

ABOUT THE DEPARTMENT OF BIOTECHNOLOGY

Post Graduate Department of Biotechnology of DAV College, since its inception in 2005, has created a niche as one of the best Biotechnology departments in the city. It is known for its academic excellence, excellent infrastructure with its state of the art laboratories, departmental library and most importantly its efficient and highly experienced motivated faculty members. In these sixteen years of its existence the department has left a mark and crossed several milestones by producing some of the best students, who are spread all over the world and are contributing their bit to the society. This has been possible only because of the unconditional support extended by the present and previous Principals and DAV managing committee.

No department can exist without its heart i.e the students. The department is credited to have several University toppers in all these years, both at the UG and PG level, along with excelling in extracurricular activities, thus bringing laurels to the Department and the college. The students of this department have been highly placed in various corporate and biotech companies as well as best research and teaching institutes of the country and abroad. This was possible because of the excellent and most advanced Practical along with theoretical training imparted to them. They are routinely exposed to various scientific lectures being delivered by eminent scientists and academicians from all over the country and abroad. They also get the opportunity to interact with these scientists and are encouraged to bring out their best caliber. They are also given academic exposure by organizing Seminars, conferences and workshops where they get the opportunity to present their research work. The students are always made to feel at home by the congenial behavior of the teachers who also are ever ready to help the students at both professional and personal front.

Further to ignite the young minds an activity club namely **Biotechnology Activity Club (BAC)** was established in 2005 under whose umbrella several scientific activities and invited lectures are organized every year. In our quest to further explore the capabilities of students and allow them to spread their wings, they were encouraged to bring out a departmental magazine.

The department is also known for its excellent research work carried out by the faculty members and students. It has its own Research Center approved by Panjab University, where students carry out their Ph.D work under the guidance of the efficient faculty members. Each faculty member has to their credit number of research publications in peer reviewed International and National journals.

The department also has to its credit of obtaining the **first Consultancy Project** in the college by one of the faculty member, Dr. Kakoli Biswas, Associate Professor & Head of the department which was signed between her and Amulya Herbs Pvt. Ltd, Panchkula in June 2019. Also putting a feather in the cap is the **first Indian Patent to be granted to Dr. Kakoli for her invention in the field of Biotechnology in 2020.**

The Department of Biotechnology stands as one of the best departments of the DAV College.



M.Sc, Ph.D, Post-Doc : University of Connecticut, USA, NIPER India, IMTECH India

RESEARH PROJECTS COMPLETED BY THE FACULTY MEMBERS

S.NO	NAME OF THE FACULTY MEMBER	TITLE OF THE PROJECT	FUNDING AGENCY	PERIOD	GRANT AMOUNT In Rs.
1.	Dr. Kakoli Biswas	Consultancy Project on “Authentication of Medicinal Plants by DNA Fingerprinting”	Amulya Herbs Pvt. Ltd. Panchkula	2019-2020	2,50,000
2.	Dr. Raman Soni				
3.	Dr. Kakoli Biswas	Novel Plant tissue Culture Medium From Biowaste-Flyash	DSIR, DST Delhi-TePP (Tehno Entrepreneur Promotion Program)	2010-2012	67,000
4.	Dr. Kakoli Biswas	“Molecular standardization and transformation of Dasamula plants”	Directorate of Forensic Sciences, Ministry of Home affairs, Government of India, New Delhi.	2006-2009	10,00,000

5. FIRST PATENT granted in College to Dr. Kakoli Biswas in December 2020 for her invention in the field of Biotechnology on Novel Plant Tissue Culture Medium. INDIAN PATENT no. 353927

LABORATORIES OF THE DEPARTMENT

- 1. Microbiology Lab**
- 2. Biochemistry Lab**
- 3. Plant Tissue Culture Lab**
- 4. Molecular Biology and Protein Biology Lab**
- 5. Bioinformatics Lab**

MAJOR EQUIPMENTS IN THE DEPARTMENT

- 1. Laminar Air Flows**
- 2. Master Thermal Cycler (PCR machine)**
- 3. Trinocular Photo Microscope**
- 4. Phase Contrast Microscope**
- 5. Agarose Gel Electrophoresis Units with Power pack**
- 6. Poly Acrylamide Gel Electrophoresis Units with Power pack**
- 7. Refrigerated Centrifuges**
- 8. Gel Documentation System**
- 9. ELISA Reader**
- 10. -80 Deep Freezer**
- 11. -20 Deep freezers**
- 12. Electronic Balances**
- 13. Double Beam Spectrophotometers**
- 14. Single beam Spectrophotometers**
- 15. Autoclaves**
- 16. CO₂ Incubator**
- 17. Incubators, shaker incubators**
- 18. Water baths**
- 19. Magnetic Stirrer, Vortex Mixtures, Dry Bath, pH Meters, Auto Pipettes**
- 20. Microtome**

RESEARCH WORK CARRIED OUT BY THE FACULTY MEMBERS

1. Dr. Kakoli Biswas:

Dr. Kakoli Biswas's research interest lies in searching for new drugs in the form of Plant Antimicrobial Peptides (PAMPs) for drug resistant microbes.

She has her interest and is also working in the field of Authentication of herbal drugs by DNA profiling, Molecular taxonomy.

Her major interest also lies in low cost propagation of plants by tissue culture and Micro-propagation, Phytoremediation using tissue cultured plants for degradation of dyes and

phenolic compounds in the environment and to identify the enzymes involved in degradation. She is also engaged in isolating microbes and the enzymes involved in lipid degradation present as pollutant in the soil.

Enhancement of secondary metabolites of pharmaceutical interest in various medicinal and ornamental plants through Plant tissue culture.

2. Dr. Raman Soni: Dr. Raman Soni's thrust area of research lies in:

Microbial Biotechnology. Working on fungal enzymes viz: Cellulases, Xylanases, amylases, pullulanases produced by indigenous fungal cultures isolated in Laboratory

Fermentation to produce ethanol: The sugars released by hydrolysis of waste of various types are fermented to produce ethanol an important biofuel and also helpful for waste management.

Plastic bio-degradation is another area of interest in which fungal isolates were found capable of degrading non-degradable polythene bags

Biosynthesis of Silver nanoparticles: In the recent pasts biosynthesis of Silver nanoparticles using medicinal plant extracts was carried out and their potential to inhibit pathogenic bacteria was investigated.

3. Dr. Anjali Sharma: Dr. Anjali Sharma has been researching on antimicrobial activity of natural resources like propolis and evaluating their antibiobilm potential against bacteria. She has worked on the synthesis of bioplastics from agricultural resources and physicochemical characterization of the same. The degradation of these plastics was compared to those of conventional plastics for exploring their future applicability. She has also been working on the potential biosurfactants that can be isolated from natural sources. The studies are being undertaken for the optimization and exploring the commercial applications of these surfactants. She has researched on the development of bioadhesive gels encapsulating antifungal drugs and probiotics against vaginal candidiasis.

4. Dr. Arti Arya:

Research Work oriented in the field of Environmental Biotechnology- Bioremediation and Biodegradation of Organopollutants, Chemical Dyes; Green biotechnology- Kitchen waste ferments /Garbage enzymes as organic biofertilizer, soil conditioner, antimicrobial agent; Herbal Formulations and medicinal Plants- Bioassays for Efficacy and activity Testing.

5. Dr. Rupinderjeet Kaur: Dr. Rupinder's research area lies in:

Functional and Structural characterization of hypothetical proteins using *insilico* tools and databases. Predicting protein-protein interactions to decipher the role of a given protein in a complex or pathway.

Studying evolutionary relationships amongst proteins using different phylogenetic tools. Using the databases and tools to study the mutations in the different strains of SarsCov2.

Predicting secondary structures for proteins using *insilico* approach. Insilico deciphering of the secondary structure elements in different proteins.

6. **Ms, Sangeeta Sharma:** Research area includes Comparative Genome analysis to compare the complete genome sequences of different species. Identifying DNA sequences that have been "conserved" in Orthologues is an important step toward understanding the evolutionary pathways. It delineates the genes that are essential to life and highlights genomic signals that control gene function across many species.

Insilico analysis of the hypothetical proteins in the Biological databases that are yet to be validated by experimental means are the area of focus for their functional characterization, metabolic pathway analysis and structure prediction using various online Bioinformatics tools and softwares.

7. **Dr. Sajal Sarabhai:** Dr. Sajal's research interests revolve around ESKAPE pathogens and their pathogenicity especially in *Pseudomonas and Acinetobacter*. She is primarily interested in identifying the alternative medicines for treating the infection as all the available drugs have become ineffective and have led to emergence of MDR and XDR strains. Her primary target is **to identify, isolate and re-proposition the old drugs** in combating the virulence and pathogenicity of these opportunistic pathogens.

Her interest also lies in Quorum sensing which is a communication between bacteria, which regulates the expression of genes *via* small chemical mediators. The analogue which can interrupt this communication can be a key for regulating various bacterial metabolic pathways. Therefore, she also aims to study the role of **quorum sensing inhibitors in spoilage of food**. She also aimed to identify and isolate enzyme (s) that could degrade the **oils in polluted soil** and water *via* both conventional and metagenomic methods.