

DISCIPLINE SPECIFIC ELECTIVE
DSE FT01: Novel Food Processing Technologies

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITE OF THE COURSE

Course title & code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Theory	Tutorial	Practical/Practice		
Novel Food Processing Technologies	4	2	0	2	XII Pass	NIL

Learning Objectives

1. To enable students to learn the basics of novel processing techniques.
2. To impart knowledge about the mechanism of microbial inactivation by various processing techniques.
3. To acquire knowledge about the effects of various novel processing techniques on food quality.

Learning Outcomes

After completing this course, students will be able to:

1. Understand the principles and mechanism of microbial inactivation by various techniques in order to preserve food and provide safe food for consumption.
2. Comprehend the effects of various novel processing techniques on the food quality.

SYLLABUS OF DSE FT01

THEORY

Credits 2 (30 Hrs.)

Unit I: High pressure processing and Hurdle technology

(10 hrs)

Unit Description: The unit will provide an understanding of the High-pressure processing used in food industries. The unit will deal with its principle and effects on food quality. The unit will also provide knowledge of the hurdle technology and its use in food preservation.

Subtopics:

- **High Pressure Processing:** Definition, principles of high-pressure processing and effects of high pressure on food quality.
- **Hurdle Technology:** Concept and effect on preservation of food.

UNIT II: Pulsed electric fields processing

(8 hrs)

Unit Description: The unit will introduce fundamentals of pulsed electric field processing. It also deals with concept of e-beam.

Subtopics:

- **Pulsed electric fields processing:** Definition, PEF treatment systems, main processing parameters, mechanisms of microbial inactivation.
- **Concept of E-beam**

UNIT III: Ultrasound and radiofrequency processing

(6 hrs)

Unit Description: The unit will help in understanding the use of ultrasound and radiofrequency processing in food industry.

Subtopics:

- Ultrasound as a food preservation and processing aid, effects of ultrasound on food properties
- Radio-frequency processing.

UNIT IV:

(6 hrs)

Unit Description: The unit will provide and insight to various other novel processing techniques such as microwave heating, dielectric heating, ohmic heating, irradiation that aids in food preservation.

Subtopics:

- Microwave heating
- Dielectric heating
- Ohmic heating
- Irradiation
- UV-C radiation
- Ozone
- Plasma technology

PRACTICAL (2 Credits, 60 Hrs)

- Market survey of novel processed foods available
- Concept of hurdle technology
- Blanching using UV light
- Ultrasonication
- Setting up of Ohmic heater
- Applications of Microwave processing
- Layout of irradiation unit
- Ohmic heating process calculations
- Quality analysis of novel processed foods vs conventionally processed foods

Essential readings:

1. P J Fellows (2009). Food Processing Technology: Principles and Practice. Third edition. Wood Head Publishing in Food Science, Technology and Nutrition.
2. Howard Q. Zhang, Gustavo V. Barbosa-Cánovas, V. M. Bala Balasubramaniam, C. Patrick Dunne, Daniel F. Farkas, James T. C. Yuan (2011). Nonthermal Processing Technologies for Food. Wiley-Blackwell.
3. Ortega-Rivas, Enrique (2012). Non-thermal Food Engineering Operations. Springer.
4. Chauhan, O. P. (Ed.). (2019). *Non-thermal processing of foods*. CRC Press.
5. Potter NN and Hotchkiss H J (1996). Food Science, Fifth Edition. CBS Publication, New Delhi.