
Departmental Seminar

Seminar Title	: Eco-Friendly Food Packaging: Chitosan-Based Biodegradable Films with Semiconductor Nanoparticles for Enhanced Shelf Life
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Supervisor	: Dr. Nivedita Patra
Venue	: BM Department Seminar Room
Date and Time	: 25 Nov 2024 (11.00 AM)
Abstract	: The increasing demand for food safety and environmental sustainability has led to the exploration of advanced packaging solutions that are both antimicrobial and biodegradable. This study introduces biodegradable films made from chitosan, a natural polysaccharide, infused with semiconductor nanoparticles. Characterized using Transmission Electron Microscopy (TEM), Zeta potential analysis, and Dynamic Light Scattering (DLS), the nanoparticles were optimized for size and stability. The films underwent surface characterization via Scanning Electron Microscopy (SEM), X-ray Diffraction (XRD), and Fourier Transform Infrared Spectroscopy (FTIR), while their thermal and mechanical properties were assessed through Differential Scanning Calorimetry (DSC), Thermogravimetric Analysis (TGA), and tensile strength testing. The resulting films demonstrated enhanced mechanical strength, efficient soil degradation, and strong antibacterial activity against Gram-positive (<i>Staphylococcus aureus</i> , <i>Bacillus subtilis</i>) and Gram-negative (<i>Escherichia coli</i> , <i>Pseudomonas aeruginosa</i>) bacteria. Crucially, the films exhibited significant antibiofilm potential, inhibiting biofilm formation by over 90% for <i>S. aureus</i> and 80% for <i>E. coli</i> . This antibiofilm activity, combined with the generation of reactive oxygen species and membrane disruption, effectively extended the shelf life of perishable foods, showcasing these films as a promising, eco-friendly solution for food packaging applications. ALL ARE CORDIALLY INVITED