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# List of students projects

**To encourage research ability of students we teach literature survey and finding research problem themselves to customize the project for each and every student according to their interest. Here we have listed few project titles relevant to students pursuing degrees in Biotechnology, Botany, Zoology, Microbiology, Biochemistry, Genetics, Molecular Biology, Bioinformatics and other life science related departments. Based on the specializations of department students can opt for topics. Following is the list of few project types that can be carried out at our facility.**

## 1. Biotechnology

- Synthesis of silver nanoparticles and DNA barcoding of *Mangifera indica* seed coat: Evaluating its antibacterial and water purification capacity.
- DNA Barcoding, Synthesis of Silver Nanoparticles from Muskmelon and Investigation of its Antimicrobial and Antidiabetic Properties.
- Genetic Variation of Onion Species using RAPD and RFLP Markers.
- Genetic Variation and DNA Barcoding Studies of Few Rose Species Collected from Lalbagh Botanical Garden, Bangalore.
- Isolation and Identification of Biosurfactant Bacterial Strains from Garbage Soil through Molecular Techniques.
- Sanger sequencing and Copper Nanoparticle Synthesis from Papaya (*Carica papaya*) Peel: Assessing its Antibacterial and Antiurolithiac Potential.
- Genetic Diversity Analysis of Tulsi (*Ocimum sanctum*) and Other Medicinal Plants Using SSR and ISSR Markers.
- Antioxidant and ROS Regulating Activity of Plant Extracts in Cell Culture Models
- DNA Barcoding of Watermelon and Synthesis of Composite Nanoparticles from Healthy and Fungal Infected Rind to Evaluate Its Efficacy.
- Isolation and Molecular Identification of Plastic degrading Bacteria from soil collected in waste dumped areas.

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- DNA Barcoding and Silver Nanoparticle Synthesis from Pineapple (*Ananas comosus*) Peel to Evaluate its Antioxidant and Anticancer Properties.
- Oxidative Stress Modulation Potential of Plant Extracts Using In Vitro Cell-Based Assays
- Evaluation of plant based Oxidative Stress Modulation Activity in Atherosclerosis-Induced Macrophage Model.
- Clonogenic Assay-Based Evaluation of Antiproliferative Activity of Plant Extracts.

## 2. Microbiology

- Isolation and Characterization of Cellulolytic Bacteria from Fruit Peels and evaluation of its Cellulolytic properties.
- Investigation of Pathogenic Bacteria Present in Unfiltered Drinking Water Using Biochemical and Molecular Methods, and its Antibiotic Resistance.
- Isolation and Characterization of Lactic Acid Bacteria from Raw and Fermented Ginger and evaluate its properties.
- Removal of Phosphorus content from Industrial wastewater using isolated bacterial strains.
- Isolation, Identification, and Characterization of Cellulolytic Bacteria from Decaying Leaf Litter and Agricultural Waste and its anticancer potential.
- Molecular and Biochemical Characterization of Bacteria in Contaminated River Water and Assessment of Their Antibiotic Resistance.
- Isolation and Characterization of Lactic Acid Bacteria from Traditional Fermented Dairy Products.
- Characterization of Endophytic Fungi from *Aloe vera* and Analysis of its Secondary Metabolites.
- Bioremediation of Heavy Metals from Industrial Effluents Using an Isolated Bacterial Strain.
- Sustainable Bioethanol Production from Fruit Yeast Extract via Fermentation methods.
- Fermentation Mechanisms and ethanol estimations using isolated and selective Yeast Cultures.

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- Analysis of anti-cholesterol activity in Atherosclerosis-Induced Macrophage Cell lines.
- *In Vitro* analysis of plant extracts by Cell Colony Formation Using Clonogenic Assay on cell lines.

## 3. Molecular Biology

- Molecular Identification and Phylogenetic Analysis of Nitrogen-Fixing Bacteria Isolated from Rhizosphere Soil of Leguminous Plants.
- Genetic Diversity and DNA Barcoding of Wild and Cultivated Mushroom Species Using ITS and RAPD Markers.
- Molecular Detection and Characterization of Virulence Genes in Pathogenic Bacteria Isolated from Contaminated Seafood.
- Genomic Profiling and Functional Analysis of Microbial Communities in Organic and Conventional Agricultural Soils.
- Genetic Polymorphism and DNA Barcoding of Endangered Medicinal Plants Using Chloroplast DNA Markers.
- Fermentation Mechanisms and ethanol estimations using isolated and selective Yeast Cultures.
- Molecular Characterization and Antibiotic Resistance Profiling of Probiotic Bacteria Isolated from Fermented Dairy Products.
- Molecular Identification and Genetic Diversity Analysis of Endophytic Fungi Isolated from Medicinal Plants Using ITS Sequencing.
- Genetic Variation and DNA Barcoding of Wild and Cultivated Spirulina Species.
- Whole-Genome Sequencing and Molecular Characterization of Antibiotic-Resistant Bacteria Isolated from Hospital Wastewater.
- *In Vitro* Assessment of Oxidative Stress Induction and Inhibition in Atherosclerotic Macrophage Cells.
- Assessment of Long-Term Cytotoxicity of Plant-Derived Compounds Using Clonogenic Assay on animal cells.

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## 4. Biochemistry

- GCMS analysis, *In Silico* and *In Vitro* Anti-Inflammatory activities of Ginger Extract.
- Synthesis of composite Nanoparticles from different fruits and Comparison of Anticancer, Antioxidant Activity of its extract.
- Soxhlet-Assisted Extraction and Phytochemical Profiling of Bioactive Compounds from medicinal plants.
- Qualitative and Quantitative Analysis of Phytoconstituents in Plant-Derived Extracts: A Comparative Study
- *In-Vitro* Evaluation of Antiurolithiac, Antioxidant and Anti-Diabetic Activities of Medicinal Plant Extracts.
- Green Synthesis of Nanoparticles from *Aloe barbadensis* and their Biomedical Applications.
- Fermentation Mechanisms and ethanol estimations using isolated and selective Yeast Cultures.
- Isolation, Quantification, and Functional Characterization of Proteins through Kinetic Studies
- Functional and Biochemical Assessment of Proteins: Purification and Enzyme Kinetics
- Synthesis of silver Nanoparticles from *Cymbopogon citratus* and its photocatalytic activity.
- Sanger sequencing and Copper Nanoparticle Synthesis from Papaya (*Carica papaya*) Peel: Assessing its Antibacterial, Anticancer and Anti-inflammatory Potential.
- *In Vitro* Evaluation of Antioxidant and Oxidative Stress Modulating Activity of Plant Extracts using cell lines.
- Isolation of Protein from seed samples, its characterization and 3D Structure Modelling.
- *In Vitro* Study of Oxidative Stress Response in Atherosclerotic Condition Using Macrophage Cells.

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## 5. Bioinformatics & Computational Biology

- Screening Chemical Libraries and ADMET Studies to Check the Efficient Ligand for Diseases.
- Artificial Intelligence-Based Prediction of Depression, Anxiety, and Stress.
- Comparison of efficiency of different tools used for Sanger sequencing data analysis.
- Microarray data analysis to predict role of key proteins involved in cancer biology.
- To Predict Heart Health Based on Artificial Intelligence Programs.
- *In Silico* Autodocking Studies to Predict the Ligand-Protein Relationship While Treating Various Diseases.
- Metagenomics based data analysis to assess involvement of bacterial species in different disease conditions.
- GCMS based data analysis, followed by its *In Silico* and *In Vitro* Anti-Inflammatory, anticancer, anti-urolithiac activities of Cardamom Extract.
- Sanger sequencing and metagenomics to predict culturable and non-culturable bacterial population abundance in probiotics.
- Comparative Modelling of Protein–Protein Interactions based on disease pathways.
- To predict of efficacy of standard drugs by DNA binding *in silico* studies.

## 6. Plant Biotechnology & Genetics

- Characterization of Endophytic Fungi from *Aloe vera* and Analysis of its Secondary Metabolites.
- Genetic Diversity and DNA Barcoding of Wild and Cultivated Mushroom Species Using ITS and RAPD Markers.
- Genetic Polymorphism and DNA Barcoding of Endangered Medicinal Plants Using Chloroplast DNA Markers.
- Molecular Identification and Genetic Diversity Analysis of Endophytic Fungi Isolated from Medicinal Plants Using ITS Sequencing.
- Molecular Characterization and Antibiotic Resistance Profiling of Probiotic Bacteria Isolated from Fermented Dairy Products.

- Whole-Genome Sequencing and Molecular Characterization of Antibiotic-Resistant Bacteria Isolated from Hospital Wastewater.
- Genetic Variation and DNA Barcoding of Wild and Cultivated Spirulina Species.
- Gene based diversity studies of animal species by Sanger sequencing technology.
- Assessment of Oxidative Stress Induction and Protection by Plant-Derived Bioactive Compounds on cell lines.
- *In Vitro* Analysis of Wound Healing Properties of Plant Extracts in Cell Culture Models.
- Oxidative Stress Modulation Activity of Plant-Derived Nanoparticles in Atherosclerosis-Induced Macrophage Cells.

## 7. Animal Cell Culture & Cancer Research

- Anti-Cancer and Anti-Oxidant Investigation of Turmeric Root Extracts Using Cell Lines.
- DNA Barcoding and Silver Nanoparticle Synthesis from Pineapple (*Ananas comosus*) Peel to Evaluate its Antioxidant and Anticancer Properties.
- Anti-Proliferative Capacity of Tulsi Leaf Extracts on Cancerous Cell Lines.
- Cytotoxicity and Oxidative Stress-Related Studies of Extracts from *Cymbopogon citratus*.
- Analysis of Isolated Proteins with Anticancer Properties and evaluation of its $IC_{50}$ concentrations.
- GCMS analysis, *In Silico* and *In Vitro* Anti-Inflammatory activities of Ginger Extract.
- Sanger sequencing and Copper Nanoparticle Synthesis from Papaya (*Carica papaya*) Peel: Assessing its Anticancer and Antiurolithiac Potential.
- Soxhlet-Assisted Extraction and Phytochemical Profiling of Bioactive Compounds from medicinal plants related to Cancer Biology.
- Curcumin loaded Silver Nanoparticles through Turmeric for Treating Atherosclerosis using Macrophage cell line.
- Evaluation of Cell Migration and Wound Healing Potential of Plant-Derived Compounds using cell line.
- Assessment of Cell Reproductive Viability and Long-Term Cell Survival by Clonogenic Assay on cell lines.

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## 8. Protein Chemistry

- Biochemical Exploration of Anticancer Proteins using isolation and SDS-PAGE Technique
- Comprehensive Protein Analysis: Isolation, Quantification, Standardization and Kinetic Profiling
- Purification and Evaluation of Proteins from chick pea and its Quantitative Analysis, Optimization and Kinetic Studies
- Comprehensive Analysis of Anticancer Proteins through Purification and SDS-PAGE from natural products
- Isolation and quantification of proteins isolated from nutraceutical sources.
- Protein 3D Structure Prediction and Molecular Docking of Plant-Derived Bioactive Compounds.
- Bioinformatics-Based Protein Modelling and Virtual Screening of Phytochemicals.
- Computational Evaluation of de novo Protein 3D Modelling isolated using lab techniques.

## 9. Metagenomics and RT-PCR Based studies

- Gut Microbiome Analysis from any Biological Sample to Investigate the abundance of Microorganisms present in it.
- Detection of Virus Species from Plant Samples Using Nanopore Technology.
- Isolation of Soil Bacteria through Culture-Dependent and Culture-Independent Methods; Comparison of Bacterial Diversity.
- Fluorescence Studies to Quantify Different Hormones and Their Levels in Animal Tissues.
- Bacterial Metagenomics Using Nanopore to Check Bacterial Abundance in Soil Samples.
- Quantification of Hormones and Their Biochemical Characteristics Through Serology Tests.
- Isolation, Purification, and Characterization of Known Proteins from Different Sources Using SDS-PAGE.

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- RT-PCR Based Gene Expression Studies Using Mulberry Leaves/Roots to Check Polyploidy.
- Chromosome Analysis and Gene Expression Studies from Different Varieties of *Pisum*

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