National Institute of Technology Rourkela

Progress Seminar

Seminar Title	: Development of Nanofiber-Based Intelligent Packaging Material from Moringa Leaf Protein Concentrate for Food Application
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Venue	: CH-113, Department of Food Process Engineering
Date and Time	: 15 Jul 2025 (5:00 PM)
Abstract	: Integrating plant protein sources in food packaging technology enhances environmental sustainability. As derived from renewable resources, these materials are biodegradable, thereby possessing minimal environmental impact. Plant-based packaging materials reduce greenhouse gas emissions by substituting traditional synthetic polymers, helping to create a greener future *Moringa oleifera* is a well-known plant of the Moringaceae family. The plant is a rapidly growing tree that exhibits resistance to drought, rendering it particularly intriguing for arid and semi-arid locations. The principal consumable component of *Moringa oleifera* Lam. is the leaf. The leaves are abundant in protein (approximately 26 &ndash 29%, dry weight) and possess a well-balanced combination of various amino acids. Mechano-chemical extraction, specifically ball milling, is a pre-treatment technique used to enhance the extraction of protein from plant materials. Ball milling has the potential to decrease the size of particles and disrupt the cell walls of plants. This has been previously shown to enhance the extraction yield, enhance the solubility of proteins, boost foaming capacity, and improve surface hydrophobicity. However, milling time affects the protein yield hence, varying the milling time might be a way forward for better protein yield. The extracted protein concentrates could be applied to develop nanofibers. Nanofibers could be fabricated using the nano-extrusion process. Moreover, these nanofibers could be used as biodegradable packaging materials for different food commodities. Furthermore, incorporating nanofibers with bioactive compounds might help in developing intelligent packaging material, which would enhance the applicability of protein-derived nanofibers in the food industry.