UNIVERSITY OF COPENHAGEN

शिक्षा मंत्रालय
MINISTRY OF EDUCATION

GIAN
GLOBAL INITIATIVE OF ACADEMIC NETWORKS

NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA

Course on

Next-Generation Sustainable Alternative Proteins for Food: Fundamentals and Technological Innovation

KEYNOTE SPEAKER

Prof. Mahesha M. Poojary
Associate Professor
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University of Copenhagen, Denmark

COORDINATORS

Dr. Winny Routray
Assistant Professor
Food Process Engineering
NIT Rourkela, India

Dr. Mohd Khalid Gul
Assistant Professor
Food Process Engineering
NIT Rourkela, India

07-10-2025 to 16-10-2025

REGISTRATION LINK

Click Here / Scan the QR Code

Registration Details

- Students: 1000 INR
- Students: INR 1,000
- Academic/ Research
- Professionals: INR 5,000
- Industry Professionals: INR 10,000
- Participants from abroad: US $500

Programme Details

- More details at: https://gian.iith.ac.in/
- Brochure: https://gian.iith.ac.in/

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Student Coordinators

- Ms. Dibyabharati (7327871101)
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Organized by:

DEPARTMENT OF FOOD PROCESS ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA

Next-Generation Sustainable Alternative Proteins for Food: Fundamentals and Technological Innovation

Overview

The global food sector is facing two major challenges: ensuring food security and achieving sustainability. The world population is projected to reach 10 billion by 2050, requiring a 40% increase in food production compared to current levels. At the same time, the agri-food sector currently contributes approximately 30% of global greenhouse gas emissions, highlighting the urgency of developing sustainable food systems. Protein is an integral component of food, playing a crucial role in determining the structure, texture, and nutritional value of various food products. The World Health Organization (WHO) recommends that about 1/3 of total daily energy intake should come from proteins. Nevertheless, almost 150 million people may face the risk of protein deficiency by 2050 if we continue to rely on current protein sources and food processing practices. Traditional protein sources, such as dairy and animals, are incapable of meeting this demand alone while meeting contemporary sustainable developmental goals. Hence, there is a rising interest in novel terrestrial and aquatic protein sources like plant-based, microalgae, seaweeds, fungi, grass, insects, and cultured meat, presenting excellent sustainable alternatives. There is an immense global focus on their industrial-scale production and incorporation into our daily diet. Therefore, gaining in-depth knowledge of the type, structure, composition, reactivity, and safety of proteins from these novel food matrices is essential. Besides, understanding the physical and chemical integrity of food proteins during production, processing, and storage is crucial to developing nutritious, tastier, and safer foods. There is also a need to advance technologies that enhance the production yield, nutritional quality, safety, stability, and palatability of proteins and protein ingredients derived from these sources. This course will provide an in-depth understanding of the science and technology behind the extraction, analysis, modification, and improvement of functional properties of alternative proteins for food applications. The course will cover the entire value chain, from sourcing raw materials to designing protein-rich food products with desired functional and nutritional attributes. Emphasis will be placed on real-world applications and challenges in the food industry, providing a comprehensive understanding necessary for researchers, food technologists, and industry professionals.

The major objectives of the course include:

- To provide an in-depth understanding of the different sources and types of alternative proteins.
- To provide basic insights into advanced extraction and analysis techniques and their optimization for maximum yield and quality.
- To elucidate the impact of various modification processes on the functional properties of proteins.
- To acquaint knowledge on the applications of alternative proteins in food product development.

- To understand the nutritional aspects, consumer acceptance, and regulatory considerations surrounding alternative proteins.
- To foster innovative thinking and practical problem-solving skills through real-world case studies and interactive sessions.

Course participants will learn these topics through lectures and hands-on experiments. Also, case studies and assignments will be shared to stimulate research motivation of participants.

Modules	**Date: 7th October, 2025 – 16th October, 2025** **Lectures:** 1. Introduction to alternative proteins: sources and types 2. Global trends and market opportunities in alternative proteins 3. Techniques for protein extraction: conventional methods 4. Emerging and sustainable extraction technologies: ultrasonication, pulsed electric fields, and enzyme-assisted methods 5. Analytical techniques for protein characterization: chromatography and spectroscopy 6. Advanced analytical methods: Liquid chromatography-Mass spectrometry for protein characterization 7. Functional properties of proteins: solubility, water-holding capacity, emulsification, and foaming 8. Role of protein structure in determining functionality: impact of processing conditions 9. Applications of alternative proteins in plant-based meats and dairy alternatives 10. Texturization techniques: high moisture extrusion and shear cell technology 11. Flavor and sensory optimization of alternative protein products 12. Scaling up production: from lab to commercial scale 13. Nutritional evaluation of alternative proteins: amino acid profiles, digestibility, and bioavailability 14. Allergenicity and anti-nutritional factors in alternative proteins 15. Regulatory frameworks for alternative proteins: global perspectives 16. Consumer perception and market acceptance of alternative proteins 17. Sustainability of alternative protein production 18. Emerging innovations: cultured meat, microalgae, and insect proteins 19. Future directions: functional proteins for high-value food products 20. Investment and entrepreneurial opportunities in alternative proteins **Tutorials:** 1. Interactive session on identifying potential protein sources and market gaps

	2. Practical session on comparing extraction techniques: protein yield versus purity 3. Hands-on session on analytical data interpretation and quality assessment of proteins 4. Case studies on optimizing functional properties for specific food applications 5. Practical session on modifying protein structure and texture using heat and enzymes 6. Interactive session on overcoming challenges in scaling up alternative protein production: discussion with industrial experts 7. Practical session on assessing nutritional quality and safety of alternative proteins (comparison of plant-based proteins with animal-based proteins with existing literature data) 8. Debate on market strategies and consumer education 9. Group activity on designing a sustainable protein production model 10. Final remarks and feedback session
You Should Attend If…	• Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories. • Students at all levels (BTech/MSc/MTech/PhD) or Faculty from reputed academic institutions and technical institutions. **The number of participants for the course will be limited to fifty.**
Fees	The participation fees for taking the course is as follows: **Students: INR 1,000** **Professionals from Academic Institutions/ Research Organizations: INR 5,000** **Professionals from Industry: INR 10000** **Participants from abroad: US $500** The above fee includes all instructional materials, computer use for tutorials, laboratory equipment usage charges. The participants will be provided with accommodation and food on a payment basis. **Registration and payment form LINK: https://forms.gle/drqnZY9cquD4SdvL7**

The Faculty

Dr. Mahesha Manjunatha Poojary is an Associate Professor of Food Protein Chemistry in the Department of Food Science at the University of Copenhagen, Denmark. He is a food chemist with a specialization in food protein chemistry and food analytical chemistry. His research interests include the development of sustainable protein ingredients and understanding the chemical reactions of proteins in food systems.

Dr. Winny Routray is working as an Assistant Professor in the Department of Food Process Engineering at the National Institute of Technology Rourkela, India. Her research interests encompass many aspects of food and post-harvest engineering, by-product and waste valorization through bioprocessing, downstream processing, and microbial applications, with the general themes of bio-engineering and sustainable biomaterials production.

Dr. Mohd Khalid Gul is an Assistant Professor in the Department of Food Process Engineering at the National Institute of Technology, Rourkela, India. His research is centered on advancing the science of food colloids, focusing on their functionalities, modifications, and interactions, particularly between proteins and polysaccharides. His work extends to developing novel encapsulation techniques for bioactives, studying sensory-satiety relationships, and ensuring food safety through innovative approaches.

Course Coordinator

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For more details visit link:
https://gian.iith.ac.in/