

Food Processing Methods I

Code: 103555
ECTS Credits: 6

Degree	Type	Year	Semester
2501925 Food Science and Technology	OB	3	1

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: No

Teachers

Manuel Castillo Zambudio

Prerequisites

There are no official prerequisites, but it is appropriate for the student to have obtained the contents of the Foundations of Process Basics, Analysis and control of food quality and Basic Operations.

The practical contents of the subject are in Pilot Plant Practices, and the student should simultaneously take both subjects to take better advantage of the learning process.

Objectives and Contextualisation

This is a third-year subject, which is compulsory. It deals with the physical processes of transformation and/or conservation of foods in general, without entering into detailing the processing of food in particular, since this study is carried out in greater depth in the optional subjects that refer to the technologies of raw materials specific

On the other hand, it is necessary to focus on the teaching of this subject in the industrial aspects of the processes, since other subjects cover the basic knowledge related to them.

The objectives of the subject are:

- recognize the balance between preservation and transformation in foods;
- compare the processes of transformation and conservation of foods;
- select the most suitable in each situation;
- demonstrate that you know the processes of conditioning and storage of raw materials;
- analyze the operation of the machinery, with all its complementary elements;
- optimize the processes, regardless of the complexity of the equipment
- select the most respectful process alternative with the product and the environment.

Competences

- Apply knowledge of the basic sciences to food science and technology.
- Apply the principles of processing techniques and evaluate their effects on the quality and safety of the product.
- Develop individual learning strategies and planning and organisation skills.
- Search for, manage and interpret information from different sources.
- Show understanding of the mechanisms by which raw materials deteriorate and the reactions and changes that take place during storage and processing, and apply the methods for controlling this.
- Use IT resources for communication, the search for information within the field of study, data processing and calculations.

Learning Outcomes

1. Build models to predict the effect of technological treatments on food components.
2. Design complex processes in accordance with the established quality criteria.
3. Develop individual learning strategies and planning and organisation skills.
4. Relate the characteristics of foods to their physical properties.
5. Search for, manage and interpret information from different sources.
6. Select processes of conservation, transformation, transport and storage that are suited to foods of animal and plant origin.
7. Use IT resources for communication, the search for information within the field of study, data processing and calculations.

Content

Block 0. Introduction and basic principles

Block 1. Mechanical treatments

1.1. Previous treatments

1.2. Changes in the dimensions of food

1.2.1. Reduction in size and mixture of solids

1.2.2. Emulsion and homogenization

1.3. Texture and extrusion

1.4. Separations

1.4.1. Sedimentation

1.4.2. Centrifugation

1.4.3. Filtering

Block 2. Processes of control of water activity

2.1. Evaporation of liquid foods

2.2. Concentration by tangential filtration

2.3. Drying and dehydration

2.4. Lyophilization and cryo-concentration

2.5. Osmotic dehydration (salting and confit)

Block 3. Processes of control of the redox potential and pH

3.1. Subcritical and supercritical CO₂

3.2. Food acidification processes

Block 4. Processes of chemical conservation and/or transformation

4.1. Application of additives and technological aids

4.2. Smoked

4.3. Ionizing radiation

Methodology

The methodology used in this subject to achieve the learning process is based on making the student work the information that is available to him. The function of the teacher is to give the information or to indicate where you can get it and to help and tutor it so that the learning process can be carried out effectively. To achieve this goal, the subject is based on the following activities:

Expositive lectures

The content of the theory program will be taught by the teacher in the form of expository classes. The theoretical classes will be complemented with the visualization of animations and videos related to the subjects treated in class. The visual aids used in class by the teacher will be available on the Virtual Campus. It is recommended that students print this material and take it to class to use it as a support when taking notes. Although it is not essential to extend the contents of the classes taught by the teacher unless expressly requested by the latter, it is advised that students regularly consult the books recommended in the Bibliography section in order to consolidate and clarify, if necessary, the contents explained in class.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Expositive lectures	40	1.6	1, 2, 4, 6
Type: Supervised			
Mentoring	3	0.12	1, 3, 2
Type: Autonomous			
Preparation of work, case preparation	31	1.24	5, 1, 3, 2, 4, 6, 7
Self-study work	64	2.56	5, 1, 3, 2, 4, 6

Assessment

The evaluation will be obtained based on the evaluation of 2 cases (20% of the mark of the subject), work of continuous evaluation (20% of the mark of the subject) and two partial exams (each with 30% of the mark of the subject). The partial examinations will be considered surpassed with a grade equal to or greater than 5.

There will be a partial recovery exam. In the recovery, a rating equal to or greater than 5 will be required to pass any of the partial ones.

It will be considered that a student is not evaluable if he has participated in assessment activities that represent $\leq 15\%$ of the final grade.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
First partial exam	30%	2.5	0.1	1, 2, 4, 6
Practical cases	20%	3	0.12	5, 3, 4, 7
Quizzes and continuous evaluation	20%	4	0.16	1, 2, 4, 6
Second partial exam	30%	2.5	0.1	1, 2, 4, 6

Bibliography

The texts highlighted in bold are considered more basic. The rest are good complements for specific subjects.

- Berk, Z. 2009. Food Process Engineering and Technology. Elsevier. (online version <http://www.sciencedirect.com/science/book/9780123736604>)
- Brennan J.G. 1998. Food engineering operations. Acribia, Zaragoza.
- Earle, R.L. 1988. Food engineering. Basic operations applied to food technology. Acribia, Zaragoza (online version of the original edition <http://www.nzifst.org.nz/unitoperations/index.htm>)
- Fellows, P. J. 2009. Food Processing Technology - Principles and Practice (3rd Edition). Woodhead Publishing. (online version <http://www.knovel.com>)
- Guy R. 2002. Extrusion of food. Technology and applications. Acribia, Zaragoza.
- Ibarz, A. y Barbosa Cánovas, G.V. 2005. Unit Operations in Food Engineering. Ed. Mundiprensa, Madrid.
- Ramaswamy H. i Marcotte M. 2006. Food Processing: Principles and Applications. CRC Press, Boca Raton, Florida, USA.
- Rodríguez, F. (Ed.) 1999. Engineering of the food industry. Ed. Synthesis Madrid
 Volume I. Basic concepts
 Volume II. Food Processing Operations
 Volume III. Food Conservation Operations
- Singh, R.P. and Heldman, D.R. 2009. Introduction to food engineering (4th edition). Academic Press. (Online version at <http://app.knovel.com>)
- Zeuthen, Peter; Bøgh-Sørensen, Leif. 2003. Food Preservation Techniques. Woodhead Publishing. (online version <http://www.knovel.com/>)