Department of Microbiology

Vidyasagar University, West Bengal

News Letter

Volume - I: April, 2024 - March, 2025

Prof. Susanta Kr. Chakraborty
Hon'ble Vice Chancellor
Vidyasagar University

FROM THE DESK OF HOD

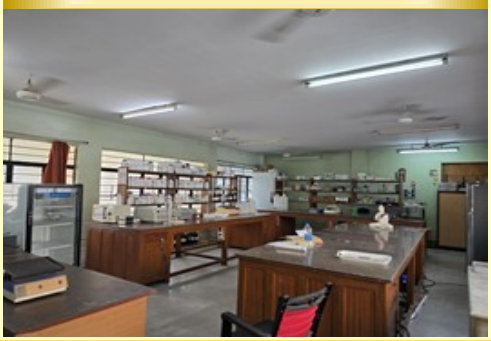
Prof. Keshab Ch. Mondal
Professor & Head
Dept. of Microbiology, VU

The postgraduate teaching of Microbiology began in 2001 as Unit of the Department of Botany and Forestry. It became an independent department in 2004 with the financial support of the Government of West Bengal and approval from the UGC. Infrastructural facility of this department is excellent. At present three faculty members with many guest faculties/ resource person are collectively engaged in teaching and research. The department boasts excellent infrastructural facilities including clean lecture galleries, well-equipped laboratories, advanced bioinformatics infrastructure, animal cell culture facilities, and fermentation laboratories. The facilities are maintained to up-to-date standards, ensuring that students and researchers have access to cutting-edge resources. A large number of research projects funded by Govt. and Non-Govt. agencies were successfully executed. Faculty members consistently publish research papers in reputed journals, contributing to the department's academic reputation. A significant number of students qualified for NET, GATE and other examination for pursuing higher education. Passed out students of our department are mostly absorbed in different industries and research laboratories. We have included some emerging fields like Nano-biotechnology, Bioinformatics, Intellectual property right, etc. in the curricula. To further enhance employability, the department regularly offers career-oriented, short-term certificate courses.

Faculty Strength	
Present	**Former**
Prof. Keshab Ch. Mondal	Dr. Bikas Ranjan Pati
Dr. Arijit Jana	Dr. Debdulal Banerjee
Dr. Kishalay Paria	Dr. Pradeep K. Das Mohapatra
	Late Dr. Nandini Ghosh
	Dr. Suman Kumar Halder
	Dr. Debesh Ch. Bhattacharya
	Dr. Amit Kumar Mandal
	Dr. Santi M. Mandal

Programs Offered		
Name	**Course Duration**	**Intake Capacity**
M. Sc. in Microbiology	Semester I-IV	35
Ph. D.	As per UGC norm	As per VU guideline
Non-Teaching Stuff		
Mr. Sabyasachi Bera		
Mr. Swarupananda Mukherjee		
Mrs. Uma Midya		

Our Department



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Departmental Academic Activities Around the Year

Celebration of World Microorganisms Day : 17th September, 2024

- Dept. of Microbiology celebrated "***World Microorganisms Day***" with an insightful seminar featuring Dr. Ramkrishna Sen, Professor, IIT Kharagpur, as the keynote speaker. Dr. Sen delivered an engaging talk on the significance of microorganisms in biotechnology, environmental sustainability, and industrial applications, inspiring students and faculty alike.
- **e-Poster Competition:** The event also featured an e-Poster Presentation Competition, where students showcased innovative research ideas on microbial science. The competition fostered creativity and scientific discussion, and winners recognized for their outstanding contributions.
- **Outcome:** The program successfully enhanced awareness of microbiology's impact, encouraging students to explore its vast potential in research and industry.






Organization of National Conference : 7th-9th March, 2025

- Dept. of Microbiology along with Bio-Medical Laboratory Science & Management, Vidyasagar University and Dept. of Biotechnology, Maharaja Sriram Chandra Bhanja University successfully organized a National Seminar on ***Microbial Technology for Health, Environment, and Employment***.
- The seminar, held from 7th to 9th March 2025, attracted over 250 distinguished gathering of scientists, academicians, industry experts, and PG students from across the country.
- The event was inaugurated by **Dr. Syamal Roy**, ICMR Emeritus Scientist & Former Vice Chancellor, Cooch Behar Panchanan Burma University, who shared invaluable insights on infectious diseases and immunology.
- **Prof. Paresh Ch. Jana**, Dean of Science, Vidyasagar University, graced the occasion as the Chief Guest.
- Adding to the seminar's prestige, **Prof. B. R. Pati** (Founder Professor, Dept. of Microbiology) and **Prof. Debidas Ghosh** (Founder Professor, Dept. of Biomedical Laboratory Science and Management) honored the event as Guests of Honour, reflecting on the advancements in microbiological research.

Contact Information: Mob no (HOD) - 9434196483; Email - kcmondal@mail.vidyasagar.ac.in
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- The seminar hosted a total of **24 plenary lectures** and **24 invited lectures**, delivered by renowned experts in the field of microbial technology from **8 States** of India.
- The seminar witnessed an impressive participation of over **250 attendees**, including **24 Senior** and **Junior Scientist**, **24 academicians**, **41 researchers**, **155 post-graduate students**, and **5 industry professionals.**

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Academic Excursion

Regular Institute and **industry** visits, included in the curriculum, provide students with **practical exposure** and **real-world learning experiences** beyond the classroom. By visiting leading industries and research institutes, students gain insights into modern technologies, industry trends, and professional work environments. These visits bridge the gap between theory and practice, helping students understand real-time applications of their academic knowledge.

Community Outreach Program

This year, we conducted a survey on oral microbial composition among the tribal community of the Belpahari region. Our findings indicate that chewing tobacco and irregular brushing have the most harmful effects on oral microbes. On the other hand, the regular use of Neem branches helps to maintain a balanced microbial environment. The analyzed data could be used to support the community through awareness programs. By combining traditional wisdom with informed choices, we can work together toward a healthier future while preserving both our heritage and well-being.

Student Teacher Relationship Building

Departmental picnic foster strong student-teacher relationships by promoting informal interactions. Through outdoor activities students and faculty break formal hierarchical barriers, build trust, and enhance communication.

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Departmental Research & Development

Ongoing Research Projects

- **Title:** Development of enzyme-based biosensor for early-detection of fungal contamination in food and foodstuffs; ***Funded by:*** *Science & Technology and Biotechnology, Govt. of WB* ; ***Co-PI*** - Dr. K. C. Mondal.
- **Title:** Molecular tracking of difficult-to-control carbapenem resistance among Enterobacterales clinical isolates in West Bengal, India: Focusing on in vitro diagnostics for antimicrobial resistance (AMR) towards the optimization of antimicrobial and infection prevention stewardship program; ***Funded by:*** ICMR, Govt. of India; ***Co-PI*** - Dr. K. C. Mondal.
- **Title:** Investigating the effects of microglial miRNAs in modulating blood-brain barrier microenvironment throughout glioma progression; ***Funded by:*** ICMR, Govt. of India; ***Co-PI*** - Dr. K. C. Mondal.
- **Title:** Comprehensive utilization of poultry slaughterhouse waste through microbial fermentation into nitrogen rich fertilizer: A sustainable approach towards a circular economy; ***Funded by:*** DST-SERB; ***PI*** - Dr. K. C. Mondal; ***Cost:*** 29.86 Lakh.
- **Title:** National Network Project of Bose Institute with Indian Statistical Institute and Vidyasagar University; ***Funded by:*** DBT, Govt. of India; ***PI*** - Dr. K. C. Mondal; ***Cost:*** 66.2 Lakh.
- **Title:** Skill Development of the Rural Women in Leh Ladakh area for Hygienic Preparation and Packaging of Traditional Foods towards their Economic Empowerment; ***Funded by:*** DSIR, Govt of India; ***PI*** - Dr. K. C. Mondal; ***Cost:*** 28.89 Lakh.
- **Title:** Selection of functional microbial inoculum (starter) for production of optimized and healthy fermented rice based alcoholic beverage; ***Approved by:*** DBT, Govt. of India; ***PI*** - Dr. K. C. Mondal; ***Cost:*** 99.87 Lakh.
- **Title:** Industrial Consultancy project on green processing of medicinal plant for boosting of immunity power of poultry birds; ***Funded by:*** West Bengal Poultry Federation; ***PI*** - Dr. Kishalay Paria; ***Cost:*** 1.27 Lakh.
- **Title:** Industrial Consultancy project on Efficacy testing of herbal formulation; ***Funded by:*** *Xplora Clinical Research Services Pvt. Ltd., Bangalore*; ***PI*** - Dr. K. C. Mondal; ***Cost:*** 3.62 Lakh/year.

Research Papers Published in Reputed Journal (during April, 2024-March, 2025)

Prof. Keshab Chandra Mondal

- Mondal S, Halder SK, Mondal KC. State-of-art engineering approaches for ameliorated production of microbial lipid. Systems Microbiology and Biomanufacturing 4 (2024): 20-38.
- Mondal S, Halder SK, Mondal KC. Microalgal farming for biofuel production: Extraction, conversion, and characterization. Microalgal Biomass for Bioenergy Applications, (2024): 43-80.
- Mondal S, Halder SK, Mondal KC. Recombinant fungal pectinase and their role towards fostering modern agriculture. Entrepreneurship with Microorganisms, (2024): 405-418.
- Mondal K, Kumar S, Singh AK, Najar IN, Thakur N, Mondal KC, Das S. Overcoming industrial challenges in microbial bioremediation: leveraging modern technologies and sustainable practices. Functional Metagenomics, (2024):1-20.
- Mondal KC, Samanta S, Mondal S, Mondal SP, Mondal K, Halder SK. Navigating the frontiers of mineral absorption in the human body: Exploring the impact of probiotic innovations. NIScPR-CSIR, India, 2024.
- Goswami D, Mondal S, Hor PK, Santra S, Jana H, Gauri SS, Suman Kumar Halder, Mondal KC. Bioprospecting of probiotic bacteria from traditional food of high-altitude Himalayan region. Food Bioscience, 57 (2024): 103257.
- Das TK, Kar P, Panchali T, Khatun A, Dutta A, Ghosh S, Chakrabarti S, Pradhan S, Mondal KC, Ghosh K. Anti-obesity potentiality of *Lactiplantibacillus plantarum* E2_MCCKT isolated from a fermented beverage, haria: a high fat diet-induced obese mice model study. World Journal of Microbiology and Biotechnology, 6 (2024): 168.
- Khatun A, Panchali T, Gorai S, Dutta A, Das TK, Ghosh K, Pradhan S, Mondal KC, Chakrabarti S. Impaired brain equanimity and neurogenesis in the diet-induced overweight mouse: a preventive role by syringic acid treatment. Nutritional Neuroscience, 27 (2024): 271-288.
- Goswami D, Halder SK, Mondal KC. Characterization of siderophore from probiotic *Bacillus spp*. strain isolated from traditional fermented food of the Himalaya. Systems Microbiology and Biomanufacturing, 4 (2024): 1150-1161.
- Kar P, Ghosh S, Payra P, Chakrabarti S, Pradhan S, Mondal KC, Ghosh K. Characterization of a novel lytic bacteriophage VPMCC14 which efficiently controls *Vibrio harveyi* in *Penaeus monodon* culture. International Microbiology, 27 (2024): 1083.

- Jana T, Mondal S, Pal K, Mondal K, Patra S, Hilaluddin, Halder SK, Mondal KC. Quality improvement of banana fiber through sequential enzymatic treatment. Systems Microbiology and Biomanufacturing, 4 (2024): 1284-1297.
- Sharma P, Mondal K, Tamang S, Kumar S, Najar IN, Das S, Mondal KC, Thakur N. A malto-oligosaccharide forming thermostable acidic α-amylase from Bacillus stercoris YSP18 isolated from sediment of Sikkim hot spring: heterologous expression and characterization. Systems Microbiology and Biomanufacturing, 5 (2024): 185-202.

Dr. Arijit Jana

- Das AJ, Banerjee A, Tyagi A, Jana A, Bhaskar T, Ghosh D. Enhanced remediation of polyaromatic hydrocarbon using agro-industrial waste for biofuel production and environmental pollution mitigation. Environmental Science and Pollution Research 31 (2024): 57369-57375.
- Baral P, Jana A, Kumar V, Agrawal D. Comparative assessment of sugarcane bagacillo and bagasse at lab-scale for production of sugars and green chemicals via biochemical platform. Biomass Conversion and Biorefinery 14 (2024): 8483-8492.

Dr. Kishalay Paria

- Bar, A., Paria, K., & Saha, S. (2025). Efficacy of Bacterial Consortium on Microplastic Mineralization at Municipal Dumping Grounds. In Microplastics in the Terrestrial Environment (pp. 55-69). CRC Press.

Research Scholar's Activities

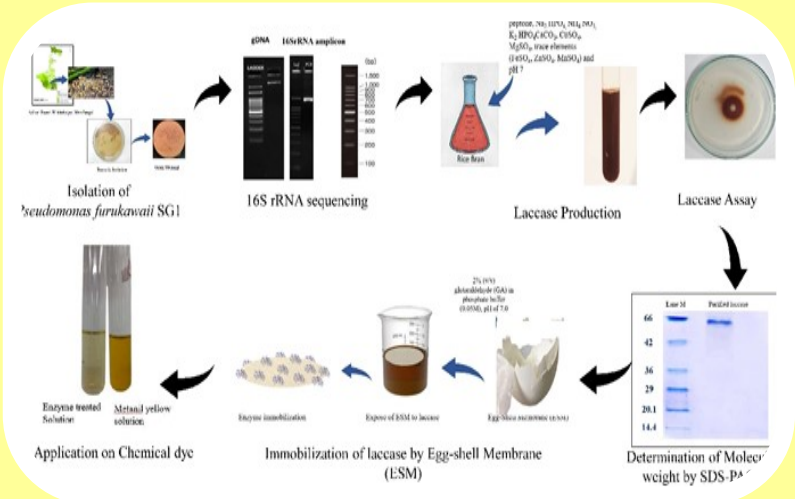
- **Five** regular scholars, **two** project assistants, **one** project scientist are doing their research work in various field of Microbiology and relevant field and making significant progress in their research area.
- They published **16** research papers in different Journal of National and International repute.
- They also participated and presented their work at different National and International Conferences and Workshops. Additionally, initiatives such as **weekly journal clubs, research discussions, and mentorship programs** have enriched the research culture, encouraging innovation and interdisciplinary collaboration.
- Their contributions have been recognized with **Outstanding Paper Presentation Award** from **National Science Congress-2024**, Kolkata athat enlightened the Department.
- We congratulate **Mr. Krishnendu Mondal** on his achievements and wish him continued success in his research journey!




Research Outputs

Application of Microbial Enzyme for Industrial Waste Water Treatment

A novel laccase-producing *Pseudomonas furukawaii* SG1 strain was isolated from forest soil. The extracellular laccase had a molecular weight of ~61.0 kDa and optimal activity at neutral pH and moderate temperatures. Application of immobilized enzyme successfully decolourized the coloured industrial effluent.



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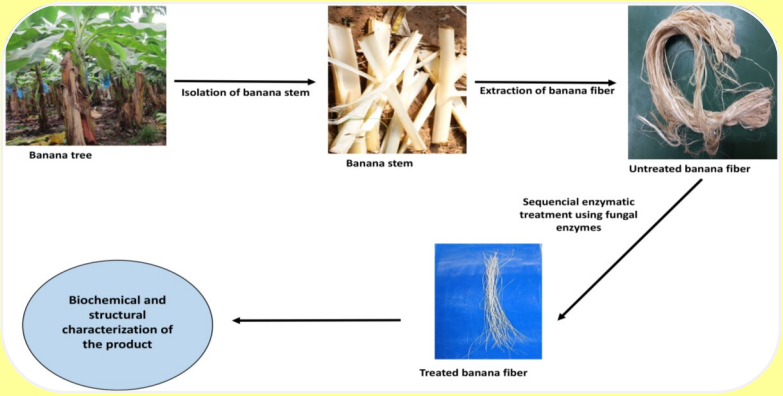
Quality Improvement of Banana Fiber through Sequential Enzymatic Treatment

This study explores applications of microbial enzyme enhanced banana pseudo-stem fiber quality. Enzymatic (pectinase, xylanase, and laccase) treatment significantly improved fiber properties, reducing weight by 22.6%, moisture sorption by 16.83%, and fiber diameter. Its physic chemical parameters supported its uses as a Rayon grade natural fiber.



Utilization of Chicken Waste as Efficient Biofertilizer

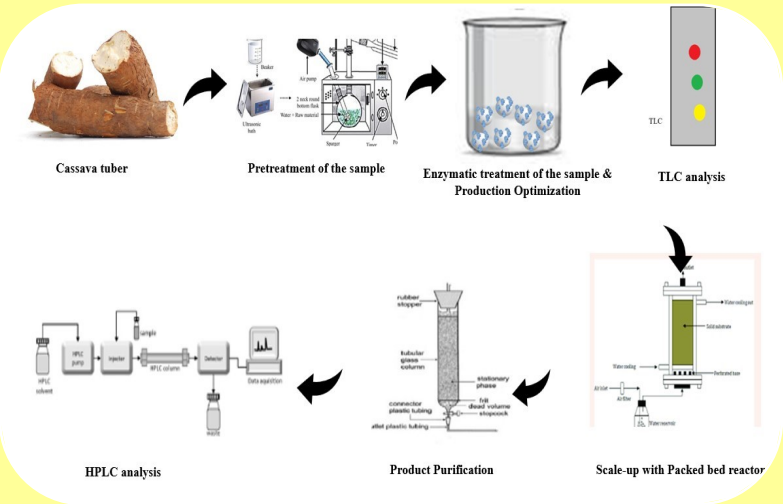
Considering the 'Waste to Wealth' approach, the chicken slaughter house solid was fermented with protease and keratinase producing bacteria. The enzymes exhibited stability and compatibility with surfactants. Fermented soluble residuals improved plant growth and promoted soil beneficial microorganisms. This study highlights the potential of chicken waste as renewable resource for sustainable nitrogen rich biofertilizer.

Production of Health Promoting Millet based Bread using Probiotic Microbes

This study evaluates the quality and functional properties of millet-based, gluten-free bread fermented with probiotic *Bacillus amyloliquefaciens* KMH10. The bread was enriched with carbohydrates, proteins, minerals, lactic acid, and B vitamins, while maintaining a medium glycemic index and a caloric value of 236.38 Kcal/100g. It also exhibited high glutathione content with potential antioxidant activity

Production of Health Promoting Oligosaccharide from Low Cost Vegetables

This study explores the sustainable production of health-promoting oligosaccharides from low-cost root vegetables like taro, elephant foot yam, and cassava using recombinant thermostable alpha-amylase. These starch-rich crops serve as ideal substrates for enzymatic hydrolysis, yielding bioactive oligosaccharides with prebiotic properties that support gut health and immunity. This approach valorizes underutilized crops, reduces agricultural waste, and promotes affordable, scalable solutions for sustainable food systems.



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Laboratory & Instrument Facility

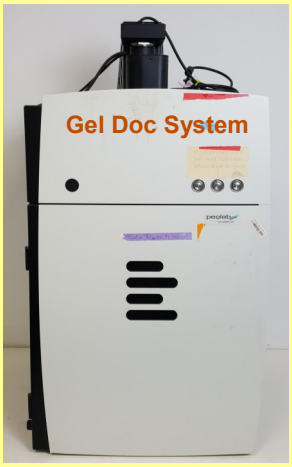

Bioinformatics Lab


Kjeldahl apparatus


Phase Contrast Microscope


Research Lab


Biosafety Cabinet


Gel Doc System


HPLC


Rotary Evaporator

Ice Maker

Thermocycler

Cooling Centrifuge


BOD Incubator


DGGE apparatus


Fluorescence Sptrophotometer

Freeze Dryer


5L Fermenter


10L *In Situ* Fermenter

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