



JUTE AND JUTE FABRICS BANGLADESH

July 2022-December 2023

BANGLADESH JUTE RESEARCH INSTITUTE

VOLUME 47 & 48

Newsletter of BJRI

No. 1-6

The 53rd Victory Day Observed at BJRI



Contents

The 53 rd Victory Day Observed at BJRI	1
Government declares jute an agricultural product	2
Dr. Mahmud Al Hossain Joined as a Director (PTC)	3
Mir Akmam Noor Rashid Awarded for Ph.D. Degree	3
Role of microbial enzymes in textile processing and antimicrobial textile	4
BJRI and Jute Industry: Achieving Bangladesh's SDG Excellence	6
BJRI Scientist Dr. Md. Al-Mamun won the Young Scientist Award	7
Md Al-Mamun was Awarded Ph.D Degree	8
Unlocking the Potential of Bangladesh's Jute: A Regional Analysis	9
3D printing with Jute fiber Filament	11
Training, workshop and seminar organized by PTC Division	12

Bangladesh Jute Research Institute celebrated the 53rd Victory Day on Saturday. The day was celebrated with due solemnity and rich tribute was paid to the Father of the Nation Bangabandhu Sheikh Mujibur Rahman and the martyrs of the liberation war of 1971.

Director General of BJRI Dr. Md. Abdul Awal hoisted the national flag at 7am at the premises of the office ground. National anthem was sung by the attendants. Special prayers were being offered after hoisting the flag. Also, the Director General wreathed at the National Memorial at savar to honor the best children of the nation along with all Directors, scientists, officers and other employees.

Among others, Director of Technological Wing Md. Moslem Uddin, Director of Jute Textile Wing Dr. Ferdouse Ara Dilruba, Director of Agriculture Wing Dr. Nargis Akter, Director of Planning, Training and Communication Wing Dr. Mahmud Al Hossain, Director of Admin and Finance Wing Dr. S. M. Mahbub Ali, scientists and officials of different wings were present at the occasion.



Government declares jute an agricultural product

On 23 February 2023, the Golden Aansh (Jute) was officially recognized as an agricultural product in a publication in the Bangladesh Gazette, paving the way for the golden fibre to enjoy all kinds of incentives allotted for the agricultural sector.

According to the decision of the cabinet, jute, the golden fibre, was declared an agricultural product.

Prime Minister Sheikh Hasina while declaring the decision said jute growers would get all kinds of incentives as enjoyed by other agricultural producers.

As a result of this declaration, the jute sector will get the benefits that other agricultural products enjoy, such as low-interest loans, incentives, rebates on electricity bills and many others.

The recognition will help the jute sector to

improve further and exports of jute and jute products will also increase.

In the meantime, Jute has been declared as 'Product of the Year' of 2023 and jute as Agricultural Product to increase consumption of jute and jute products and highlight the bright potential of golden fibre globally.

According to the decision of the cabinet meeting, the Ministry of Agriculture issued a notification declaring golden fiber jute as an agricultural product and the notification gazette was published on March 1, 2023.

Jute will now be included in agricultural credit because it is regarded as an agricultural product, and exports of the product will be eligible for a variety of facilities.

According to the Agricultural Marketing Act, the minimum price and reasonable price of jute as an agricultural product will be determined and implemented by the Directorate of Agricultural Marketing.

Dr. Mahmud Al Hossain joined as a Director (PTC)



Bangladesh Jute Research Institute (BJRI) appointed Dr. Mahmud Al Hossain as Director (PTC) on 05.07.2023. Prior to joining as Director (P. T. C.), he was the chief

Scientific Officer (CSO) of Genetic Resources and Seed Division of Agriculture Wing.

Dr. Mahmud was born on 12 November 1969 in an aristocratic Muslim family in Barishal. His father, the late Amjad Hossain, was a well-known lawyer and his mother, Mrs. Khaleda Begun, was an educator by profession.

Dr. Hossain has been a talented and wise man since childhood. Dr. Mahmud mild laughter and well behaved by nature, holds B.Sc Agri (Hons) from Patuakhali Krishi College, Patuakhali, M.S degree from Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur.

Subsequently, he also obtained Ph.D from Patuakhali University of Science and Technology, Patuakhali. He started his professional career at Bangladesh Jute Research Institute as a Scientific Officer (SO) on 30th June 1996.

He has more than thirty scientific papers in different national and international journals. He developed salt tolerant Jute variety (BJRI Deshi Pat -10) for the coastal region and also develop waterlogging tolerant jute line for the use of char land of Bangladesh.

He is happily married to Israt Jahan and blessed with a daughter Jerin Tasnim and a son Raiyan Mahmud. His wife Israt Jahan is the inspiration for all his activities.

Mir Akmam Noor Rashid was awarded for Ph.D. Degree



Mir Akmam Noor Rashid, the Senior Scientific Officer of the Bangladesh Jute Research Institute, received a Ph.D. from the International Islamic University Malaysia (IIUM) in the

field of Mechatronics Engineering on June 15, 2023. He obtained his Ph.D. degree under the guidance of Professor Dr. Tanveer Saleh, conducting research on the topic "Investigation on Laser Beam and Micro Electro Discharge Machining Based Hybrid Micromachining". He was chosen to get funding from the Malaysia Government FRGS and AOARD funds USA, in



order to do his experimental study for his Ph.D. He has developed a hybrid micromachining model utilizing Artificial Neural Network (ANN) and Response Surface Methodology (RSM) based hybrid modeling. This model has been published in reputed journals such as Springer Nature (ISI: Q1 index), IOP science, Elsevier, and IIUM Engineering Journal.

Dr. Mir Akmam Noor Rashid was born in Dhaka on December 31, 1987. In 2010, he started his professional career as a Textile Engineer at EPYLLION GROUP, located in Bangla Bazar, Gazipur. He held the position of Executive Officer of Epyllion Knitex Limited (EKL) when he joined. In 2011, He joined as a Scientific

Officer at the Bangladesh Jute Research Institute after gaining one year of experience in a mill. He has been employed in the Dyeing and Printing Division since its inception.

At this point, he had participated in two successful research projects and oversaw numerous applications involving natural and artificial colors on fabrics made from jute and jute cotton blends. In addition, he has actively engaged in the development of two advanced technologies and is also participating in many initiatives inside TRB.

Due to his exceptional academic research and experimentation, he was awarded the "Silver Award in 2019" in the KERICE competition held at IIUM in Kuala Lumpur, Malaysia. Additionally, he was selected as a keynote speaker at the International Seminar SDP in Palembang, Indonesia, where he delivered two research papers on the application of Artificial Neural Networks. Furthermore, he has authored 34 research articles in esteemed journals with high impact factors, in addition to his academic achievements.

Dr. Mir Akmam Noor Rashid obtained his Master of Science degree in Manufacturing Engineering with a CGPA 3.70 out of 4.0 from the International Islamic University Malaysia in 2018.

While pursuing his Master's research Program, he was chosen to receive funding from the RIGS fund and was awarded a scholarship from IIIT. He presented his research result at several renowned international conferences, including the AMPT conference, IIUM congress, ICAMME, iM3F, NUSYS and IIUMCEP. In addition, he disseminated his study findings through publication in prestigious journals such as the Journal of Engineering Materials, IOP Science, Springer Book Chapter, ARPN, and Lecture Notes of Mechanical Engineering.

He was designated as a Teaching Assistant in the MME Department at IIUM. He has conducted some Bachelor courses in IIUM such as Engineering Workshop 1, Thermal Dynamics Part-1, Manufacturing Process, Thermal

Treatment (Annealing), and Engineering Drawing. He achieved a First-class Bachelor's Degree from Bangladesh University of Textiles (BUTEX). Throughout his Bachelor program, he was awarded a merit scholarship each year based on his exceptional academic performance. He was awarded the HNM (Harris and Menuk) scholarship as well as the Fazilatunnesa Jute Mill scholarship for four straight years, from his first year to his fourth year academic period. In his personal life, he is married and has two sons named Abdullah Jaabir and Abdur Rahman.

Role of microbial enzymes in textile processing and antimicrobial textile

Zakaria Ahmed, Ph.D.

Principal Scientific Officer, Weaving Department, BJRI, Bangladesh.

Enzymes are biocatalysts working on specific perfection in very small amounts. Enzymes are biodegradable products capable of efficient working under milder conditions, thus



conserving precious nonrenewable sources of energy. The use of enzymes in the textile industry is an example of white industrial biotechnology, which allows the development of environmentally friendly technologies in

fiber processing and strategies to improve the final product quality.

The consumption of energy and raw-materials, has led to an increased awareness of environmental concerns related to the use and disposal of chemicals into landfills, water or release into the air during chemical processing of textiles, as well as conservation of the depleting non-renewable sources of energy. These are the principal reasons for the application of enzymes in finishing of textile materials.

Out of all the processing steps of natural fiber fabrics, desizing is the main step in which microbial action helps in better and quick removal of the starch-based sizing material applied onto the yarn before weaving to impart it strength and avoid mechanical breakages during weaving. Desizing with very less impact on the environment without the use of corrosive acids and alkalis is utmost necessary for the subsequent successful dyeing and printing operations involved in textile processing. Textile processing has reaped great benefits in terms of both environmental impact and product quality through the use of enzymes. From the 7000 enzymes known, only about 75 have found to be useful in textile processing. This enzyme processing also results in savings of packing costs and handling and transportation charges.

The principal enzymes used in textile industry are hydrolases and oxidoreductases. The group of hydrolases includes amylases, cellulases, proteases, pectinases and lipases or esterases.

- **Amylases** were the only enzymes applied in textile processing until the 1980s. These enzymes are still used to remove starch-based sizes from fabrics after weaving.
- **Cellulases** have been employed to enzymatically remove fibrils and fuzz fibers, and have also successfully been introduced to the cotton textile industry. Further applications have been found for these enzymes to produce the worn-out look of denim apparel and other garments.
- **Proteolytic** enzymes have the potential to remove wool fiber scales, resulting in improved anti-felting property.
- **Esterases** have been successfully studied for the partial hydrolysis of synthetic fiber surfaces, improving their hydrophilicity and aiding further finishing steps.

Besides hydrolytic enzymes, oxidoreductases have also been used as powerful tools in various textile-processing steps.

- **Catalases** have been used to remove H_2O_2 after bleaching, thus reducing water consumption. An outstanding example of the high catalytic power of the enzymes is the activity of catalase enzyme. One molecule of enzyme catalase is able to convert 5×10^6 molecules of hydrogen peroxide into hydrogen and water in 60 seconds.

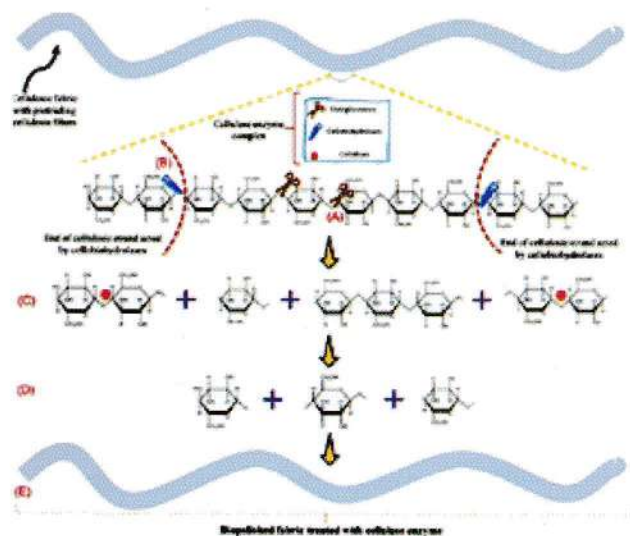
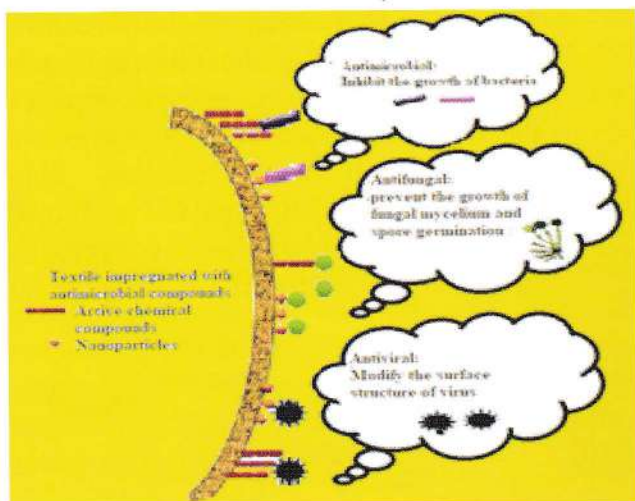


Fig: Mechanism of action of cellulase on cellulosic fabrics for improving their properties

Textiles are omnipresent and play an essential part in human society. Cloths may contain certain types of microbes, which has been recently discussed as clothing microbiology and the effect and interaction of cloths with human skin microflora. Coatings of natural antimicrobial agents on the textiles or fabrics date back to ancient times, when the Egyptians used spices and herbal coatings on cloths to prepare the mummy wrap.

Antimicrobial winter wear is gaining importance as these clothes are not washed frequently and rarely exposed to sunlight.

These clothes are generally stored for a longer time, which may enable the growth of microbes and thus antimicrobial type fabric may be an appropriate option. Similarly, the antimicrobial textiles may also be useful in those places where no plastic bags are used.



Food packaging which generally involves degradable material is safer for the environment as well as does not affect the food properties, however, the concept of antimicrobial coating in such wrappers is important to reduce the growth of pathogenic and food spoilage microbes.

Primarily, the antimicrobial textile is required by the following sectors along with the appealing combination of color, print and design:

- (1) **Apparel:** caps, jackets, sanitary pads, sportswear, undergarment, winter wear;
- (2) **Commercial:** carpets, covering for seats, window, vehicle, etc.; dusting cloths, military fabric, tent, and uniform;
- (3) **Health care:** bandage, scrub, mask, lab coats, protective kits; and
- (4) **Households:** bedding, carpet, cover, curtains, mop, pillows, towel.

BJRI and Jute Industry: Achieving Bangladesh's SDG Excellence



Syed Kabir Aflatun Hemel
Scientific Officer
Bangladesh Jute Research Institute

The Sustainable Development Goals (SDGs) offer a global blueprint for a prosperous, equitable, and sustainable future. All United Nations member states endorsed the '2030 Agenda for Sustainable Development' in 2015, featuring 17 interconnected goals addressing urgent issues such as poverty eradication, hunger, education, gender equality, clean energy, and responsible production. The SDGs envision an inclusive economy harmonizing with environmental preservation, social equity, and universal well-being, leaving no one behind. Bangladesh, like many nations, actively pursues the SDGs.

The country aligns its development priorities with the SDGs, leveraging this framework to tackle a wide range of socioeconomic and environmental challenges effectively.

Agriculture is pivotal in achieving multiple SDGs, with profound impacts on society, the economy, and the environment. Adopting sustainable agricultural practices can raise crop yields, enhance food security, and combat malnutrition, aiding in eradicating hunger. The link between agriculture and access to nutritious food is essential for overall health. Sustainable agriculture also reduces harmful chemical use, nurturing healthier ecosystems. It advances the SDGs by addressing water pollution, generating jobs, fostering economic growth, reducing waste, and promoting responsible land use.

Jute cultivation is a vital part of Bangladesh's agriculture. It serves as a major cash crop, playing a crucial role in boosting the economy through exports and providing job opportunities.

Jute, often hailed as the "golden fiber," boasts a rich history and versatile applications, spanning textiles, packaging, and construction for centuries. Renowned for its eco-friendliness and biodegradability, jute stands as a sustainable choice for various products. Jute cultivation enhances soil fertility, reduces carbon emissions, and bolsters economies, which ultimately benefit countless livelihoods. The production of jute, kenaf, and fiber products is now led globally by Bangladesh, overtaking India, according to the most recent data from the Food and Agriculture

Organization (FAO). During the previous four fiscal years, India's jute production fell by 37%, while Bangladesh's output remained strong, accounting for 58% of all jute produced globally and helping to manufacture 53% of all jute, kenaf, and fiber products. Recently, realizing the importance of jute, the Honorable Prime Minister declared jute and jute products as the 'Product of the year, 2023'.

Bangladesh places a strong emphasis on achieving the SDGs, particularly focusing on the crucial role of jute cultivation. This sector serves as a lifeline for countless small-scale farmers and laborers, aligning closely with SDG 1's mission to eradicate poverty. By boosting the productivity and sustainability of jute farming, Bangladesh can make significant strides in reducing poverty and improving economic well-being, uplifting communities from hardship. Moreover, jute cultivation also positively impacts SDG 2, addressing hunger through crop rotation and diversified farming practices, enhancing food security, and enabling households to access nutritious meals. The jute industry in Bangladesh offers employment in both rural and urban areas, aligning with SDG 8's aims of fostering decent work and economic growth. Jute's eco-friendly nature supports SDG 12, and its role in enhancing soil fertility, reducing carbon emissions, and preventing soil erosion contributes to SDGs 13 and 15. By engaging in global collaboration to strengthen the jute sector, Bangladesh can make significant progress towards sustainability and further its development goals. This sector has the potential to contribute in various ways to promoting sustainability and achieving the SDGs.

Bangladesh Jute Research Institute (BJRI) is at the forefront of jute research, developing new jute varieties and technologies to enhance crop yield, quality, and resilience. BJRI has made notable strides in developing new jute varieties and technologies, such as reducing the jute's growth cycle to 110 days and creating varieties suited for salt and submergence-prone areas. The institute conducts research on jute pests and diseases and provides guidance to farmers on

effective management strategies. BJRI's latest efforts include introducing 'BJRI Tossa pat 9,' also called 'Sabuj Sona,' a high-yielding fiber plant, and 'BJRI Mesta-4,' which can be eaten as a vegetable. BJRI has also developed advanced technologies for pest control, better farming methods, and seed production. BJRI also promotes eco-friendly jute farming, offers food security with jute varieties, and collaborates globally to enhance jute production and competitiveness.

BJRI's research and developmental efforts aim to sculpt the landscape of Bangladesh's jute industry. Their work not only enhances the yield and quality of jute but also supports the overall development of the jute industry, contributing to the country's economy and sustainability. BJRI's research, innovation, and sustainable farming practices in the jute sector can, directly and indirectly, align with multiple SDGs, making a significant contribution to Bangladesh's sustainable development agenda.

BJRI Scientist Dr. Md. Al-Mamun won the Young Scientist Award



The Plant Breeding and Genetics Society of Bangladesh honored Dr. Md. Al-Mamun, the Principal Scientific Officer of the Bangladesh Jute Research Institute, with the Young Scientist Award 2019 on the eve of the 2nd International and 12th Biennial Conference of PBGSB 2023. Honorable State Minister Dr. Shamsul Alam, of

the People's Republic of Bangladesh's Ministry of Planning, presented him with the award in recognition of his contributions to genetics and plant breeding.

The BJRI family, especially the Director General, all the Directors, the scientists, and all their colleagues, expressed delight at the celebration and expressed gratitude to Dr. Al-Mamun for helping to make BJRI a success.

He was born in the Barguna district on 20 August 1979. Dr. Al-Mamun started his professional career at the Bangladesh Jute Research Institute in 2004 as a Scientific Officer.

He is involved in varietal development/improvement activities of jute and kenaf. By this time, he has developed three high-yielding and adaptable cultivars with red stems BJRI Kenaf 4; moderate nematode tolerance variety BJRI Mesta 3 and nutraceutical leafy vegetables variety BJRI Mesta 4. Besides he has developed a good number of mature technologies and is also involved in different activities of releasing some varieties of jute, kenaf, and mesta.

Dr. Al-Mamun obtained his B.Sc. in Agriculture (Hons) degree from Sher-e-Bangla Agricultural University, in 2004. He achieved a Master of Science degree in Genetics and Plant Breeding from the same university in 2008 as a scholar of BJRI. Under the National Agricultural Technology Project (NATP) phase 2, Mr. Al-Mamun was selected as PhD scholar in 2018 by the Bangladesh Agricultural Research Council. In 2022 he completed his PhD from the University Putra Malaysia in Genetics and Breeding with the research title "Genetic diversity and development of high fiber yield Kenaf Mutant Hybrids through Diallel Crosses."

Recognizing his outstanding academic achievements and leadership, he received the "Best Student Award 2021" presented by the Bangladeshi Students' Union Malaysia at InterContinental Hotel, Kuala Lumpur, Malaysia, on 25 December 2021.

Dr. Al-Mamun successfully attended in-country and foreign training, international conferences and seminars on plant breeding and molecular

biotechnology. He has published 37 research articles having 16 JCR impacts in international and nationally reputed journals. Besides, he has more than 110 other publications like popular articles published in various print media like newsletters, magazines, and daily newspapers.

Dr. Al-Mamun has conducted television and radio talk shows covering agriculture, jute technologies, and jute products. Additionally, he has served as an editorial board member of some international journals. Dr. Al-Mamun is a life member of the Krishibid Institution, Plant Breeding and Genetics Society of Bangladesh, Seed Science Society of Bangladesh, and Bangladesh Association for the Advancement of Science. Dr. Al-Mamun was married to Mrs. Kamrunnaher Shilpi in 2005 and blessed with two sons, Ahnaf Faisal and Asir Abdullah.

Md Al-Mamun was awarded PhD Degree



Md. Al-Mamun, the Principal Scientific Officer of the Bangladesh Jute Research Institute was awarded PhD from the University Putra Malaysia in Genetics and Breeding on 10 November 2022. He completed his PhD under the supervision of Professor Dr. Mohd Rafii bin Yusop with the research title "Genetic diversity and development of high fiber yield Kenaf Mutant Hybrids through Diallel Crosses." Nine high-yielding hybrid kenaf lines that were developed from Dr. Al-Mamun's PhD dissertation are currently being made available through multi-site research conducted by the BJRI. Under the National Agricultural Technology Project (NATP) phase II, he was selected as PhD scholar in 2018 by the Bangladesh Agricultural Research Council.

Dr. Al-Mamun was born in the Barguna district on 20 August 1979. Dr. Al-Mamun started his professional career at the Bangladesh Jute

Research Institute in 2004 as a Scientific Officer. He is involved in varietal development/improvement activities of jute and kenaf. By this time, he has developed three high-yielding and adaptable cultivars with red stems BJRI Kenaf 4; moderate nematode tolerance variety BJRI Mesta 3 and nutraceutical leafy vegetables variety BJRI Mesta 4. Besides he has developed a good number of mature technologies and is also involved in different activities of releasing some varieties of jute, kenaf, and mesta.

Recognizing his outstanding academic achievements and leadership, he received the “Best Student Award 2021” presented by the Bangladeshi Students’ Union Malaysia at InterContinental Hotel, Kuala Lumpur, Malaysia, on 25 December 2021. In addition to his academic accomplishments, he has already published eleven research articles in high impact factor journals based on the findings of his PhD research. The Plant Breeding and Genetics Society of Bangladesh honored Dr. Al-Mamun with the Young Scientist Award 2019 on the eve of the 2nd International and 12th Biennial Conference of PBGSB 2023. During his academic journey at Sher-e-Bangla Agricultural University and University Putra Malaysia, he has been involved in several student associations and voluntary organizations to pursue one of his amateur interests.



Dr. Al-Mamun obtained his B.Sc. in Agriculture (Hons) degree from Sher-e-Bangla Agricultural University, in 2004. He achieved a Master of Science degree in Genetics and Plant Breeding from the same university in 2008 as a scholar of BJRI. Dr. Al-Mamun successfully attended in-country and foreign training, international conferences and seminars on plant breeding and

molecular biotechnology. He has published 37 research articles having 16 JCR impacts in international and nationally reputed journals. Besides, he has more than 110 other publications like popular articles published in various print media like newsletters, magazines, and daily newspapers. Dr. Al-Mamun has conducted television and radio talk shows covering agriculture, jute technologies, and jute products. Additionally, he has served as an editorial board member of some international journals. Dr. Al-Mamun is a life member of the Krishibid Institution, Plant Breeding and Genetics Society of Bangladesh, Seed Science Society of Bangladesh, and Bangladesh Association for the Advancement of Science.

Unlocking the Potential of Bangladesh's Jute: A Regional Analysis

Sweetey Shahinur, Md. Moslem Uddin &
Taibur Rahman Tushar
Bangladesh Jute Research Institute

Introduction: Jute, often referred to as the “golden fiber” due to its color and luster, is a vital natural fiber extracted from the *Corchorus capsularis* plant. It ranks as the third most important vegetable fiber globally, following cotton and bamboo. Bangladesh is one of the largest producers of jute, with extensive cultivation across various regions including Faridpur, Jessore, Rangpur, and Manikgonj. Jute's versatility and biodegradability make it suitable for a wide range of applications, from burlap, sacks and twine, carpets, upholstery, composite, air craft to auto mobile industries and even clothing.

Objectives and Methodology: This study focuses on the physico-mechanical properties of jute fibers from four key regions of Bangladesh. The properties examined include bundle strength, fineness, density, brightness, whiteness, breaking twist (TPI), tex, water uptake, and permeability, all measured according to ASTM standards. The goal is to determine which

region's jute fibers offer superior characteristics for specific applications.

Why Regional Selection Matters: Selecting jute from different regions allows for a comprehensive understanding of the fiber's properties, enabling manufacturers to optimize agricultural practices and develop area-specific jute-based products. Each region produces jute with unique characteristics, such as varying fiber lengths, strengths, and fineness, which can influence the end product's quality and suitability for different industrial applications.

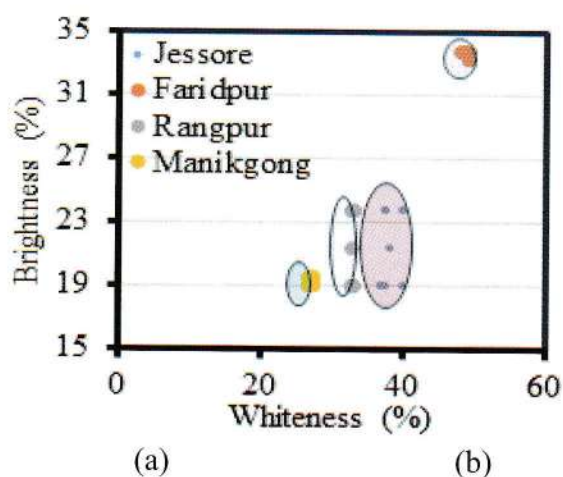


Figure 1: (a) Brightness ~Whiteness (b) jute (Robi-1) fiber(I) Manikgong (II) Jessore (III) Rangpur (IV) Faridpur for four different regions of Bangladesh

Key Findings: Faridpur region: The study revealed that jute fibers from the Faridpur region exhibited the highest bundle strength, making them ideal for producing strong yarns, twines, and decorative products. Faridpur fibers also showed superior

fineness and moisture content, which contribute to better spinning and product durability.

- Manikgong region: Displayed the lowest bundle strength, fineness 40-46μ likely due to varying retting conditions.
- Rangpur region: Had the lowest TPI and bundle strength, is useful for handicraft product development industries.
- Jessore region: Showed high TPI but moderate bundle strength, suitable for high-speed yarn production with lower strength requirements.

The study established a positive relationship between fiber fineness and bundle strength. The finest fibers from Faridpur demonstrated the highest strength, which is crucial for producing high-quality textile products.

Brightness and Whiteness: Faridpur fibers also exhibited the highest brightness and whiteness values, which are important for decorative products and determine the fiber's dye absorption and color pickup capabilities. Hence, product made from Faridpur region jute fiber will stand out with its vivid shades and eye-catching design

Water Absorption: The hydrophilic nature of jute fibers was evident in their water absorption patterns, with Faridpur fibers again showing superior performance.

Industrial Impact: This study underscores the importance of selecting high-quality jute fibers for specific applications, promoting sustainable industries, and supporting local economies. By utilizing the best fibers, manufacturers can produce superior products that are environmentally friendly and economically beneficial.

The comprehensive analysis of jute fibers from Faridpur, Jessore, Rangpur, and Manikgonj regions of Bangladesh highlights the superior

qualities of Faridpur jute for industrial applications. This study provides valuable insights for manufacturers and researchers, aiding in the development of high-quality, sustainable jute products.

Conclusion: This study illustrates the critical role that regional selection plays in the quality and application of jute fibers, emphasizing the need for ongoing research and development to harness the full potential of this versatile natural fiber. In this study it can be also concluded that Faridpur jute fiber can be a Bangladeshi Geographical Indication (GI) product due to its unique regional characteristics and specification.

3D printing with Jute fiber Filament

Sweety Shahinur & Sharmin Akhter
Bangladesh Jute Research Institute

Introduction: Textile Physics division of Bangladesh Jute research Institute exploring the groundbreaking possibilities of integrating jute fiber into 3D printing. This research approach not only broadens the scope of 3D printing materials but also aligns with sustainable manufacturing practices. Initially limited to a few polymeric materials, 3D printing has evolved to include metals, ceramics, and composites, thanks to advancements in material science. This progression opens new opportunities for creating complex shapes without the need for assembly. Here, we delve into the potential of jute fiber as a composite material for 3D printing.

Innovative Applications of Jute in 3D Printing: Pioneering Methods and Materials: 3D printing offers a unique solution for fabricating complex shapes that traditional composite

fabrication methods struggle to achieve. Jute fiber, known for its strength and biodegradability, can be utilized to develop composite filaments for printing jute-based products. Figure 1 illustrates the process steps involved in manufacturing 3D-printed biobased jute composites.

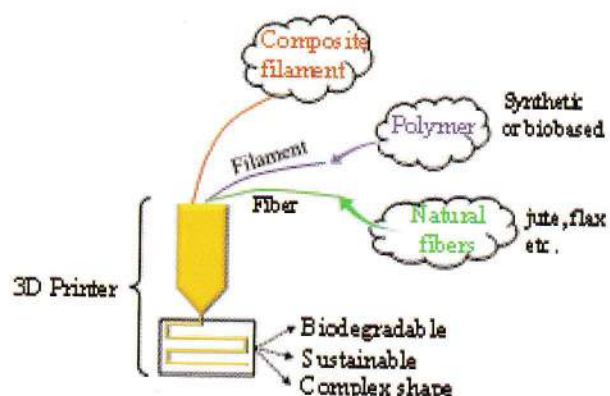


Figure 1. Natural fiber incorporation in 3D printing filament

Continuous Fiber Reinforcement: Matsuzaki et al. pioneered a method of 3D printing with continuous jute fiber-based PLA thermoplastic composites using fused-deposition modeling. In that process, both the polymer filament and twisted jute yarns are individually fed into the printer, embedding the fibers within the matrix as reinforcing materials. Although the jute fiber-reinforced composite exhibited better tensile strength compared to the pure polymer, it was still inferior to carbon fiber-based composites. The jute fiber volume fraction was relatively low at 6.1%. However, some success was noted with continuous flax fiber/PLA (cFF/PLA) composite filaments, which demonstrated significant improvements in tensile strength and modulus. As jute is a fiber there is a scope to use it in the reinforcing materials in the filament development.

Comparative Studies and Findings: Perez et al. conducted a comparative study on the strength

and fracture behavior of FDM 3D printed ABS with different fillers, including 5 wt.% jute fiber. Despite embedding the jute fibers within the ABS matrix, the resulting composite's strength was slightly lower than that of pure ABS. This outcome was attributed to higher porosity and poor bonding. Hence jute fiber can be incorporated in the PLA (Poly Lactic acid) to strengthen the PLA matrix.

Alternative Approaches: Exploring alternative methods, Franco-Urquiza et al. deposited PLA-fused filament onto jute fabrics modified with flame retardant additives and adhesives to enhance mechanical properties. However, the resulting composite did not exhibit improvements over pure PLA in terms of stiffness or strength, despite well-organized and bonded fabrics. The authors recommended further investigation to achieve better composite performance. therefore jute fiber need different modification tool for better adhesion with the matrix materials.

Future Directions: The potential of incorporating jute-derived nanofibers, cellulose, or activated carbon into 3D printer filament extends to applications in aerospace, packaging, and medical devices such as scaffolding. Additionally, jute fiber treated with antibacterial agents can be encapsulated in polymers, providing a slow-release antibacterial effect over time. These innovations could lead to entirely new research directions in jute fiber-based 3D printed products.

Conclusion: Integrating jute fiber into 3D printing presents exciting opportunities for sustainable and versatile manufacturing. While current research shows promise, further studies are essential to optimize these composites' mechanical properties and fully unlock their potential. Stay tuned for more updates as we continue to explore this innovative frontier in 3D printing.

Training, workshop and seminar organized by PTC Division

Dr. Farhana Sharmin

Senior scientific officer, PTC Division, BJRI,

A set of skilled manpower is the key component for successful running of an institution. Keeping this message in mind, BJRI (Bangladesh Jute Research Institute) has started its work with a separate division named Planning, Training and Communication (PTC) Division. It is our mandate to organize need based different events for uplifting the knowledge and skills of the scientists, officers, stakeholders and supporting staffs of the institute, time to time. During the current year until December, 2023 we have organized 15 training, 3 workshops and 7 seminars. Among the event, some are described briefly with some pictorial images.

Annual Agriculture Research Review Workshop:

Annual Agriculture Research Review Workshop was organized by Agriculture Wing at BJRI conference room during 4-6th December, 2023. The purpose of the workshop was to review, evaluate annual progress and discuss the future action plans to improve the field of agriculture. Dr. Rehana Yasmin, Joint Secretary, Research wing, Ministry of Agriculture was the chief guest, special guest was Dr. Nathu Ram Sarker, Executive Director, Krishi Gobeshona Foundation (KGF) and former DG, BLRI of the program and the workshop was chaired by Dr. Md. Abdul Awal, Director General, BJRI, Manik Mia Avenue, Dhaka in the opening session.

The chief guest Dr. Rehana Yasmin has expressed her opinion through the combined quality work of BJRI scientists the institute will move forward towards a positive change of BJRI



in coming days. Dr. Nathu Ram Sarker has informed the audience during his speech especially the scientists of BJRI, he can allocate budget for the need-based project on Jute production, processing as value added products and food items. He told that if any scientist wishes to devote himself for the technology generation, money is not at all a problem. We have to keep in mind one thing that technology generation is very important for the farmers, industrialists and the stakeholders. Our Honorable Director General, BJRI committed that we will change the BJRI Research and Development (R&D) system with the help of all scientists and personnel as per our government expectation. The main article was presented by Dr. Nargis Akter, Director (Agriculture Wing), BJRI and welcomed the participants and highlighted the objectives of the workshop. Eng. Md. Moslem Uddin, Director (Technical Wing), Dr. Ferdouse Ara Dilruba, Director (Jute Textile Wing), Dr. Mahmud Al Hasain, Director (PTC Division) and Dr. S. M. Mahbub Ali, CSO and Director (Admin and Finance) were participated in the workshop. All the Chief Scientific Officer (CSO), Principle Scientific Officer (PSO), Senior Scientific Officer (SSO), Scientific Officer (SO) and others Officials also participated in that workshop. The BJRI regional station in-charge including other scientists were attended virtually by Zoom platform.

Fourth Industrial Revelation (4IR):

Planning, Training and Communication (PTC) Division of our institute (BJRI) was organized two workshops on 10th April 2023 and 15th May 2023. The duration of the workshops were day-long and the topics were 1) Fourth Industrial Revelation and 2) 4IR in Textiles: Opportunities and Challenges, which were held at BJRI conference room. In that program all BJRI scientists and officers were attended. These workshops were conducted to fulfill the requirement of Annual Performance Agreements (APA) as a part of the government's overall development plan. The chief guest was Dr. Md. Abdul Awal, Director General, BJRI, Manik Mia Avenue, Dhaka and the special guests were Eng. Md. Moslem Uddin, Director (Technical Wing), Dr. Ferdouse Ara Dilruba, Director (Jute Textile Wing) and Dr. Nargis Akter, Director (Agriculture Wing). Those workshops (4IR) were presided by Dr. Mahmud Al Hasain, Director (PTC) Division.

Dr. Zakir Ahmed, PSO, PTC division presented the main article under the Ministry of Agriculture's integrated work plan aligned with 4IR on 10th April 2023. The required actions such as short-, mid- and long-term plans were discussed in the presentation. On the other hand, 4IR in Textiles: Opportunities and Challenges was presented by Dr. H. M. Zakir Hossain, CSO (C.C.), Jute Textile wing of BJRI. In both sessions, the participants were spontaneously contributed to the discussion in different aspects of each event. The scientists and other officials were enriched with related knowledge and stillness viz. AI (Artificial Intelligence), IoT (Internet of Things), Robotics, Dron etc.

Sustainable Development Goal (SDG):

The workshop on Sustainable Development Goal (SDG)'s related to Bangladesh Jute Research Institute (BJRI) activities, progress, obstacles

Mst. Zohra Khatoon, Joint Secretary, PPB Wing. The workshop was Chaired by Dr. Md. Abdul Awal, Director General, BJRI, Manik Miah Avenue, Dhaka. The main article was presented by Dr. S. M. Mahbub Ali, CSO and Director (Admin and Finance). Eng. Md. Moslem Uddin, Director (Technical Wing), Dr. Ferdouse Ara Dilruba, Director (Jute Textile Wing), Dr. Nargis Akter, Director (Agriculture Wing), Dr. Mahmud Al Hasain, Director (PTC Division), all CSOs, PSOs, SSOs, and SOs were participated in this workshop. From the regional stations of BJRI, all the Station In-Charge and scientists were attended virtually by Zoom platform.

Training on Citizen Charter:

A day-long in-house training program on Citizen Charter was held on 26th September 2023 as per APA 2023-2024 Work Plan. A total 42 BJRI scientists (Grade 3-6) participated in the training program and the session was conducted by BJRI resource persons. The training was conducted on Citizen Charter to enhance the duties and responsibilities of employees for ensuring quality service. The chief guest Dr. Md. Abdul Awal, Director General, BJRI inaugurated the training program and the special guests were Eng. Md. Moslem Uddin, Director (Technical Wing), Dr. Ferdouse Ara Dilruba, Director (Jute Textile Wing) and Dr. Nargis Akter, Director (Agriculture Wing) were present in that sessions. Dr. Mahmud Al Hasain, Director (PTC Division) was presented the program as Chair. The welcome address was delivered by Dr. A T M Morshed Alam, CSO, PTC division.

Training on D-Nothi:

Government has taken several initiatives for making a Digital Bangladesh and paperless office. BJRI organized a day-long training on the topic of D-Nothi at the computer lab of PTC division. Two batches total forty (20+20) scientists and officers (grade 6-9) were

participated in the training course at different days on 21th August, and 27th September, 2023. Directors from different Wing's (Agriculture, Technical, Jute Textile and PTC), CSO, PSOs and SSOs of PTCs division were present in the inauguration ceremony. Dr. A T M Morshed Alam, CSO, PTC division delivered the welcome address. Resource persons were from BJRI computer department.



Training of Trainers (ToT):

Trainings of trainers (ToT) for the dissemination of agricultural technologies on Jute were held on 22-23rd November, 2023 and 29-30th November, 2023 at BJRI bord room. The objective of the training program was to update the modern technologies of the Upazila Agricultural Officer' regarding Jute and Jute product generated by the scientists of BJRI and transferred those to the farmers' field. Two batches total fifty (25+25=50) Upazila Agricultural Officer from different Upazilas' were attended to these trainings. Our BJRI Director General Dr. Md. Abdul Awal was presented in the training program as the chief guest in the opening ceremony. Director of Planning, Training and Communication (PTC) division Dr. Mahmud Al Hasain presided over the session. Scientists of BJRI acted as resource persons on the training course. The extension officers mentioned that similar training program should be arranged frequently so that they could interact with

scientists regarding field research and its problem for the future as well, in the closing session.

Among of them, 10 more training sessions were held at BJRI conference room. A day-long training on (1) Right to Information Act (Grade 10-17); (2) National Integrity Strategies (Grade 10-20); (3) Grievance Redress System (Grade 10-20); (4) Annual Performance Agreement (APA) (Grade 4-6) and two days training on (5) Conduct and Discipline of Government Servants (Grade 6-9) & (Grade 13-20); (6) Field Experimentation, Data Collection and Recording (Grade 10-16). Additionally, a three day-long training for women entrepreneurs of Jute product on (7) Recent Development of Dyeing and Printing suitable for Jute and Jute products.

Seminars held on BJRI

Attending a scientific seminar is very important for the scientist to enrich knowledge on a specific topic. Seminars usually involve presentations, discussions, and interactive activities that help scientist to become more knowledgeable in that area. Keeping in mind the importance of seminar our honorable Director General Dr. Md. Abdul Awal expressed his opinion to organize seminar at least once a week.

BJRI organized weekly seminar where all scientists of four Wing's Agriculture Technical, Jute Textile and PTC were attended. Product development division through four seminar's on (1) Innovation of Jute-Cotton Viscose Blended Yarn and Compared with 100% Cotton Yarn; (2) Dyeing of jute-cotton blended fabric produced

from various ratio of jute-cotton blended yarn with reactive dye; (3) Studies on salt free dyeing of jute cotton blended fabric with a view to reducing process cost and environment pollution; (4) Scientific writing using keyword sequence importance (KSI) technique. Pest Management division give seminar on (1) Research activities of Entomology department and (2) Research activities of Pathology department.

The grievance redress system helps in resolving employees' grievances in a formal manner. For an organization to function effectively, it is important that the employees are satisfied and happy about their job. On 6th November, 2023 PTC division organized a seminar on grievance redressal system where all scientists were participated. A seminar was also held on 20th November, 2023 on expert panel member outside of the institute and BJRI all scientists were participated.

In conclusion, PTC department of BJRI are trying best to enhance the knowledge and skillness of our scientists, officers, staffs, jute farmers and the entrepreneurs. As the country is transformed into a developed country by 2041 and the skilled, trained, experienced and knowledgeable citizen is required. So that in coming days within this time frame our PTC, BJRI has to organize training / seminar / workshops with more numbers of personnel. In this circumstances, it is logically requested to authority to allocate more budget compared to present allocation. Moreover, we have to formulate a DPP for establishing a Modern Training Center under the banner of PTC, BJRI.

Subscription rate per year

Bangladesh	Tk.	100.00
Asia	\$	15.00
Europe	\$	18.00
Africa	\$	18.00
America	\$	20.00
Australia	\$	20.00

- No Subscription for less than one year is accepted.
- One may become a Subscriber for more than one year, multiplying Subscription rate accordingly.
- Subscription may be started at any time of the year, but it will be treated as calendar year (January-December) with back issue (if any) All the back issue are available.
- 10% Agency commission may be allowed for collection at least 3 (Three) Subscriber.
- Subscription should be sent in advance through Cheque, Bank Draft or cash in the name of the Director General, Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka-1207.
- All correspondence should be made with the Editor/Publication Officer, Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka-1207, Bangladesh.

Editorial Board

Chief Editor

Dr. Md. Abdul Awal
Director General

Executive Editor

Dr. Mahmud Al Hossain
Director (PTC)

Technical Editors

Dr. Md. Abdul Alim
Chief Scientific Officer

Dr. A. T. M. Morshed Alam
Chief Scientific Officer

Dr. M. M. Alamgir Sayeed
Chief Scientific Officer

Dr. H. M. Zakir Hossain
Chief Scientific Officer

Editor in Charge

Md. Mubtasim Fuad
Publication Officer

Phone: 01737880788
E-mail: fuad.bjri@gmail.com

Use Jute Goods Save Environment

ON STATE SERVICE



Jute & Jute Fabrics Bangladesh
NEWSLETTER
Bangladesh Jute Research Institute
Manik Mia Avenue, Dhaka-1207
Web: www.bjri.gov.bd

BOOK POST
Printed Matter

To,

.....
.....
.....
.....

Printed by : Apollo Printing & Packaging Industry, Keraniganj, Dhaka. Cell : +88 01819232077, E-mail : apollo.shahab@gmail.com