

I have done my Doctoral Thesis entitled “Multipotential Aspects of Calcium Carbonate Based Nanostructure in Pharmaceutical and Environmental Applications”. According to my thesis, the considerable focus must be given to cutting-edge nanotechnology discoveries in order to address the limitations of the conventional results in medicinal and environmental applications. Remarkably, porous nanostructures were widely utilized for diverse pharmaceutical and environmental applications with respect to their superior features such as porosity, adsorption, pore volume, large surface area, stability, electrostatic interaction, and conductivity. The porous nanostructures were materially important for the improved adsorption and controlled release of the therapeutics and other bioactive compounds as a nanocarrier system for different kinds of biological applications. Further, the porous nanomaterials also play a key role as a catalyst or stimulating factor of the catalyst in environmental remediation applications. Currently, researchers are focusing to resolve the difficulties in the fabrication of the nanoscale system including the cost-effect, environmental pollution, material toxicity, and availability of the organic and inorganic precursor reagents. To overcome the aforementioned problems, scientists must pay attention towards research on the development of nanostructured materials from the extensively accessible biogenic waste, as an innovative strategy of waste management, which is cost effective, non-toxic and biocompatible in nature. Based on the above aspects, my doctoral work aimed on the synthesis of calcium carbonate (CaCO_3) nanostructures from the marine conch shell waste accumulated in the coastal area. The ultimate focus of my work is to explore the multiple aspects of the selfsame CaCO_3 nanomaterial for diverse field of applications by formulating with pharmaceutical agents, nanostructures, and fertilizer compounds for the purpose of advanced drug delivery in neuroprotective and lung carcinoma therapy, wastewater treatment, and agricultural applications, respectively. Our findings from my doctoral thesis suggested that marine waste derived CaCO_3 nanostructures has become an outstanding platform for the fabrication of less-expensive, non-toxic, and biocompatible porous structures for pharmaceutical and environmental applications.

Research experience:

- Received Student Project as a Co-Principal Investigator entitled “**Bio-Waste Derived Hydroxyapatite Nanofertilizer for Smart and Sustainable Agriculture on Tropical Vegetables**” Under **Entrepreneurship, Innovation and Career Hub, RUSA Phase 2.0** Scheme at Department of Nanoscience and Technology, Alagappa University, Karaikudi, India
- Working as a Project Assistant in the **MHRD - Rashtriya Uchchatar Shiksha Abhiyan RUSA) - TBRP** Project entitled “**Advanced Nano Materials for Energy and Environmental Applications**” 01.02.2023 to 29.02.2024 at Department of Nanoscience and Technology, Alagappa University, Karaikudi, India
- Worked as a Project Fellow in the **DST – Promotion of University Research and Scientific Excellence (PURSE)** Scheme during 01. 10. 2019 to 31. 01. 2023 at Department of Nanoscience and Technology, Alagappa University, Karaikudi, India.
- Master of Science project entitled “***In-Vitro* Evaluation of Neuroprotective, Antimicrobial and Antibiofilm Efficacy of Nanoencapsulated Triphala Churna**”

during December 2017 to April 2018

- Bachelor of Science project entitled “**Biodegradation of Jakazol Reactive Blue Dye by Bacterial Isolates from Textile Effluent**” during November 2015 to April 2016

Technical Skills:

- Known to operate and interpret data from UV- Visible spectrometer, Fluorescence spectrometer, Multiplate reader, Optical and Fluorescent microscopes, X-Ray diffractometer, Scanning electron microscope, Transmission electron microscope and Fourier transform infrared spectroscopy, Atomic force microscopy, Dynamic light scattering with zeta analyzer.
- Experienced with technical and theoretical knowledge in the field of microbiology, plant/animal cell culture, nanomaterial fabrication/functionalization, forensic, food and medical lab biotechnology.
- Gathered experience in synthesis of nanoscale materials from the biogenic wastages
- Well-versed in nano-immobilization techniques such as fabrication of nanoformulations, nanocomposites and nanoencapsulations for pharmaceutical and environmental applications
- Photoshop, CorelDraw, Origin, X’pert Pro, Image J, ANOVA SPSS

In-Plant Training:

- **Hands on training programme dealing with molecular biology techniques** conducted by Centre for Nanoscience Research, Coimbatore, Tamilnadu, India.
- Two days Training programme on “**High-resolution Transmission Electron Microscopy, Scanning Electron Microscopy and Scanning Probe Microscopy**” organized by NRIIC, PSG college of Technology and PSG Science and Technology Entrepreneurial Park, Coimbatore during 14th and 15th September, 2018.
- Five Day Workshop on “**TECHNICAL COMMUNICATION SKILLS: DRAFTING AND PRESENTING RESEARCH PAPERS**” organized by Department of Humanities and Social Sciences, National Institute of Technology, Warangal, Telangana.
- Two days Workshop on “**CeNSE DBT Nano-biotechnology Alliance (C-DNA) Inaugural Workshop**” hosted by Centre for Nano Science and Engineering (CeNSE), IISc, Bangalore on 4th and 5th November, 2019.
- 5 days of **C-DNA hands-on training program** conducted by Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore supported by Department of Biotechnology (DBT).