on Rules and Bye-Laws of ICAR, purpose and objectives of QRT in ICAR system, Council's expectations from the team, resource position of the institute and discussion on review plan, the meeting was called by Dy. Director General (Engg.), ICAR in his office on 5.7.2017. In the meeting, major achievements during 2012-17 were presented by Director of the institute and ATR on the recommendations of last QRT presented by the Secretary, QRT. There after the DDG (Engg.), ADG (PE) and other Sr. Officers of the divisions expressed their views and work plan for review was finalized by the team accordingly.

First Quinquennial Review Team Meeting

First Quinquennial Review Team Meeting was held on August 08-10, 2017 under the Chairmanship of Dr Bangali Baboo, Former National Director, NAIP, ICAR in presence of Dr R Venkatram, Director, Planning and Monitoring, TNAU, Coimbatore; Dr Pitam Chandra, Former ADG (Engg.), ICAR; Dr. Sadhan Chandra Ray, Former Professor, University of Calcutta and Dr. Samir Baran Roy, Principal Scientist, ICAR-NIRJAFT and Secretary, QRT (2012-17) in the BPD Hall of ICAR-NIRJAFT, Kolkata.

Divisional presentations including completed

projects, achievements (technologies/ papers/ patents recognitions etc.), list of future projects, constraints etc. organizational network of jute and allied fibre sector in India, general information on jute and allied fibres, visits to different laboratories, workshop, pilot plants, units and divisions besides visit to Hukumchand Jute Mills , the largest jute mill in the world were under taken as part of review process.

Second Quinquennial Review Team Meeting

Second Quinquennial Review Team Meeting was held on September 12-14, 2017. In this meeting separate interactions with representatives of organized sector; decentralized sector and govt. departments (Centre and State) dealing with jute and allied fibres were held aiming at understanding their activities, any technology/ equipment of NIRJAFT being used by them and expressing any two most important problems (researchable) in everyone's view, NIRJAFT should undertake. Besides these, meeting with Scientists` Forum, Institute Joint Council, Grievance Cell and Women Cell separately also held to understand their contribution; problems, if any and expectations from institute management for improving effective and smooth functioning of the Institute. A visit to M/s. Jayashree Fibre Ropes, one of the oldest Sisal rope manufacturing organisations was organised.

Final Quinquennial Review Team Meeting

Final Quinquennial Review Team Meeting was held on January 29-30, 2018 in order to finalize the draft report prepared by the Secretary and the inputs sought from all members through e- mails. Inputs thus received were incorporated. The revised draft including recommendations sent to the Chairman. The committee went through the report and corrected wherever required during a joint discussion. Thereafter, the Committee briefed the Director, ICAR-NIRJAFT about recommendations on 30 January, 2018 prior to interaction with IMC. The committee interacted with the IMC and presented the recommendations on 30 January, 2018.

69th IMC MEETING

The 69th meeting of the Institute Management Committee (IMC) of the ICAR-NIRJAFT held on January 30, 2018. The IMC members Dr. S. N. Jha ADG(PE) ICAR, Dr. Alok Nath Roy Director(Acting), Dr. Niranjan Prasad of IINRG Ranchi, Dr. Sabyasachi Mitra of CRIJAF, Dr. Indra Mani Mishra of IARI, Sh. Amitabh Singh FAO , Sh. Navin Kumar Jha SAO , QRT members and Dr. G.Basu, Head-MP Division, Dr. N.C.Pan, Head-CBP division & Dr. B.Saha, Head-QEI Division were attended the meeting. The agenda items have been discussed and Dr. K.K.Samanta have presented a topic "Jute/Yak blend – A new concept" in the meeting. Sh. NK Jha has coordinated the meeting.

Delegates of IMC

Address by Director in the IMC

NATIONAL SEMINAR

National Seminar on "Market Driven Innovations in Natural Fibres" was organized by The Indian Natural Fibre Society (TINFS), Kolkata in collaboration with the institute and National Jute Board (NJB), Kolkata. It was organised at the institute premises during February 22-23, 2018 with supported from National Bank for Agriculture and Rural Development (NABARD), Mumbai. The inaugural session was began with the National song by NIRJAFT Staff members followed by welcome address by Dr. Debasis Nag, President, TINFS. Dr. Alok Nath Roy, Director, NIRJAFT briefed about the theme of the seminar. Chief guest Shri Arvind Kumar M,Secretary, National Jute Board, Kolkata on his address, expressed his views on status of the natural fibres and stressed the need of market driven technologies for stakeholders in collaboration with other sectors.

Guests on dias at inaugural session

A view of delegates

The key-note address on the topic "*Market Driven Innovations: Engineered Cellulose Products from Ligno-Cellulosic Fibres and Biomass*" was delivered by Dr. S. Sreenivasan, Ex-Director, ICAR-CIRCOT, Mumbai in the inaugural session . In his presentation, he focused in the area of regenerated cellulose products from ligno-cellulosic mass using ionic liquids that include nano cellulose based composites, biopolymers, films and LC beads.

Dr. P.K.Das, Ex-Prof, BCKV delivered lead lecture

A glimpse of cultural program by recreation club

Seven technical papers were presented in the poster session in the theme area of market driven innovations and the session. The session was presided over by Dr. Debasis Nag and Dr. Debanjan Sur. Jute products developed by the institute were displayed to the particpants in the CT building , where delegates had interacted and shown more interests. A poster on use of natural fibres for sound insulation has attracted the special attention to reviewers. There were four technical sessions in the seminar in which twenty one research papers were presented. Three lead papers were presented by Dr. P.K. Das , Dr. G. Bose and Dr.A.K.Samanta respectively in the technical sessions. After completion of the first day technical sessions, a cultural program was organized in the institute premises by NIRJAFT Recreation club followed by a gala dinner.

The valedictory session was chaired by Dr. S. Sreenivasan, in which Dr. Alok Nath Roy, Director has given his remarks over the two days deliberations. The conclusive remarks about the technical sessions was given by Dr. Debasis Nag,President, TINFS. He also highlighted the innovative outputs from this seminar for doubling farmers' income. The recommendations of each technical sessions were presented by rappoteurs of each session separately.

Remarks by Dr. A.N.Roy during valedictory session

Presentation of Award to Best Paper

To highlight the best presernations, awards were given for the best papers for each techncial sessions. The best paper for each session was selected by the session' chairman and in total five awards have been presented. In his conclusive remarks, Dr. S.Sreenivasan urged the delegates to join hands with other organizations to work together in order to satisfy the need of the farmers and stakeholders which can help to achieve the mission of Doubling of Farmers' Income (DFI) in 2022. Dr. Gautam Bose, Organizing secretary of the seminar expressed his hearty vote of thanks to all the participants for successful completion of the event.

CAPACITY BUILDING PROGRAM

ICAR-Sponsored 10 days Short Course on "Recent advances in processing technologies for Value addition of jute and allied fibers" has been successfully organized in the institute during December 11-20, 2017. In the inaugural session, Dr. L.Ammayappan, Principal Scientist and Course Director elaborated the objectives and contents of the short course. Dr.Alok Nath Roy, Director briefed about the need of product diversification from jute and allied fibres in his address. Dr. S.K. Biswas, Ex-Director, DJD, the Guest of Honour of the event highlighted the issues on marketing of raw jute and the problems faced by the jute sector in competition with the synthetic fibres. Dr. Swapan Kumar Ghosh, Professor and Head, Department of Jute and Fibre Technology, Institute of Jute Technology and the Chief Guest of the program stressed the development of cost-effective and sustainable processing technologies for jute based textiles. He also urged for collaborative R & D work on the jute based technical textiles, functional textiles and composite products. He also released the training manual of the short course. There were 13 participants (12 male and 1 Female) from three states of the country participated in the short course. They belonged to the disciplines of Textile Manufacture, Textile Chemistry, Textile Clothing, and Computer Application in Agriculture, Agricultural Microbiology, Agronomy and Seed Technology.

Remarks by Dr. A.N.Roy during valedictory session

Presentation of Award to Best Paper

Participants of the short course with scientist of the institute

Release of training Manual

Practical demonstration in the training

Theory class is in progress

Dictribution of certificates to trainee

There were 21 lectures by experts in different aspects of processing technologies in value addition on jute and allied fibres, one exposure visit to jute spinning mill, and twelve practical demonstrations conducted in the Short Course. An objective type examination related to jute and allied fibres was conducted for participant trainees. Trainee participants made into groups and presented their presentation related to the theme of the short course.

Dr. Debasis Nag, Ex-Director, ICAR-NIRJAFT has distributed certificates to the participants of the short course as Chief Guest in the valedictory function. He also stressed that jute and allied fibres need awareness among the people for its potentialities of making diversified products has potential to fulfil the needs of stakeholders. Dr. R.K. Ghosh, Scientist and Course Co-Director and Dr. K.K. Samanta, Scientist and Course Co-Director have coordinated the event.

Visit of B.Sc (Agriculture) students to NIRJAFT

106 students of third year B.Sc., (Agri.) from College of Agriculture, Vellayani, Trivandrum, Kerala accompanied by four staff member and led by Dr. A.S.Anil Kumar, Professor and Head, Department of Agronomy visited the Institute on April 4, 2017. Director welcomed the students and briefed them about the research and developmental activities of the institute.

Gathering of students at institute auditorium

Demonstration of the spinning process

Research and developmental activities of all division of the institute were explained to them in four batches by Dr. L.K. Nayak, Principal Scientist, ToT Division, Dr. S.C.Saha, Senior Scientist, QEI Division, Dr. S. Debnath, Principal Scientist, MP Division and Dr. K.K.Samanta, Scientist, CBP Division. Dr.L.Ammayappan, Principal Scientist, CBP Division has coordinated the visit.

AGRICULTURE EDUCATION DAY

Institute observed the "***Agriculture Education Day 2017***" to commemorate the birth anniversary of first president of independent India and union Minister of Agriculture, Bharat Ratna Dr. Rajendra Prasad on December 4, 2017 . On this occasion Dr. N.C. Pan, Director (*Officiating*) addressed the students and highlighted upon the importance of agriculture in strengthening Indian economy.

Dr. Deb Prasad Ray, Principal Scientist has given a presentation on "*Agricultural Education in India: Present status and future perspectives*" in which he has elaborated upon the history of Indian Agriculture and its growth over the years; revolutions in Indian agriculture through research and development; modernization in agricultural practices and agricultural education opportunities in India and Abroad. On this occasion debate and essay writing competition on the themes "*Agriculture: The back bone of Indian Economy*" and "*The future of Indian Economy lies in Agriculture*" respectively were organized among the school students. The winners were presented with certificates and trophies. Visit of students to different laboratories and facilities were also a part of the programme where live demonstration of institute technologies was performed.

Dr. N.C.Pan addressed the gathering

Dr. D.P.Ray delivered his presentation

Dr. N.C.Pan felicitated the students

Demonstration on handloom

TECH MELA 2018

Technology and Machinery Demonstration Mela 2018 was held on February 17, 2018 in the institute premises ICAR-NIRJAFT. Farmers from Mera Gaon Mera Gaurav adopted villages of Nadia, 24 Parganas (South), Howrah and Hooghly districts related to jute cultivation have participated this programme. The programme started with welcome address by Dr. A. N. Roy, Director (Acting), ICAR-NIRJAFT followed by inauguration of the demonstration stall. Various products and technologies developed in the Institute were shown through exhibits and live demonstration of

extraction and processing machineries. The participants were visited to different technologies, product displays and process related to jute and allied fibres and briefed about the machineries and technologies developed in the institute and their need for extraction, quality determination and product diversification in natural fibre sector.

Inauguration of stall by Director

Demonstration of Technology to stakeholders

WORKSHOP-CUM-IPR CLINIC

One-day awareness workshop cum IPR Clinic was organized at ICAR-National Institute of Research on Jute and Allied Fibre Technology, Kolkata on November 18, 2017 in the institute BPD Hall by ITMU. Scientists of the institute have participated in this program. Dr. Alok Nath Roy, Director and Chairman, ITMU of this institute delivered the welcome address and sensitized the importance of the workshop as well as stressed the scientists to focus on the invention which has more benefits for their stakeholders. Mr. Sushil Kumar Mitra, Retd. Assistant Controller of Patents, Kolkata and Mr. Anjan Sen, Managing and Principal Attorney, Patent Attorney and IPR Advocate-Anjan Sen and Associates, Kolkata have sensitised the steps in the drafting and filing of a patent. Scientists of the institute have also interacted with the experts regarding the IPR issues.

Mr. Sushil Kumar Mitra sensitised the IPR Issues

Mr. Anjan Sen interacted with the scientists

SWACHH BHARAT ABHIYAN

Weekly sanitation and cleanliness drive being carried out by the officials under "Swachh Bharat Abhiyaan" every Wednesday and all officers came forward to clean their working place. The staff members of the Institute also utilise bio-degradable and non bio-degradable baskets in which bio-degradable waste is being recycled.

Swachh Bharat Abhijan campaigning in a village

Prize distribution to school students in Swachh Pakhwada

Institute celebrated Swachh Bharat Pakhwada from May 16-31, 2017 taking pledge and formed human chain. Local school students participated in essay competition and employees of NIRJAFT contributed slogan and short poem. The compost pit of the Institute was renovated and production of bio fertilizer has been initiated from bio-wastes.

Tree planting by Director

Mosquito control

Human chain

Yoga Class for staff members of the iunstitute

Prize distribution to School student by Principal, Future Foundation School

Disposal of obsolete vehicle

Cleanliness drive at public place

International Yoga day (June 21, 2017) celebrated by NIRJAFT staff under guidance of two learned teachers and they learned various Asan, Mudra, pranyam, meditation and their benefits.

A team of ICAR-NIRJAFT staff went to a village (Tripura Nagar, South 24 Pargana) for campaigning under Swachh Bharat Mission which included making of toilet and its benefit, preparation of compost pit and necessity of cleanliness at individual premises and ended with interactive session with village people. ICAR-NIRJAFT took initiative in the mosquito control followed by applying anti larval spray, anti-mosquitoes fogging operation, cleaning of dustbins and cleaning of water tank and underground reservoir at regular frequencies.

ICAR-NIRJAFT celebrated "Swachhta Hi Sewa" - (September 15, to October 2, 2017) under Swachh Bharat Mission. Staff of NIRJAFT took participation whole heartedly at cleanliness drive at Institute campus, at public place (Shantinagar) and at local tourist spot (premises of Victoria Memorial Hall). Director and NIRJAFT staff planted tree at Institute campus. NIRJAFT staff took participation in essay and extempore competition. All divisions/ sections/cells have been identified old, unserviceable items, files, materials etc and disposed off to clean the office under Swachh Bharat Mission during October 9-20, 2017. Reports of all action plan, activities, implementation and expenditure regarding Swachh Bharat Abhiyaan of ICAR-NIRJAFT have been submitted to concerned personnel of ICAR at regular frequencies.

VIGILANCE AWARENESS WEEK

Institute observed the Vigilance Awareness Week during October 30 to November 5, 2017 with the main focus on "My Vision –Corruption Free India". All staff were took pledge on October 30, 2017. Debate Competition, Quiz Competition and Essay Writing Competition were conducted in the Institute as well as in a nearby school, Mansur Habibullah Memorial Institue, Kolkata. On November 5, 2017, Mr. S.D. Chand, Joint Director, Enforcement Directorate, Kolkata gave an overview of vigilance awareness and different ways to make India corruption free as well as government rules and regulation in this regard. Different prizes were given to the school children. Dr. N.C. Pan, Vigilance Officer have coordinated this program

STUDENTS' OUTREACH PROGRAM

A group of 23 students of class 12 (humanities stream) from St. Augustine's Day School, Kolkata led by the teachers Mrs.Shukla Majumder and Mr. A.K Singh had visited the Institute on August 31, 2017. Research activities from extraction of fibres to dissemination of technologies of the institute NIRJAFT were described to them by Dr.V.B. Shambhu, Senior Scientist, ToT Division, Dr.S.C. Saha, Senior Scientist, QEI Division, Dr. S.Debnath , Principal Scientist, MP Division , Dr. L.Ammayappan, Principal Scientist, CBP Division and Dr. S.Das, Scientist, ToT Division respectively. Dr. Alok Nath Roy, Director, finally addressed the students and described the research and developmental activities of the institute on jute and allied fibres. Dr.L.Ammayappan and Mr. S.Das have coordinated the program.

OTHER OUTREACH PROGRAMS

Participants from	*Date of visit*	*Participants*
Staff members and students of third year B.Sc., (Agri.) students of College of Agriculture, Vellayani, Trivanum, Kerala	April 04,2017	110
Input dealers from Hooghly District, West Bengal pursuing Diploma in Agriculture Extension Services	June 22,2017	40
Post Graduate students and faculty from the Department of Botany, Cotton University, Guwahati, Assam	October 27, 2017	21
Faculty and students from Agricultural College, Mandya, University of Agricultural Sciences, Bangalore	November 27,2017	20
Students from The Future Foundation School, Kolkata	December 04, 2017	30
Members of the Earth Lovers Club of the Future Foundation School	January 19,2018	30

WORLD SOIL DAY

World Soil Day was celebrated on December 5, 2017 by displaying the banner (in English, Bengali) on the gates. A meeting was held at the premises Babpur village under Barasat-1 block of the district North 24-parganas and Dr. Biplab Saha, Dr.Atul Kumar Singha, , Dr. Debabrata Das, and Sh. Koushik Mitra attended the program. Dr. Biplab Saha briefed the importance of World Soil Day celebration along with video on inauguration of Soil Health Card apps by Honourable Agriculture Minister, Sh. Radha Mohan Singh. Then he delivered a lecture on importance of soil to our life, demographic pressure on soil health at present, need to maintain soil health through different methods for sustainable agriculture in view of climate change with special emphasis on carbon sequestration in soil. He also described the role of jute in organic carbon sequestration, agro-textile materials for soil conservation and advised to do soil management on the basis of soil health card. Dr Atul Singha emphasised the role of microbes in maintaining soil health. Dr Debabrata Das discussed about various cropping sequences and systems for improving soil health and overall agricultural production. Then the entire team interacted with farmers on various issues of soil management and agricultural production.

MERA GAON MERA GAURAV PROGRAM

Under MGMG program, ICAR-NIRJAFT has adopted 25 villages belongs to Howrah, Hooghly, Nadia, North 24 Parganas and South 24 Parganas and each village has been allotted to a scientist of the institute for adoption by disseminating required information , guidance and awareness through lectures, demonstration and training. Some of the activities carried out in different parts of the West Bengal been depicted in the following figures

Lecture on Prospects of Jute handicraft training and Distribution of raw jute to progressive farmers for preparation of hand braid on 15.04.2017 at adopted villages of Nadia

Meeting with progressive farmers on 22.04.2017 at adopted villages of 24 Parganas (North)

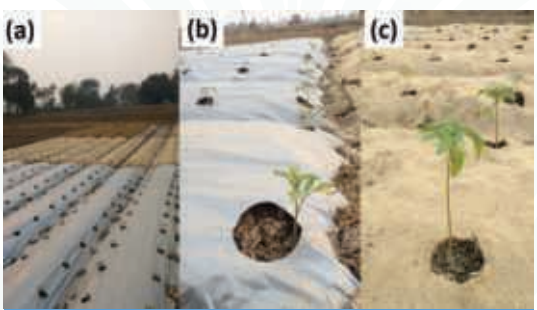
Lecture on Grading of raw jute on 24.06.2017 at adopted villages of Nadia

Demonstration of jute based geotextile for road construction at KVK Hooghly, Chinsura on 15.04.2017

Lecture on value addition of Banana fibre on 23.06.2017 at adopted villages of South 24 Parganas

Lecture on post-harvest processing of jute and allied fibres on 28.06.2017 at adopted villages of Howrah

One day Awareness Programme on Jute Ribbon Retting on 02.08.2017 at Ghoshalia, Hooghly



On-farm trial of jute nonwoven mulch for summer tomato on 9-2-2018 at Hooghly KVK, Chinsura

Demonstration of jute ribboner at adopted villages of 24 Parganas (North) on 30.08.2017

NATIONAL LEVEL TRAINING PROGRAMS

Three National Level Training programs on "Production and retting technology of Jute/Mesta/Ramie/Sunnhemp including other related aspects" sponsored by National Food Security Mission (NFSM) - Commercial Crops, Department of Agriculture Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Govt. of India were organised in the institute on July 17-19, July 24-26, and August 1-3, 2017 respectively. In the inaugural function of first training programme on 17th July, 2017, Dr. S.K. Biswas, Ex-Director, Directorate of Jute Development has attended the programme as Chief Guest and highlighted upon the issues on production and marketing of jute crop. Dr. K. Manoharan, Director, Directorate of Jute Development has graced the occasion as guest of honour and complemented the role of ICAR-NIRJAFT in organizing such training programmes. Dr.Alok Nath Roy, Director briefed about the need of value addition and product diversification in jute and allied fibre sector. Dr. Laxmikanta Nayak, Principal Scientist has coordinated all programs. Twenty-five trainees for each training from different jute growing districts of West Bengal, Bihar, Andhra Pradesh, Uttar Pradesh and Tripura have participated.

EXPOSURE VISIT

An exposure visit – cum – training program on "*Innovative Agricultural Practices for Production and Processing of Jute and Allied Fibres*" sponsored by Block Farmers Advisory Committee (BFAC), Raghunathganj Block-I, Murshidabad, West Bengal was held at ICAR-NIRJAFT during July 28-29, 2017. Shri Tutul Sawpuri, Chairman, ATMA Scheme highlighted the importance of value addition and entrepreneurship development in jute sector.

Welcome address by Director

Particpants with the sscientists of the institute

Sh. Mainul Hoque, BTM, ATMA Scheme has appreciated the role of ICAR-NIRJAFT, Kolkata for coordinating the event. Dr. A.N. Roy, Director briefed the technologies developed in the institute and their need for product diversification in jute and allied fibre sector. Forty one trainees from Ragghunathganj block of Murshidabad District, West Bengal have participated in this program. Dr.L.K. Nayak, Principal Scientist and Dr. V.B.Shambhu Senior Scientist have coordinated the program.

BRAINSTORMING WORKSHOP

Institute in collaboration with Sisal Research Station, ICAR-CRIJAF, Barrackpore have organized a Brainstorming Workshop on Sisal Grading and Electronic Instrumentation on August 25, 2017 at Sisal Research Station, Bamra, Odisha. Dr. D. K. Kundu, In charge of Sisal Research Station, stressed the importance of sisal fibre and problems to be addressed with locally adaptable, practicable and economically viable technology interventions. Dr. Gautam Roy, Head, QEI Division and Principle Investigator of CRP project ICAR-NIRJAFT-2 elaborated the objectives of the workshop. Six presentations were made including agricultural practices, grading of sisal fibre and related electronic instruments developed by NIRJAFT. After the presentations, the instrument developed for Sisal fibre were displayed and demonstrated to the 60 participants from State Government Officials, Sisal Farmers, NGOs, Researchers and Academia and KVK.

PUBLICTIONS

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2. Ammayappan L, Ray DP, Chakraborty S, and Pan NC, 2017. Effect of silver nanoparticle application on properties of jute based textiles by exhaustion method: Part 2 – Surface morphology properties, *Indian Journal of Natural Fibres*, 4(1):1-6
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1. Bose G, 2018. *Market Driven Innovations in Natural Fibre Based Product Development*, National Seminar on "Market driven innovations in natural fibres" , ICAR-NIRJAFT, Kolkata, February 22-23, 2018.
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TRAINING MANUALS / COMPILATIONS / BOOKS

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- Ammayappan L, Roy, AN, Pan NC, Chattopadhyay SN, Ray DP, Nayak LK and Samanta KK, Souvenir of the National Seminar on "*Market Driven Innovations in Natural Fibres*", ICAR-National Institute of Research on Jute and Allied Fibre Technology, Kolkata, February 22-23, 2018, pp.41.
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TECHNICAL BULLETIN/MANUAL/LEAFLET/BROCHURE

- Ray DP, Saha SC, Sarkar A, Debnath S, Bayan HC and Sarma MK 2017 Workshop Manual on Prospects of Natural Fibres including Ramie in North-East Hill Regions, ICAR-NIRJAFT Publication, English, May, 2017, p. 70
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PATENTS GRANTED

- A patent entitled "*Pomegranate Aril Extractor*" invented by Dr. A.K.Thakur was granted on 21.02.2018 (Patent No. 293135).
- A patent titled "*A jute fibre reinforced composite moulded tile from jute reed and unsaturated polyester resin and method for producing the same*" invented by Dr.S.Sengupta, Dr. S. Samajpati and Dr. A. Roy was granted 05.12.2017 (Patent No. 290314)
- A patent titled "A method for producing jute- hollow polyester blended yarn, union fabric of said yarn and method of preparing said union fabric and shawl from the said yarn" invented by Dr. S. Debnath , Dr. S. Sengupta and Mr. U.S. Singh was granted on 14.12.2017 (Patent No. 290640)
- A patent titled "*Jute synthetic blended woven geo-textile material*" invented by Dr.G. Basu, Dr.A.N.Roy, Dr.S.Samajpati and Dr.S.K.Bhattacharya was granted on 19.03.2018 with Patent No. 294517 (Filed on 30.03.2007).

PATENTS FILED

- A patent titled An *Integrated Grading System for Natural Fibres Including Jute Fibre* by Roy G, Saha SC, Sarkar A, and Sardar G, 2017 was E-filed on 20.05.2017
- A patent titled *Digital Colour and Lustre Meter for Lignocellulosic Fibre* by Roy G, Saha SC, Sarkar A, and Sardar G, 2017 was E-filed on 20.05.2017
- A Patent entitled "*A Power Ribboner Machine for Stripping of outer green barks/ribbons from jute and mesta plants*" by Shambhu VB, Nayak LK, Das S and Sanyal P, was filed vide application 201731040456 dated 13.11.2017.

PARTICIPATION IN MEETING / WORKSHOP/ CONFERENCE

Program	*Organized by*	*Date*	*Participants*
Development of Technology a Challenge to Bio-diversity	West Bengal State Centre, The Institution of Engineers (India) at Gokhale Road, Kolkata	April 03, 2017	S. Debnath
XXVI RAC Meeting	ICAR-NIRJAFT, Kolkata	April 25-26, 2017	All Scientists
Lecture on National Technology Day	The Institution of Engineers (India), WBSC	May 11, 2017	S. N. Chattopadhyay
State Level Officers Training Programme under NFSM (CC)- Jute Based Cropping System	Deputy Director of Agriculture (Admn) at Hooghly	May 3-4, 2017	D. P. Ray S. C. Saha
India Innovation Growth Programme (IIGP) 2.0	FICCI Kolkata	May 10, 2017	K. K. Samanta
International Conference On Contemporary Issues in Integrating Climate for Sustainable Development (AGROTECH-2017)	UBKV-RRS (Hill Zone) and Krishi Sanskriti, New Delhi	May 11-12, 2017	D. P. Ray
Workshop on "Prospects of Natural Fibres including Ramie in North-East Hill regions"	B.N.College of Agriculture, B.N.Chariali at Assam	May 17-20, 2017	G.Roy D.P.Ray S.C.Saha A.Sarkar
Zonal Workshop on Promotion of Skill Development in Agricultural Sectors for Eastern India	Govt of West Bengal at Ramakrishna Mission Institute of Culture, Golpark, Kolkata-29	May 25, 2017	D.P.Ray
Visual studio 2017- Accelerating your business growth	Microsoft a Kolkata	June 1, 2017	S.Das
11th Meeting of Technical Textiles for Agro-tech Sectional Committee, TX 35, BIS	Bureau Of Indian Standards at SASMIRA Marg, Worli, Mumbai	June 1, 2017	S. Debnath
Climate related contingency meeting building on as the Director's nominee	CRIDA and Government of West Bengal at Nabanna, Howrah	June 6, 2017	B.Saha
Road Show / Press Conference on Textile India, 2017	Ministry of Textiles, Govt. of India at Park Hotel, Kolkata	June 12, 2017	D.P.Ray
Review Meeting with Hon'ble Union Minister for Agriculture and Farmers Welfare	ICAR-NIRJAFT, Kolkata	June 13, 2017	All Scientists and Technical Officers
State Level Officers Training Meeting under NFSM (CC)	DDA (Admn), North 24 Parganas, Department of Agriculture, Govt. of West Bengal	June 15-16, 2017	D.P.Ray S.C.Saha
Two days training meeting of State Level Officers Training Meeting under NFSM (CC)	DDA (Admn), Raiganj, Department of Agriculture, Govt. of West Bengal	June 20-21, 2017	D.P.Ray S.C.Saha
Meeting on Rural Programme advisory Committee (RPAC)	All India Radio, Akashvani Bhavan, Eden Gardens, Kolkata	June 29, 2017	D.P.Ray

Program	*Organized by*	*Date*	*Participants*
Textile India 2017	Ministry of Textiles at Mahatma Mandir Convention Centre, Gandhinagar, Gujarat	June 30-July 2, 2017	S.N.Chattopadhyay K.K.Samanta S.Debnath
Twelfth Anniversary Celebration of the Foundation Day and Annual Convention of Ramakrishna Mission Vivekananda University	Ramakrishna Mission, Vivekananda University	July 4, 2017	A. N. Roy L.K.Nayak
Recording programme for talk show on the topics "Pat Pachanor Unnato projukti" and "Patjato shilpo o Samagri"	All India Radio, Akashvani Bhavan, Eden Gardens, Kolkata	July 11, 2017	D.P.Ray
Officers Refresher Training Meeting on Jute under NFSM (CC) at Gadaiara Morshel Lodge, Howrah	DDA (Admn), Howrah, Department of Agriculture, Govt. of West Bengal	July 13-14, 2017	D.P.Ray S.C.Saha
National level training programme on "Production and retting technology of Jute/ Mesta/ Ramie/Sun-hemp including other related aspect"	National Food Security Mission-Commercial crops at ICAR-NIRJAFT, Kolkata	July 17-19, 2017	P.C.Sarkar A.K.Thakur A.Singha
Handloom Day celebration	Indian Council for Culture Relations (ICCR) at Weavers' Service Centre, Beliaghata, Kolkata	August 7, 2017	S.Debnath
Quinquennial Review Team (QRT) meetings	ICAR-NIRJAFT, Kolkata.	August 8-10, 2017	All Scientists
One day Workshop on Custom Hiring of Farm Machinery	Agricultural Engineering Division, West Bengal State Centre at IEI, Kolkata	August 19, 2017	A.K.Thakur L.K.Nayak, D.P.Ray V.B.Shambhu
Executive Committee Meeting of Indian Society of Coastal Agricultural Research.	CIFE at Salt Lake, Kolkata	August 19, 2018	B.Saha
One day workshop on "Management Review Meeting of ICAR-NIRJAFT for adoption of ISO 9001: 2015"	ICAR-NIRJAFT	August 20, 2017	All Scientists
New India Manthan-Sankalp Se Siddhi	KVK, North 24 Parganas at ICAR-CRIJAF	August 26, 2017	S.N.Chattopadhyay D.P.Ray L.Ammayappan
Role of NAARM on ICAR- NAARM in shaping Agricultural Research and Education System Management for 2030"	ICAR-NAARM at Hyderabad	August 31, 2018	B.Saha
Meeting on formulation of price policy for raw jute for the year 2018-19 seasons	The Jute Corporation of India (JCI) at Kolkata	September 12, 2017	L.K.Nayak
Quinquennial Review Team (QRT) meetings	ICAR-NIRJAFT, Kolkata	September 14, 2017	All Scientists

Program	*Organized by*	*Date*	*Participants*
4th Meeting of Scientific Advisory Committee (SAC) of Sasya Shyamala Krishi Vigyan Kendra, Ramakrishna Mission Vivekenanda University	Faculty Centre of Rural Development and Management (IRDM) at Naranapur, West Bengal.	September 15, 2017	S.Debnath
Theme lecture of '50th Engineers day' on 'Role of Engineers in a developing India',	The Institution of Engineers (India), West Bengal State centre at Kolkata	September 15, 2017	S.Debnath
NITI-I Meeting	ICAR-NIRJAFT, Kolkata	September 16, 2017	All Scientists and Technical Officers
IMC Meeting of ICAR-IINRG, Ranchi	ICAR-IINRG, Ranchi	October 6, 2017	S.N.Chattopadhyay
International and National Seminar of Coir Kerala 2017	The Department of Coir Development, Govt of Kerala	October 5-9, 2017	G.Basu
Review meeting of Vigilance Officer, Head of Administration and Head of Finance with Secretary, ICAR and Chief Vigilance Officer, ICAR	ICAR-CRIJAF, Barrackpore	October 10, 2017	N.C.Pan
Data analytics and signal processing with Matlab	Mathworks at Hayat, Kolkata	October 10, 2017	S.Das
Seminar on "Dissemination of feasibility study of activated charcoal / carbon from jute stick"	National Jute Board, Kolkata	October 16, 2017	S.N.Chattopadhyay R.K.Ghosh
Vigilance Awareness Week Programme	ICAR-NIRJAFT, Kolkata	November 4, 2017	All staff members
Awareness Workshop Cum IPR Clinic	ICAR-NIRJAFT, Kolkata	November 18, 2017	All Scientists
Two days training meeting of farmers regarding package of practice of jute cultivation, retting, grading, post-harvest handling and diversified use of jute fibre	Agriculture Marketing Department, Howrah, Govt. of West Bengal at Amta, Howrah	November 29-30, 2017	D.P.Ray S.C.Saha
	Agriculture Marketing Department at Bongaon, North 24 Parganas	December 21, 2017	D.P.Ray
ICAR sponsored short course on Recent Advances in Processing Techniques for Value Addition Of Jute and Allied Fibres	ICAR-NIRJAFT, Kolkata	December 11-20,2017	S.Das A.Singha M.Bhowmick
CARBO-XXXII national conference on "Emerging chemistry and biology of carbohydrates (ECBC-2017)"	Association of Carbohydrate Chemists and Technologists (ACCTI), India and jointly with IIT, Kharagpur	December 18-20,2017	N.C.Pan S.N.Chattopadhyay
Training and awareness of journal discovery through J-Gate@CeRA for eastern region	ICAR-DKMA and CIFA at ICAR-CIFA, Bhubaneswar, Orissa	December 19,2017	S.Das R.Naiya
80th Foundation day of ICAR-NIRJAFT	ICAR-NIRJAFT, Kolkata	January 3, 2018	All past and present staff members of NIRJAFT

Program	Organized by	Date	Participants
Annual Internal Review of CRP-on Natural Fibre Projects	CAR-CIRCOT, Mumbai	January 4-5, 2018	A.N.Roy S.N.Chattopadhyay
2-Days training programme on jute	Assistant Director of Agriculture Marketing (Administrative) at Uttar Dinajpur, West Bengal	January 8, 2018	S.B.Roy L.K.Nayak
2-Days training programme on jute	Assistant Director of Agriculture Marketing (Administrative), Cooch Behar at Mathabhanga, Cooch Behar, West Bengal	January 9, 2018	S.B.Roy L.K.Nayak
52nd ISAE annual convention and symposium on Doubling Farmer's Income through Technological Interventions	Agricultural Engineering division of IEI at Anand Agricultural University, Anand, Gujarat	January 8-10, 2018	A.K.Thakur
2-Days training programme on jute	Assistant Director of Agriculture Marketing (Administrative) at Jalpaiguri, West Bengal	January 10, 2018	S.B.Roy L.K.Nayak
Evening Lecture on "Present status and future perspectives of organic foods in metro cities"	Agricultural Engineering Division, West Bengal State Centre at IEI Kolkata	January 12, 2018	L.K.Nayak S.Das D.P.Ray L.Ammayappan S.Debnath H.Baite
One day farmer training programme at Krishnagar	DDA(Admn), Nadia District	January 17, 2018	D.P.Ray
Technology Week	Krishi Vigyan Kendra (KVK), Howrah	January 20, 2018	L.K.Nayak
Technology week cum Rabi Kisan Sammelan 2018	KVK, Howrah at Jagadbalvpur, Howrah	January 18-20, 2018	S.Das
National seminar on Doubling Farmers' Income: Role of Agricultural Mechanization	Department. of Agriculture Engineering, Visva-Bharti at Shantiniketan	January 29, 2018	A.N.Roy
Indo-Japan Bilateral Symposium on Future Perspective of Bioresource Utilization	IIT-Guwahati at Guwahati	February 1-4, 2018	K.K.Samanta
31st National Convention of Agricultural Engineers on "Engineering interventions in doubling the income of small and marginal farmers by 2022"	The Institution of Engineers (India), Delhi State Centre (DSC) at Engineers Bhawan, New Delhi	February 2-3, 2018	L.K.Nayak

Program	*Organized by*	*Date*	*Participants*
13th Annual Group Meeting of All India Network Project on Jute and Allied Fibres	ICAR-CRIJAF, Barrackpore at BCKV, Kalyani	February 10-11,2018	N.C.Pan S.C.Saha A.Sarkar D.P.Ray
International Conference on "Functional Textile and Clothing Conference"	IIT-Delhi at New Delhi	February 10-11,2018	K.K.Samanta G.Bose A.N.Roy
Tech-innovation, value addition and marketing towards strengthening Agriculture and food economy and doubling farmer's income	ICC at Science city auditorium, Kolkata	February 12-13,2018	S.Das
6th Agroprotect-2018	ICC at Science city ground, Kolkata	February 12-14,2018	S.Das
Technology and Machinery Demonstration Mela–2018	ICAR-NIRJAFT, Kolkata	February 17,2018	All Staff members
Workshop on Developing multi-disciplinary approach in project formulations and innovations in Agriculture and allied sectors	ICAR-CIFRI, Barrackpore	February 17, 2018	B.Saha
International congress on Cotton and other Fibre Crops	CRDA, Hisar; ICAR Research Complex, Umiam and IAHF at ICAR RC for NEHR, Umiam	February 20, 2018	A.N.Roy
National seminar on "Market driven Innovations in Natural Fibres"	TINFS, ICAR-NIRJAFT, NJB and NABARD at ICAR-NIRJAFT, Kolkata	February 22-23,2018	All Staff members
67th Annual Conference on Development in Technical Textiles and Apparel	The Textile Association (India), West Bengal Unit	February 24, 2018	A.N.Roy, N.C.Pan, S.N.Chattopadhyay S.Sengupta S.Debnath
Regional Krishi Mela 2018	BAU at Sabour, Bihar	February 24-26,2018	S.Das
Jute Grading training programme	Assistant Director of Agricultural Marketing (Adm) at Murshidabad	February 27, 2018	D.P.Ray S.C.Saha
Annual review meeting of CRP on Natural Fibres	ICAR-CIRCOT, Mumbai at NASC Complex, New Delhi	March 5, 2018	L.K.Nayak S. Debnath, N.C.Pan K.K.Samanta
Assessment of different retting technologies in Jute-ICARE Project	National Jute Board at Kolkata	March 7, 2018	D.P.Ray
Workshop on 'Yak Resource Towards Doubling Highland Farmer's Income'	ABI, ICAR-NIRJAFT and ICAR-NRC on Yak at Dirang	March 14-16, 2018	A.N.Roy S.Debnath K.K.Samanta
National Conference on "Emerging Packaging Technology – Optimizing Performance and Cost"	Indian Institute of Packaging, Regional Centre-Kolkata at Hotel ITC Sonar, Kolkata	March 14-15, 2018	L.K.Nayak L.Ammayappan G.Bose, H.Baite M.Bhowmick

Program	*Organized by*	*Date*	*Participants*
Training programme on "Diploma on Agriculture Extension Service for Input Dealers (DAESI)"	KVK-Howrah at Jagatballavpur	March 15, 2018	D.P.Ray
Krisi Unnati Mela-2018	ICAR at IARI, Delhi	March 16-18,2018	S.Das
Institute Management Committee (IMC) meeting	ICAR-Central Institute of Post Harvest Engineering and Technology at Ludhiana	March 17, 2018	A.K.Thakur
Festival of Innovation and Entrepreneurship (FINE)	National Innovation Foundation (NIF) – India at Rastrapati Bhawan, New Delhi	March 19-22, 2018	L.K.Nayak
World Water Day-2018	Agricultural Engineering Division, West Bengal State Centre at IEI Kolkata	March 22, 2018	L.K.Nayak H.Baite
Allowance of Ropes and Habijabi in Raw Jute Bale Consignments	Office of the Jute Commissioner at Kolkata.	March 23, 2018	G.Bose
XXVII RAC Meeting	ICAR-NIRJAFT,Kolkata	March 26-27, 2018	All scientists and Technical Officers
Evaluation of a proposal to set up a Linen yarn factory near Kolkata	The Chairman, Pollution Control Board at Kolkata	--	G.Bose

IN-HOUSE SEMINAR

03.04.2017	Dr.(Smt) Rina Naiya	Open access centralized information dissemination and data bank network systems in the field of agriculture
30.06.2017	Mr. Sayandeep Debnath	Acoustic absorption properties of porous textile materials
31.07.2017	Mr. Ramdayal Sharma	Bharat Sarkar ki Rajbhasha Niti Avam Karyanwayan
18.09.2017	Mr. Ramdayal Sharma	Pandit Deendayal Upadhyaya
18.09. 2017	Mrs. Paramita Mitra Mukhopadhyay	Parthenium-A friend or Foe?
25.09. 2017	Dr. Laxmikanta Nayak	Development of rural social enterprises
10.11.2017	Dr. Laxmikanta Nayak	A pineapple leaf processing machine for extraction of fibre A fibre extraction assembly for green sisal leaves
16.12.2017	Mr. Haokhothang Baite	Orientation Training at ICAR-NIRJAFT

DISTINGUISHED VISITORS

Date	*Visitor*
June 13, 2017	Shri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' Welfare, Government of India
August 8, 2017	Dr Bangali Baboo, Former National Director, NAIP, ICAR Dr R Venkatram, Director, Planning and Monitoring, TNAU, Coimbatore Dr Pitam Chandra, Former ADG (Engg.), ICAR Sh. S.K.Chandra, CEO, Hooghly Infrastructure Ltd.,
November 5, 2017	Mr. S.D. Chand, Joint Director, Enforcement Directorate, Kolkata
November 18, 2017	Mr. Sushil Kumar Mitra, Retd. Assistant Controller of Patents, Kolkata Mr. Anjan Sen, Managing and Principal Attorney, Patent Attorney and IPR Advocate -Anjan Sen and Associates, Kolkata
January 03, 2018	Dr. Nawab Ali, former DDG (Engineering), ICAR
February 22, 2018	Dr. S. Sreenivasan, Ex-Director, ICAR-CIRCOT, Mumbai

AWARDS/ RECOGNITIONS

Dr. Alok Nath Roy

- Core committee member to arrange the visit of Parliamentary Standing Committee on Official Language on 23-24th May, 2017.
- Outside observer in ARS – 2016 Mains Examination on 8th July, 2017.
- Member of the National Jute Board (Ministry of Textiles), Kolkata.
- Member of the Institute Management Committee of ATARI II, Salt Lake, Kolkata by ICAR, New Delhi.
- Elected as President of The Indian Natural Fibre Society (TINFS), Kolkata

Dr. Nimai Chandra Pan

- Member of Board of Examination for the under graduate and postgraduate studies in Fibre Technology/Technical Textiles of the University of Calcutta, Kolkata.
- Nodal Officer for the visit of Parliamentary Standing Committee on Official Language on 23-24th May, 2017
- Reviewer for the journals Indian Journal of Fibre and Textile Research and Textile Research Journal.

Dr. Gautam Basu

- Member of Board of Studies for the under graduate and postgraduate studies in Fibre Technology/Technical Textiles of the University of Calcutta, India.
- Member of the Cordage Sectional Committee (TX 09), Geo-synthetics Sectional Committee (TX 30) and Technical Textiles Sectional Committee (TX 33) of Textile Division of Bureau of Indian Standard, from 2005 till this date.
- Member of the Jute and Jute Products Sectional Committee (TX 03) to formulate Indian Standards for terminology, grading, specifications and packaging for jute, Mesta and other related bast fibres and their products.
- External examiner for a Ph. D. Thesis under Jadavpur University, Kolkata.
- External expert for selection of Scientist B (2 posts) under Central Silk Board, Govt. of India, Bangalore on 9th January, 2018.
- Received the Best Poster for the paper 'Jute based Sound Absorber' presented in the National Seminar on "Market Driven Innovations in Natural Fibres" held at ICAR-NIRJAFT, Kolkata, February 22-23, 2018.

Dr. Biplab Saha

- Reviewer in the journal The Bioresource Technology and Journal of Agricultural Physics
- Evaluator of Ph.D thesis submitted from Faculty of Agriculture, BCKV, Mohanpur, Nadia , West Bengal
- External expert for the recruitment of SRF under NICRA project at RRS, Canning Town, South 24-Parganas,

Dr. Sambhu Nath Chattopadhyay

- Reviewer for Indian Journal of Fibre and Textile Research and Textile Research Journal.
- Member of Board of Examination for the postgraduate studies in Fibre Technology/Technical Textiles of the University of Calcutta, Kolkata.

Dr. Purna Chandra Sarkar

- External Expert in the Departmental Promotion Committee for assessment of Senior Technical Officers of ICAR-VPKAS, Almora, on September 12, 2017 and again on January 15, 2018
- External expert to impart training to staff in fruit / vegetable coating technology in IINRG, Ranchi, during November 15 – 18, 2017,
- Enrolled as a Life Member of The Indian Natural Fibre Society (TINFS), Kolkata

Dr. Abhay Kumar Thakur

- Awarded with Fellowship by The Institution of Engineers (India), Kolkata
- Member of Institute Management Committee of ICAR-Central Institute of Post Harvest Engineering and Technology, Ludhiana wef 02.02.2018
- Member of the Agricultural Engineering Divisional Sub-committee of West Bengal State Centre of Institution of Engineers (India)
- Received the Commendation Medal-2017 for the Professional Achievement i.e. outstanding contributions in the field of Post Harvest Process and Food Engineering by Indian Society of Agricultural Engineers, New Delhi during 52nd Annual Convention Of ISAE and National Symposium on January 08 to 10, 2018
- External Examiner for M. Tech Thesis evaluation and conducted viva-voce examination at Department of Processing and Food Engineering, Dr Rajendra Prasad Central Agricultural University, Pusa (Bihar) on 11.07.2017
- Reviewer for the Journal of Food Science and Technology and Journal of Agricultural Engineering
- Life Member of The Indian Natural Fibre Society (TINFS), Kolkata

Dr. Surajit Sengupta

- Member of Board of Examination for the under graduate and postgraduate studies in Fibre Technology/Technical Textiles of the University of Calcutta, Kolkata.
- Reviewer for the following journals : Indian Journal of Fibre and Textile Research , Textile Research Journal , Journal of the Institute of Engineers (I) , Journal of Industrial Textiles, Journal of Scientific and Industrial Research, Journal of Natural Fibres, Measurement and Industrial Crops and products

Dr. Samir Baran Roy

- External member of the Institute Technology Management Committee (ITMC) of ICAR-Central Island Agricultural Research Institute, Port Blair, Andaman and Nicobar Island
- Member of Price Fixation Committee if ICAR-IVRI, Eastern Regional Office
- Resource person to deliver lectures on several State Government entrepreneurship development programme.

Dr. Sanjoy Debnath

- Reviewer for the following journals : Journal of Industrial Textiles , Textile Research Journal, Indian Journal of Fibre and Textiles Research, Royal Society Open Science and Journal of Natural Fibres
- Alternate Member of 'Technical Textiles for Agro-Tech Sectional Committee', TX 35, Bureau of Indian Standards, New Delhi during 2017-2018.
- Examiner evaluate of Ph.D. Thesis under Anna University, Chennai during 2017-2018.
- Awarded 'Best Paper' entitled 'Extraction and Spinning of Indian Flax Fibre' during the National Seminar on "Market Driven Innovations in Natural Fibres" held at ICAR-NIRJAFT, Kolkata, 22-23 February 2018.

Dr. L. Ammayappan

- External examiner to conduct the Viva Voce examination under Alagappa University, Karaikudi in 2017.
- Indian examiner to evaluate the PhD thesis and as an external examiner / expert to conduct the Viva Voce examination under Anna University, Chennai, Tamilnadu in 2017.
- Peer reviewer for the following journals : Carbohydrate Polymers, Cellulose, Fibers and Polymers, Indian Journal of Fiber and Textile Research, Industrila Textila , Journal of Cleaner production, Journal of Industrial Textiles, Journal of Natural Fibers, Materials Science, Plasma Science and Technology, Textile Research Journal and The Journal of the Textile Institute.

Dr. Deb Prasad Ray

- Chairman of a Technical Session in International Conference on Contemporary Issues in integrating climate- The Emerging Areas of Agriculture, Horticulture, Biodiversity, Forestry, Engineering Technology, Fundamental/ Applied Science and Business Management for Sustainable Development (AGROTECH-2017), organized at Kalimpong Science Centre, Kalimpong, West Bengal.
- Councillor of the Society of Plant Protection Sciences, Division of Nematology, IARI, LBS Centre, New Delhi-110 012
- Internship supervisor of Summer Project of M.Sc. student from Institute of Agricultural Sciences, Banaras Hindu University
- Winter Internship supervisor of five B.Tech. Students from Bengal Institute of Technology, Tech Town, Bantala, Kolkata-700150
- Associated Chief Editor of the Journal, International Journal of Agriculture, Environment and Biotechnology and International Journal of Bioresource Science.
- Elected as the Vice-President of Society of Pesticide Science India
- Institute representative for appointment of technical assistant under NFSM Scheme at Directorate of Jute Development, Ministry of Agriculture and Farmers 'Welfare, Govt. of India held on 22.04.2017
- Received the Best Overall Award for the paper "Accelerated jute retting in the context of Water Scarcity and its socio-economic impact" in National Seminar on Water and Soil Management for Agriculture and Livelihood Security under Climate Change held at ICAR-Indian Institute of Vegetable Research during September 8-9, 2017
- Received the Best Paper award for the paper "Accelerated Degumming of Ramie (Boehmeria nivea (L.) Gaud.) Fibre: An Eco-friendly Approach" in National Seminar on Water and Soil Management Approaches for Climate Smart Agriculture held at Banaras Hindu University during March 23-24, 2018

Dr. Laxmikanta Nayak

- Expert Member, Selection Committee for the recruitment of one SMS (Subject Matter Specialist) in Agricultural Engineering at Krishi Vigyan Kendra (KVK), Purulia, West Bengal.
- Resource person to deliver lectures on several State Government entrepreneurship development programme.
- Reviewer for Journal Indian Society of Coastal Agricultural Research.
- Life Member of The Indian Society of Coastal Agricultural Research (ISCAR), Canning Town, West Bengal
- Life Member Society for Agriculture Innovation and Development (SAID), Ranchi, Jharkhand
- Elected as Secretary of The Indian Natural Fibre Society (TINFS), Kolkata

- Received the "Team Award – 2017" conferred by The Indian Society of Agricultural Engineers (ISAE) for design and development of a double roller banana fibre extractor for extraction of fibre from banana pseudo-stem.
- Editorial Board Member of Journal of the Indian Society of Coastal Agricultural Research

Dr. Vidya Bhushan Shambhu

- External examiner for two M.Tech Thesis evaluation and conducted viva-voice examination at Faculty of Agricultural Engineering, BCKV, Mohanpur, West Bengal on 03.07.2017
- Awarded a Fellowship by the Institution of Engineers (India).
- Member of the Agricultural Engineering Divisional Sub-committee of West Bengal State Centre of Institution of Engineers (India)
- Received "Excellence in Research Award" for professional Achievement (outstanding contribution in the field of Farm Machinery and Power) by Society for Agriculture Innovation and Development, Ranchi.
- Received "Team Award -2017" for development of an extractor to produce good quality banana fibre for textile use by Indian society of Agricultural Engineers (ISAE), New Delhi.
- Board member for Amity Journal of Agribusiness

Sh. Sujai Das

- Expert member in a selection committee and question paper setter of a written examination for the Programme Assistant (Computer) under KVK, Kalyan, Prulia, West Bengal on 3rd November, 2017.

Dr. Kartick Kumar Samanta

- Member of Board of Examination for the M.Sc. in Textiles and Clothing students at J. D. Birla Institute, Kolkata.
- Member of Board of Examination for the under graduate and postgraduate studies in Fibre Technology/Technical Textiles of the University of Calcutta, Kolkata.

Dr. Rakesh Kumar Ghosh

- Reviewer for the journal Pesticide Research Journal and International Journal of Environmental Analytical Chemistry, Separation Science and Technology.
- Editorial board member of the International Journal of Bioresource Science
- Editorial board member of the Bengali Magazine Krishi Samachar.

Mr. Haokhothang Baite

- Sub-Divisional Committee member of The Agricultural Engineering Division of West Bengal State Centre, The Institution of Engineers (India),Kolkata
- Life Member of The Indian Natural Fibre Society (TINFS), Kolkata

RESEARCH SUPPORTING SERVICES

ARIS CELL

ARIS cell take care of establishment of IT facility, development and maintenance. During this period, new firewall device has been installed for better security and proper monitoring of the institute Internet facility. Login and password has been provided to individual users to access the Internet. Clientless account for staff mobile phone has been provided through campus Wi-Fi. Frequently monitoring the user internet utilization trend, bandwidth utilization, policy configures etc. using firewall software. Software has facility to monitor the gateway, firewalls configure, user policy, intrusion prevention, routing and host configure. Campus Wi-Fi has been monitoring through integrated Wi-Fi software. In this software, institute map with deployed device location is easy to located fault device. Software has monitoring facility like fault device, user activity, device location, etc. ARIS cell also facilitated to conduct various training programs through video conference.

Firewall dash board

Map based campus Wi-Fi monitoring

Hindi training through Video Conference

DESIGN, DEVELOPMENT AND MAINTENANCE (DDM) SECTION

The Design, Development and Maintenance Section (DDM Section) of the Institute is entrusted with the responsibility of Infrastructure development along with estate management which are the basic necessities for smooth flow of R & D works. The section executes co-ordinates and monitors all forms of civil, electrical, mechanical, sanitary, plumbing, repair and maintenance services essential for the day to day smooth functioning of all Divisions, Sections, Training Hostels, Laboratories, Residences, Scientists Homes, Farmers' Hostel of the Institute. Coordinating vehicle movement and others support services like watch and ward and fire fighting are among the other functions of this section. Planning, coordinating and execution of major infrastructure development works of the Institute through external agencies like CPWD, is also undertaken by this section. Regularization and digitization of land records, uploading of institute map on Google earth (Latitude: 22° 28' 52.92" N, Longitude: 88° 21' 08.73" E), institute master plan and land utilization related information is taken care off. This section is instrumental in implementation of the important central schemes like "Swatch Bharat Abhiyan" by monitoring supply of sanitary consumables to all Divisions/Sections for cleanliness drive.

The section is responsible for fabrication, assembly and supply of different NIRJAFT developed jute grading instruments like Bundle Strength Tester, Air Flow Fineness Tester, Colour and Lustre Metre and Bulk Density Metre. These instruments are supplied on order basis to different national and international organizations as per requisition from stake holders. The DDM section provides all technical support to ongoing research projects like design modifications in the Power Ribboner and for fabrication of the drape meter. Important public safety issues like, coordinating with Public Health Engineering Department of the State Govt. for water sampling, testing and undertaking efforts for supply of safe drinking water to the Institute under guidance of the Task Force Committee, coordinating with CPWD for Special Repair to severe structural damage to Adm. Bldg. and CT Bldg. and liaison with Kolkata Municipal Corporation (KMC) for treated water supply, Land Records, better drainage etc. is also undertaken by this section.

LIBRARY

NIRJAFT library has a holding of about Approx. 18,670 Nos. books in the different subjects. It is a member of CeRa (Consortium e-resources in agriculture). It contains 3,900+ e-journals in agricultural sciences. Library renders reference services, photocopy services, current awareness services and abstracting services (Jute and allied fibre abstract) to fulfill the user's requirements. Library section interacts with different Institutes/organizations by mailing annual reports, newsletters and Institute's publications at a regular frequency and receives the same from different Institutes. Digitization of old, valuable, rare and damaged books occur at regular frequency. To preserve permanently old and rare publications with brittle condition of library use "Tissue paper lamination technique" at regular interval. Visitors from different Institutes/organizations enjoy facilities of reading, consulting CeRA (consortium e-resource in agriculture) and photocopy services. At present users of ICAR-NIRJAFT can access to e-resources of different ICAR research Institutes and universities through local server available in the library and connected with central server at IARI, New Delhi.

Collection of old journals

Digitization of old books

Hindi books, Swamy's compilation and Standards and specifications have been purchased for library as per requirement of scientists, researchers, technical and administrative staff. All categories of NIRJAFT staff can have access to the On-line library system to request and return, browse entire library from their comfort zones. They can access On-line library through link provided in institute website. Users can access e-resources of NIRJAFT Library from outside of Institute through On-Line remote access to fulfill their need through software. Partial digitization has been made of old, rare and valuable books of library for the period 2017-18 (206 Nos.). Library Rendered abstracting services and published "Jute and Allied Fibre Abstract" Vol.5 No. 1 and 2, Jan-Dec., 2016" and disseminated soft copies to researchers, scientific community, technical staff for their required information.

HINDI SECTION

Meeting

The meeting of Official Language Implementation Committee for the four quarters were held on 21.06.2017, 22.07.2017, 14.12.2017 and 24.03.2018 respectively at the Director's room under the chairmanship of Director, NIRJAFT. I each meetings, the agenda items of the previous meeting were confirmed and 10 new agenda were placed in which main discussion was to increase the original correspondence in Hindi for achieving the required target given in Annual Programme 2017-18

Hindi Workshop

Four One day Hindi Workshop on the topic "Hindi Noting and Drafting" and "Hindi as Official Language" on 24/06/2017, "Problems while working in Hindi and its solution" and "UNICODE" on 19/08/2017, "Hindi Noting and Drafting" and "UNICODE" on 23/12/2017 as well as "Hindi on Computer" and "The Journey of Hindi as Official Language" on 24/03/2018 were organized respectively in the Institute.

A test of Hindi language training and Hindi workshop on the topic "Hindi Grammar" via video conferencing by Central Hindi Training Institute, New Delhi was organized in the Institute on 13.07.2017. 16 Officers and 10 staff members have participated in the programme.

Hindi training through video conferencing

Meetings attended

- Dr. G. Roy, Director (Acting) and Mr. R.D. Sharma, Assistant Director (OL) attended 1st Half-yearly meeting of Town Official Language Implementation Committee, Kolkata (Karyalay-2), held on 21st April, 2017 at Maghnad Saha Auditorium, CSIR-Central Glass and Ceramic Research Institute, 196 Raja S.C. Mullick Road, Jadavpur, Kolkata- 700032.
- Dr. A. N. Roy, Director (Acting) Mr. R.D. Sharma, Assistant Director (OL) attended 2nd Half-yearly meeting of Town Official Language Implementation Committee, Kolkata (Karyalay-2), held on 8th September, 2017 at A.P.C. Roy Seminar Hall, CSIR-Central Glass and Ceramic Research Institute, 196 Raja S.C. Mullick Road, Jadavpur, Kolkata- 700032.

Hindi Fortnight Celebration

Hindi Fortnight Celebration was observed in the Institute during 01-15 September, 2017. During this period Quiz Competition, Extempore competition, Debate Competition, Recitation Competition and maximum work in Hindi Competition were organized among the staff members of the Institute. Participants were awarded with prizes.

Dr. S.S. Singh, Director, ICAR-ATARI, graced Hindi fortnight closing celebration as Chief Guest and he suggested working more and more in Hindi. He also appreciated the enthusiasm of the staff members for participating in different competitions during Hindi Fortnight Celebration.
Dr. A. N. Roy urged the staff menbers to perform the works in bilingual form viz Hindi-English which is a constitutional responsibility of each employee that they should render their official works originally in Hindi to the maximum extend.

Training

- "Parangat" Training from Hindi Teaching Scheme, Department of Official Language, Ministry of Home Affairs was organized in the Institute from July, 2017 to November, 2017 and 22 staff members of the Institute were trained.
- 07 Staff members of the institute were deputed to attend Basic Training Programme for working in Hindi on Computer which was organized by Dept of Official Language, Ministry of Home Affairs during 17-21July, 2017.
- "Praveen" Training from Hindi Teaching Scheme, Department of Official Language, Ministry of Home Affairs is continue in the Institute from January-May, 2018 and 09 staff members of the Institute are nominated for training.

Inspection

Hon'ble Parliamentary Committee on Official Language had visited the Institute on 23-24 May, 2017 and praised the Institute for outstanding Implementation of the official language policy of the govt of India.

Felicitation to Director

Hindi Workshop is in progress

Hon'ble Parliamentary Committee on Official Language

Official Language Implementation Committee meeting

Publication

Hindi Section published a Hindi Magazine named "Devanjali" which comprised technical articles on jute and allied fibres

INSTITUTE TECHNOLOGY MANAGEMENT UNIT (ITMU)

ITMU of this institute is maintaining liaison between Patent Office, GOI, Patent attorney in the process of new patent filing and follow up old cases. This unit also facilitating the documentation process of IP assets for patentable / non-patentable technologies of the institute and the process of patent /commercialization of the technology. It is assisting in the scientist for developing a project in the light of IPR and organized various meetings in connection with Institute patent related decisions and policy formulation. ITMU conducted two ITMC meetings on 14.12.2017 and 23.03.2018 respectively and the following patents were filed / granted during the period. There are four patents were granted and one patent was e-filed during this year.

PRIORITY SETTING, MONITORING and EVALUATION (PME) CELL

Prioritization Monitoring and Evaluation (PME) concept is an executive tool in R & D system to augment the scientific productivity. It helps to set an integrated priority and monitoring of all the in-house projects. PME cell coordinates and blends the recommendations of QRT, RAC and IRC/NITI of institute and to recommend research priorities of the institution for short, medium and long term listing priority researchable problems on jute and allied fibres. PME cell coordinates and assemble for annual monitoring of each on-going project and evaluation of completed projects through internal and external experts. In addition to these, replies to the parliamentary questions on technical and scientific matter addressed to the institute by ICAR.

PERSONNEL

Dr. Gautam Roy, M.E., Ph.D.	Director (Acting) up to 03.07.2017
Dr. Alok Nath Roy, M.Tech., Ph.D.	Director (Acting) w.e.f.04.07.2017

QUALITY EVALUATION and IMPROVEMENT DIVISION

Scientists

Dr. Gautam Roy, M.E., Ph.D.	Principal Scientist and I/c Head (Retired on 28.02.2018)
Dr. Biplab Saha, M.Sc., Ph.D.	Principal Scientist and I/c Head (wef 01.03.2018)
Dr. Avijit Das, M.Sc., Ph.D.	Principal Scientist
Dr. Deb Prasad Ray, M.Sc. Ph.D., PGDTMA, FSPPS	Principal Scientist
Dr. Subhas Chandra Saha, M.Sc., Ph.D.	Senior Scientist
Dr. Atul Singha, M.Sc., Ph.D.	Scientist (wef 27.06.2017 from CISH, Lucknow)

Technical Officers

Sh. Koushik Manna, M.Sc, B.Ed, CLIS.	Technical Officer
Sh. Amitava Sarkar	Technical Officer

MECHANICAL PROCESSING DIVISION

Scientists

Dr. Gautam Basu, M.Tech., Ph.D, FIE (I), DJT	Principal Scientist and I/c Head
Dr. Surajit Sengupta, M.Tech., Ph.D, FIE(I), C.Engg, PGDFM	Principal Scientist
Dr. Sanjoy Debnath, M.Tech., Ph.D, FIE (I)	Principal Scientist
Dr Kartick Kumar Samanta, M.Tech., Ph.D,	Scientist (Sr. Scale)
Sh. Manik Bhowmick, M.Tech,	Scientist

CHEMICAL and BIO-CHEMICAL PROCESSING DIVISION

Scientists

Dr. Nimai Chandra Pan, M.Tech., Ph.D., FIE(I), FTA	Principal Scientist and Head
Dr. Sambhu Nath Chattopadhyay, M.Tech., Ph.D. FIE(I), FTA	Principal Scientist
Dr. Purna Chandra Sarkar M.Sc., Ph.D.	Principal Scientist (Joined on 01.07.2017)
Dr. Ammayappan Lakshmanan, M.Sc., Ph.D, PGDCA.	Principal Scientist
Dr. Rakesh Kumar Ghosh, M.Sc., Ph.D.	Scientist (Sr. Scale)

Technical Officers

Sh. Amalesh Khan, B.Sc.	Senior Technical Officer
Sh. Basudev Chakraborty, ITI	Technical Officer (Retired on 31.01.2018)
Sh. Vikas Chandra	Technical Officer

TRANSFER OF TECHNOLOGY DIVISION

Scientists

Dr. Alok Nath Roy, M.Tech., Ph.D.	Principal Scientist and Head
Dr. Abhay Kumar Thakur, M.Tech., Ph.D.	Principal Scientist
Dr. Samir Baran Roy, M.Sc., Ph.D.	Principal Scientist

Dr. Laxmikanta Nayak, M.Tech., Ph.D.	Principal Scientist
Dr. Vidya Bhushan Shambhu, M.Tech., Ph.D.	Senior Scientist
Sh. Sujai Das, M.Sc.	Scientist (Sr. Scale)
Sh. Haokhothang Baite, M.Tech.	Scientist (Joined on 16.10.2017)
Technical Officers	
Sh. Koushik Mitra, B.A.	Technical Officer
Smt. Chandra Karmakar	Technical Officer

DEVELOPMENT, DESIGN and MAINTENANCE SECTION

Dr. Gautam Basu, M.Tech., Ph.D.	Principal Scientist and I/c
Sh. Prosenjit Sanyal, B.Sc.	Chief Technical Officer
Sh. Lilamoy Patra, D.E.E.	Assistant Chief Tech Officer (Retired on 30.09.2017)
Sh. Chanchal Kundu, D.M.E.	Technical Officer
Sh.Karunamoy Patra, D.E.E.	Technical Officer

PME CELL

Dr. Samir Baran Roy, M.Sc., Ph.D.	Principal Scientist and I/c
Dr Utpal Sen, M.Sc., Ph.D.	Chief Technical Officer
Dr Debabrata Das, M.Sc., Ph.D.	Senior Technical Officer
Sh Krishna Gopal Nath, M.C.A.	Technical Officer
Sh. Kishun Lal Ahirwar, M.A.	Senior Technical Officer

LIBRARY

Dr. (Smt). Rina Naiya, B.Sc., B.Lib., Ph.D.	Senior Technical Officer and I/c Library
Sh. Srikumar Chowdhuri	Technical Officer

ADMINISTRATION

Sh. Navin Kumar Jha, B.A.	Senior Administrative Officer (wef 23.12.2017)
Sh. Amitabh Singh, M.A.	Finance and Account Officer
Mrs. Anasua Majumder, M.Sc.	Assistant Finance and Account Officer
Sh. Sanatan Sardar, B.A.	Assistant Administrative Officer and DDO (Retired on 31.01.2018)
Smt. Jayashree Nath, B.A.	Assistant Administrative Officer – Adm. I (Retired on 30.09.2017)
Sh. Ratan Roy, B.Com.	Assistant Administrative Officer – Adm. I
Sh. Sujit Kar, B.A.	Assistant Administrative Officer – Adm. II (wef 03.10.2017)
Ms. Swarnali Mukherjee, M.Sc.	Assistant Administrative Officer – Adm. III
Sh. Shahzad Javed, B.Com, PGDPM.	Assistant Administrative Officer (wef 01.02.2018)
Sh. Balaram Chatterjee, B.Com.	Personal Secretary to Director

HINDI CELL

Sh. Ram Dayal Sharma, M.A., DHT, PGDT	Assistant Director (Office Language) and I/c

RETIREMENT ON SUPERANNUATION

- Dr. Gautam Ray , Principal Scientist (On 28.02.2018)
- Sh. Basudev Chakraborty, Technical Officer (on 31.01.2018)
- Sh. Lilamoy Patra, ACTO (on 30.09.2017)
- Smt. Jayashree Nath, AAO (on 30.09.2017)
- Sh. Sanatan Sardar, AAO/DDO (on 31.01.2018)
- Sh. Ashok Bahadur Thapa, Skilled Support Staff (on 30.04.2017)
- Sh. Joydev Mondal, Skilled Support Staff (on 31.10.2017)
- Sh. Madhab Chandra Paul, Skilled Support Staff (on 31.01.2018)
- Sh. Ratan Sarkar, Skilled Support Staff (on 31.03.2018)

RESIGNATION (VRS)

- Sh. Naresh Mallick, Skilled Support Staff (on 01.03.2018)

FINANCE

BALANCE SHEET AS ON 31st MARCH, 2018

Corpus/Capital Fund & Liabilities	Schedule	2017-18 (₹)	2016-17(₹)
Capital Fund	1	18,12,47,277	19,39,04,828
Reserves	2	-	-
Earmarked/Endowment Fund	3	-	-
Current Liabilities and Provisions	4	2,27,97,315	2,32,13,397
	Total	20,40,44,592	21,71,18,225
Assets			
Fixed Assets	5	16,81,09,520	17,76,25,855
Investments-Earmarked/Endowment Funds	6	-	-
Current Assets, Loans and Advances	7	3,59,35,072	3,94,92,370
	Total	20,40,44,592	21,71,18,225

A. The budget provision and actual utilization under grants and plan schemes during 2017-18

S.No	Name of Heads	Fund Received (₹)	Actual Utilization (₹)	Closing Balance(₹)
1	Grants	21,60,00,000	20,83,48,184	76,51,816
2	Plan Schemes (ITMU,CRP and ABI)	66,37,000	59,94,171	6,42,829

*- *As per annual account 2017-18 submitted to ICAR*

B. Sub-head wise budget provision and actual utilization under Institute Plan and Non-plan Schemes during 2016-17

S. No	Sub-Head	Grants (₹)	
		Budget Provision	*Actual Utilization*
	A) Revenue Expenditure		
1	Establishment Expenses	11,47,00,000	11,41,67,936
2	Pension and Other Retirement Benefits	6,22,00,000	5,86,26,592
3	Travelling Allowances	16,50,000	16,02,578
4	Research and Operational Expenses	38,00,000	35,65,422
5	Administrative Expenses	2,46,00,000	2,44,19,288
6	Miscellaneous Expenses	60,50,000	37,15,975
	Total of A	**21,30,00,000**	**20,60,97,791**
	B) Capital Expenditure		
1	Equipment	19,50,000	13,08,851
2	Library Books and Journals	1,00,000	24,204
3	Furniture and Fixture	5,00,000	4,70,880
4	Information Technology	4,50,000	4,46,458
	Total of B	**30,00,000**	**22,50,393**
	Total (A+B)	**21,60,00,000**	**20,83,48,184**

Income and Expenditure account for the year ended 31st March 2018

	Schedule	2017-18 (₹)	2016-17 (₹)
A. Income			
Income from Sales/Service	8	10,47,507	13,31,970
Grants in aid/subsidies	9	21,62,46,071	18,45,03,842
Fees/Subscriptions	10	-	-
Income from Investments	11	-	-
Income from Royalty, Publications	12	-	-
Interest earned	13	2,91,684	1,71,270
Other Income	14	10,84,520	5,76,144
Prior Period Income	15	-	-
	Total (A)	**21,86,69,782**	**18,65,83,226**
B. Expenditure			
Establishment expenses	16	17,34,08,505	13,42,78,775
Research and Operational Expenses	17	1,37,20,277	83,00,456
Administrative expenses	18	2,31,12,416	2,89,27,872
Grants and subsidies	19	-	-
Miscellaneous expenses	20	37,15,975	30,36,123
Depreciation	5	1,80,21,532	99,86,943
Prior period expenditure	21	-	-
	Total (B)	**23,19,78,705**	**18,45,30,169**
Balance being surplus/(Deficit) carried to corpus/Capital Fund		**-1,33,08,923**	**20,53,057**

Abstract of 'Other receipts' for the year 2017-18

S.No	Head of account	Amount (₹)
1	Sale of farm produce	3,78,074
2	Sale of vehicle, other machine tools	1,36,163
3	Licence fee	52,329
4	Interest earned on loans and advances	4,06,279
5	Analytical and testing fee	4,34,610
6	Income from service	-
7	Application fee from candidates	2,000
8	Receipts from services rendered	-
9	Interest earned on short term deposits	2,20,580
10	Income generated from Internal Resource Generation Schemes	
	a) Training	48,660
	b) Consultancy	50,000
	c) Sale of technology	42,708
11	Recoveries of Loans and Advances(including the refund of S-Advance)	3,86,569
12	Miscellaneous Receipts	9,87,483
	TOTAL	**31,45,455**

List Of Developed Instruments (Ready for Sale)

Sl No	*Name of Instrument/ Machinery*	*Model No*
1	Air Flow Fineness Tester	-
2	Automatic Electronic Fibre Bundle Strength Tester for Multiple Fibres (with PC interface)	NIRJAFT-AEFBST-MF01
3	Auto speed controller of spinning frame (without motor)	-
4	Bulk Density Meter	-
5	Colour & Lustre Meter	-
6	Fibre Bundle Strength Tester	-
7	Digital Colour Lustre Meter (Laboratory Type)	NIRJAFT-DCLM-LT01
8	Digital Colour Lustre Meter for multiple fibres	NIRJAFT-DCLM-MF01
9	Digital Colour Range Indicator (Handy type)	NIRJAFT-DCRI-HT01
10	Digital Fineness Meter for Jute	NIRJAFT-DFM-J01
11	Digital Fineness Meter for multiple fibres (Ramie, Sunhemp, Sisal, Flax)	NIRJAFT-DFM-MF01
12	Digital Moisture Meter for Jute (Handy Type)	NIRJAFT-DMM-HT01
13	Digital Moisture Meter (Laboratory Type with probes)	NIRJAFT-DMM-LT01
14	Electronic Fibre Bundle Strength Tester for Jute (Semi-Auto)	NIRJAFT-EFBST-SA01
15	Fibre clamp (attachment with bundle strength tester)	-
16	Grading Aid Album for Jute	-
17	Graded Sample Box	-
18	Manual Ribboner	-
19	Portable Hard Fibre Tensile Tester (without computer)	-
20	Portable Hard Fibre Tensile Tester (with computer)	-
21	Power Jute Ribboner	-
22	Ramie Degumming Plant (10 Kg. capacity)	-
23	Thermal Insulation Value Tester (with PC interface)	NIRJAFT-TIV-01

For detail, please visit our website http://nirjaft.res.in/

Services Offered

1. Spinning trial of various lingo-cellulosic fibres
2. Grading of jute fibre
3. Property evaluation of fibre, yarn and fabric.
4. Trial on chemical processing of fibre, yarn and fabric.
5. Non-woven trial of various natural fibres
6. Analysis of chemical composition of various natural fibres
7. Blend analysis of textile materials
8. Field trial of Geo-textiles and Agro-textiles
9. Property evaluation of pulp and paper
10. Property evaluation of composites
11. Training on different modules related to Jute and Allied fibres
12. Business Incubation Centre
13. Sales counter at our campus
14. Entrepreneurship Development Programme

In addition, institute has Sophisticated Analytical Instruments Facility (SAIF) and offers the students and researchers working in the area of material science can utilise these facilities on charge basis.

For detail, please visit our website http://nirjaft.res.in/

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