Quality, Innovation and Emerging Processing Technologies

Code: 43035
ECTS Credits: 9

Degree	Type	Year	Semester
4313796 Quality of Food of Animal Origin	OB	0	2

Contact

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Teachers

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Use of Languages

Principal working language: spanish (spa)

External teachers

Elena Beltran

Sònia Guri

Prerequisites

This module does not have any requirements.

Objectives and Contextualisation

In this module students will learn the different key stages in the innovation process and design of a new product of animal origin. They will also know the most innovative processing technologies; its validation and they will study the parameters of the process that have the greatest impact on the characteristics of the final product. Among the technologies that reduce the environmental impact of the food industry, students will study the use of co-products for the preparation of functional ingredients.

Competences

- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Design new foods by incorporating the necessary ingredients and additives and by applying appropriate processing and conservation technologies.
- Design, organise and execute projects related to this field of study, working alone or in a unidisciplinary or multidisciplinary team, displaying a critical sense and creativity, and the ability to analyse, synthesise and interpret information.
- Evaluate the potential of a technological process to obtain the microbiological, physical, chemical, sensorial and nutritional properties that determine the quality of a food.
- Execute and manage an innovation process on a food product, or a production and conservation process.
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Search for information using the appropriate channels and use this information to solve problems in the work context.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.

Learning Outcomes

1. Carry out a bibliographic search.
2. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
3. Identify regional, national and international regulations.
4. Identify scientifically sound information sources.
5. Identify the differential characteristics of the innovation project.
6. Identify the potential of food industry by-products as sources of functional ingredients.
7. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
8. Know the parameters that determine product quality in a process of food transformation or conservation
9. Make proposals for addressing specific practical problems.
10. Obtain the parameters of a quantitative model that describes the changes caused by technological processing to the properties of a food.
11. Prepare flowcharts, diagrams, tables and/or figures.
12. Present work done in seminars, leading the discussion of problem areas
13. Present work done in seminars, leading the discussion of problem areas.
14. Recognise the capacities of each different food processing and conservation technology, especially those of emerging technologies.
15. Recommend the appropriate technology for preparing innovative foods.
16. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
17. Use mathematical models to predict the effect of processing on the characteristics of a food.
18. Use tools for managing and documenting the innovation process.

Content

New technologies for processing, preserving and control

- Sensors: fundamentals, validation and uses
- High pressure
- Electrical pulses
- High pressure homogenization
- Active packaging
- UV radiation
- Validation of technological treatments to ensure food quality

Innovation Management

- New products design
- Foods with nutrition and health claims
- Recovery of raw materials devalued and co-products of food industry

Methodology

- Lectures / expository classes
- Seminars
- Problem-based Learning
- Debates
- Tutoring
- Lab / Pilot Plant
- Reporting / coursework
- Reading articles / reports of interest
- Lecture / oral presentation of work

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Participative lectures	35	1.4	8, 9, 6, 5, 10, 7, 16, 15, 14, 18, 17
Pilot plant practices	6	0.24	9, 6, 11, 7, 16, 14
Presentation/Oral presentations	14	0.56	11, 12, 13, 2
Seminars	4	0.16	4, 1, 10, 11, 13, 7, 16, 2, 17
Type: Supervised			
Learning based on problem-solving	15	0.6	8, 4, 9, 1, 6, 5, 3, 10, 11, 12, 13, 7, 16, 2, 15, 14, 18, 17
Unprogrammed tutoring	15	0.6	8, 4, 9, 6, 5, 10, 12, 7, 2, 15, 14, 18, 17
Type: Autonomous			
Reading articles and reports of interest	70	2.8	8, 4, 1, 6, 5, 3, 10, 11, 7, 15, 14, 18, 17
Reporting	60	2.4	8, 4, 9, 1, 6, 5, 3, 10, 11, 12, 13, 7, 16, 15, 14, 18, 17

Assessment

At the beginning of each block, the responsible professor will inform about the activities to be carried out and the relative weight of the activities and assistance in the note.

Final grades will be calculated as follows:

- New technologies to process food(24%)

- Validation of food process in order to guarantee food safety (20%)

- Innovation management (22%)

- Food packaging (12%)

- Co-products uses and imrovements (12%)

- Sensors (10%)

To pass the module you also need a minimum average grade of 5 out of 10.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Active performance during course sessions	5-10%	0	0	4, 2
Delivery of problems and written exercises	20-30%	1	0.04	8, 4, 9, 1, 6, 5, 3, 10, 11, 12, 13, 7, 16, 2, 15, 14, 18, 17
Oral defense of problems	20-30%	1	0.04	8, 4, 9, 1, 6, 5, 3, 10, 11, 12, 13, 7, 16, 2, 15, 14, 18, 17
Peer co-evaluation	15-20%	0	0	7, 16
Test	20-30%	1	0.04	8, 6, 5, 14, 17
Tutorial activities attendance	10-15%	3	0.12	8, 4, 9, 1, 7

Bibliography

Generics: Online books on UAB intranet

    www.knovel.com

    www.sciencedirect.com (Encyclopedia "of dairy sciencies", "of meat sciencies" "of food sciences and nutrition")

Specifics:

Ahvenainen, Raija (2003). Novel Food Packaging Techniques. Woodhead Publishing. http://www.knovel.com/web/portal/browse/display?_EXT_KNOVEL_DISPLAY_bookid=914&VerticalID=0

Baldwin, Cheryl (2009). Sustainability in the Food Industry. John Wiley & Sons. http://www.knovel.com/web/portal/browse/display?_EXT_KNOVEL_DISPLAY_bookid=5063&VerticalID=0

Breivik, H. (2007). Long-Chain Omega-3 Specialty Oils. Breivik, Harald (2007). Woodhead Publishing. http://app.knovel.com/web/toc.v/cid:kpLCOSO002/viewerType:toc/root_slug:long-chain-omega-3-specialty-oils

Campus, M. (2010). High Pressure Processing of Meat, Meat Products and Seafood. Food Eng. Rev. 2, 256-273.

Chemat F & Vorobiev E (eds.) (2020). Green Food Processing Techniques. Preservation, Transformation and Extraction.

    4 - High hydrostatic pressure processing of foods

    5 - High-pressure homogenization in food processing

Decker, E.A.; Elias, R.J.; McClements, D.J. (2010). Oxidation in Foods and Beverages and Antioxidant Applications, Volume 2 - Management in Different Industry Sectors. Woodhead Publishing. http://app.knovel.com/web/toc.v/cid:kpOFBAAVMK/viewerType:toc/root_slug:oxidation-in-foods-beverages/url_sl

Doona, Christopher J.; Kustin, Kenneth; Feeherry, Florence E. (2010). CaseStudies in Novel Food Processing Technologies - Innovations in Processing, Packaging and Predictive Modelling. Woodhead Publishing. http://www.knovel.com/web/portal/browse/display?_EXT_KNOVEL_DISPLAY_bookid=3882&VerticalID=0

Martin, R.E., Carter, E.P., Flick, G.J.., Davis, L.M. (2000). Marine & freshwater products handbook, CRC Press.

Medina-Meza, I.G., Barnaba, C., Barbosa-Cánovas, G.V. (2014). Effects of high pressure processing on lipid oxidation: A review. Innovative Food Science and Emerging Technologies 22, 1-10.

Peter W.B. Phillips, Jeremy Karwandy, Graeme Webb andCamilleD. Ryan (2012). Innovation in Agri-food Clusters. Theory and Case Studies. CABI https://xpv.uab.cat/cabebooks/FullTextPDF/2012/,DanaInfo=.awxyCgfhpHx1r+20123378738.pdf

Zhang ZH, Wang LH, Zeng XA, Han Z & Brennan CH (2019). Non-thermal technologies and its current and future application inthe food industry: a review. Food Sc. & Tech. 54: 1-13. https://doi-org.are.uab.cat/10.1111/ijfs.13903

Software

Free software provided by professors.