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Departmental Seminar

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Seminar Title	: Formulation and characterization of biodegradable bio-composites from banana peel-derived pectin with plant extract integration for sustainable antimicrobial application
Speaker	: Renupama Bhoi (520bm3008)
Supervisor	: Dr. Nivedita Patra
Venue	: BM Department Seminar Room
Date and Time	: 11 Feb 2025 (04:00 PM)
Abstract	: Banana peel is one of the most abundant lignocellulosic biowastes which is primarily made up of cellulose, hemicellulose, lignin, pectin, and other extractives in varying proportions worldwide. The present study described sustainable waste management by an innovative sequential biorefinery approach. The high yield with good quality commercial products pectin was found to be 11% and the structural characterization of extracted pectin using Fourier Transforms Infrared (FTIR), Scanning Electron Microscope (SEM), and X-ray diffraction (XRD) revealed the chemical and surface structure. Banana peel-derived pectin enriched with the different concentrations of Tridax procumbens leaf extract ranging from 0.1-2% and were formulated and examined for their physiochemical properties. The moisture content, thickness, water solubility, and water vapor permeability of the biocomposite increased, while the tensile strength dropped with the integration of leaf extract. The FTIR, XRD, and SEM confirm the chemical, surface morphology, and successful casting of the film, while the contact angle reveals the biocomposite has the properties of hydrophilicity in a concentration-dependent manner. The formulated biocomposite with different concentrations of plant extract formed effective UV barriers. Moreover, the bio composite not only demonstrates strong antimicrobial activity against Bacillus sp. PhNs9, Pseudomonas sp. PhNs10, Enterobacter sp. Etk3 and E. coli compared to other bacterial species but also enhances its biodegradability up to 91% during 28 days of soil degradation test. The developed films provide an eco-friendly packaging solution for the packaging industries, combining innovation with sustainability. Keywords: Banana peel pectin; Biocomposite; Biodegradation; Antimicrobial activity; Plant extract ALL ARE CORDIALLY INVITED