Course Overview

Over the last decade, consumer demand has progressively required processed foods to have a more natural color, flavor and nutrients with a shelf life that is ample for distribution and a reasonable period of home storage before consumption. Agri-food sector is currently facing huge pressure to produce quality food to feed billions with dwindling resources and reduce environmental impact of current food systems. This is achieved by embracing disruptive technologies that safeguard foods and also retain to a greater point their sensory quality and nutritional characteristics by dropping the reliance on heat as the main preservative action. The module 'Sustainable disruptive processing technologies' will provide an insight into the application of key enabling technologies for agri-food sector. These technologies can meet the demand for fresh, healthy, convenient and safe foods which has prompted the development of novel technologies. A large number of disruptive technologies including non-thermal processing techniques, such as electro-technologies, mechanical processing, pressure-based technologies, emerging thermal processing techniques, and chemical based will be covered.

The exploration and development of alternatives to conventional food processing technologies, not only to improve food processing & preservation, but also to add value to food processing streams while maintaining product safety, quality and sustainability will be covered. The course intends to provide knowledge and application of these technologies which are considered as sustainable, have lower environmental impacts and can produce food with minimal impact on climate without compromising safety, quality and nutritional profile of foods.

Course Contents

- Basics of dielectric heat processing technology – Principle, process control parameter, microbial inactivation mechanism, effect on fluid food quality parameters.
- Non-thermal processing technology – Operating principle, mechanism of microbial inactivation, intrinsic and extrinsic processing parameters
- Modelling biochemical dynamics of non-thermal technologies and discussion about statistical properties.
- Discussion about the current status and future trends in fluid foods :HPP, PEF, Plasma.
- Discussion on high pressure processing, pulsed electric field, plasma technology, ozone processing, super and sub-critical fluid processing, irradiation;
- Light based and cavitation technologies: UV light, LED light, acoustic and hydrodynamic cavitation.
- An overview of the different types of irradiation processes (gamma, electron bean, x ray) an appraisal of process control parameters to obtain established performance criteria on pathogenic microorganisms will be discussed.
- Transformational strategies: Development of clean label ingredients with green extraction principles will be outlined.
- Brief discussion on novel food regulatory and legislation issues.
- US and European perspectives, Validation of Non-thermal Technologies, Regulatory requirements for foods will be outlined.

Objectives

- Impart knowledge to the members on emerging processing, preservation and extraction technologies that possess potential to sustain the food nutrients required for health (termed *nutritional quality* of a food)
- Increase variety in the diet by preserving a range of attractive flavors and colors in food
- To employ novel technologies for agri-food sector
- To analyse the impact of novel technologies on food sustainability
- To apply technologies in real life scenario

GIAN Course on

Advances in Sustainable Disruptive Technology in Food Processing

December 27 - 31, 2021
(Monday - Friday)

Course Instructor

Prof. Brijesh K Tiwari,
Adjunct Professor, UCD School of Biosystems and Food Engineering
Principal Research Officer, Food Chemistry and Technology, Teagasc Food Research Centre, Ashtown, Dublin D15 KN3K, Ireland.

Course Coordinators

Dr. Madhuresh Dwivedi
Assistant Professor
Department of Food Process Engineering
National Institute of Technology, Rourkela 769008 Odisha.

Dr. Sushil Kumar Singh
Assistant Professor
Department of Food Process Engineering
National Institute of Technology, Rourkela 769008 Odisha.

Department of Food Process Engineering
National Institute of Technology, Rourkela
Odisha, India.

Teaching Faculty

Professor B K Tiwari, **PhD, FIFST, FRSC** is a Principal Research Officer at TEAGASC and Adjunct Professor at UCD School of Biosystems and Food Engineering, obtained his PhD at the University College of Dublin (Ireland) in 2009. Before starting his PhD, he was employed as a Research Scientist at the Indian Institute of

Processing Technology (IICPT, India). Subsequently during his PhD studies he secured a Lecturer position in University College Dublin and later moved to commence a fulltime faculty position in Manchester Metropolitan University (MMU) in 2010; later in 2011 he was appointed as a Senior Lecturer in MMU. Demonstrated ability to fund, manage and lead a high quality, innovative and multi-disciplinary food processing research group with a strong international reputation. Current Advanced Food Technologies Research Group comprises 21 researchers. Strong track record in development of intellectual property including patents and technology transfer to industry. Research group is funded through various competitively won sources including the EU 7th Framework Programme, Horizon 2020, Science Foundation Ireland, Irish Research Council, Irish Department of Agriculture, Food & the Marine, Enterprise Ireland and industry.

Principal Supervisor/co-supervisor of 14 (13 PhD and 1 Masters) research thesis completed. Sustained successful track record in obtaining external research funding from EU, SFI, DAFM, EI and industry. Strong publication track record includes over 175 peer reviewed journal papers, 88 international conference papers, 84 book chapters, 1 patent, 10 edited/authored books and 1 book series (IFST Advances in Food Science Series).

Excellent collaborative research links with national/international industry, academic and food research centres as evidenced by joint national/overseas funding awards and research outputs. Fellow of Royal Society of Chemistry (FRSC), Fellow Institute of Food Science and Technology (UK), Elected member of the Food Engineering group of Institution of Mechanical Engineers (IMechE). He appointed Editor – in – Chief of Journal of Food Processing and Preservation, Guest Managing Editor (Food research International; Innovative Food Science and Emerging Technologies). He is also a member of the Editorial Board of Food Engineering Reviews (Springer) and Ultrasonic Sonochemistry (Elsevier).

Course Coordinator

Dr. Madhuresh Dwivedi is an Assistant Professor in Department of Food Process Engineering of NIT Rourkela. He received his PhD in the area of Food Process Engineering from IIT Kharagpur, India in 2015. Before joining NIT Rourkela as an Assistant Professor in 2018, he has

worked as an Assistant Professor at Indian Institute of Plantation Management (2017 - 2018), and University of Allahabad, Allahabad (2015 - 2017). His research area focusses on new product development and Novel thermal and non-thermal technology.

Dr. Sushil Kumar Singh is an Assistant Professor in Department of Food Process Engineering of NIT Rourkela. . He received his PhD in the area of Food Process Engineering South Dakota State University, Brooking

USA a in 2016. Before joining NIT Rourkela as an Assistant Professor in 2018, he has worked as a product development scientist in the industry. His research interest includes modelling & simulation, ready-to-eat foods, thermal and non-thermal processing of food.

Who can attend?

❖ Executives, Food engineers and researchers from manufacturing, service and government organizations including R&D laboratories.
❖ Faculty from reputed academic institutions and technical institutions.
❖ Students at all levels (BTech/MSc/MTech/PhD)

e-Certificate

Participation certificate will be give to all the participants.

Event Type

This is an international event. Lectures will be offered in the online mode only.

Registration Fee

Participants from abroad	$ 250/-
Industry/ Research Organizations	Rs 3000/-
Academic Institutions (Students)	Rs 500/-
Faculty/Scientist	Rs 1000/-

The above fee is only for participation in the event in the online mode. Lecture materials, if provided, will be in the form of soft copy only.

*Foreign teaching faculty will handle the course from NIT Rourkela .

How to Register?

1. Interested candidates are requested complete payment through NEFT Transfer to the following account details: Name of the Beneficiary: Continuing Education NIT Rourkela; Name of Bank: State Bank of India; Branch Code: NIT Rourkela; Branch Beneficiary Account No.: 10138951784; Bank MICR Code: 769002007; Bank IFS Code: SBIN0002109.

2. After successful payment candidate need to fil the google form

Link: https://forms.gle/hNLvz6nxBHooA4wo7

Important dates and venue

Last date for Registration	December 21 2021
Course Schedule	December 27 - 31, 2021
Venue	Online mode only

Contact Details

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Ministry of Human Resource Development,
Government of India