

**Food Sciences**

Code: 102611  
ECTS Credits: 3

Degree	Type	Year	Semester
2502445 Veterinary Medicine	OB	2	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**

Victoria Ferragut Pérez  
Montserrat Mor-Mur Francesch  
Josep Yuste Puigvert

**Prerequisites**

There are no official prerequisites, but it is recommended that the students have passed the subjects of Microbiology and Biochemistry of the first year of the Degree. Students must be able to read and understand academic texts in Catalan and Spanish.

**Objectives and Contextualisation**

Our health depends on what we eat daily and how we do it. Also, our economy depends on that, since the agri-food sector is one of the most active in our country. In Catalonia, there are many industries that are dedicated to the production or the processing of raw materials to convert them into food. Industries must ensure that food is safe and healthy, and that it remains appetizing for as long as possible. The administration, for its part, must carry out official controls to ensure that food legislation is accomplished. According to Order ECI/333/2008 of 13 February, which establishes the requirements for the verification of the official university degree that qualifies for the exercise of the Veterinary profession, the first competence that Veterinary graduates must have acquired is the control of the hygiene, the inspection and the technology of the production and elaboration of foods of human consumption from the primary production until the consumer. Food Science and Technology related subjects which are taught in the 2nd year of the Veterinary Degree, contribute to a part of the specific competences necessary for the exercise of the profession. In the first semester, in the subject Food Science, the students must acquire the theoretical and practical fundamentals about the characteristics, composition and alteration of foods of human consumption. In the second semester, Food Technology is studied, in which the foundations and principles of the technologies used for obtaining healthy and safe foods are acquired.

After completing the course, the students are expected to:

- Recognize the components and ingredients of foods, and their functions and properties

- Recognize the additives and their main functions
- Analyze components and their properties in specific foods
- Identify specific food quality indicators
- Relate components, properties and quality indicators
- Identify the mechanisms of food deterioration
- Evaluate the possibility and probability of deterioration of a food due to a specific cause

## Competences

- Analyse, synthesise and resolve problems and make decisions.
- Demonstrate knowledge of the rights and duties of the veterinarian, with a special focus on ethical principles
- Seek and manage information related with professional activity
- Work effectively in single or multidisciplinary teams and show respect, appreciation and sensitivity for the work of others.

## Learning Outcomes

1. Analyse, synthesise and resolve problems and make decisions.
2. Identify foodstuffs and relate their functions, characteristics, interactions and evolution.
3. Seek and manage information related with professional activity
4. Work effectively in single or multidisciplinary teams and show respect, appreciation and sensitivity for the work of others.

## Content

The subject consists of two units, whose contents are distributed in classroom activities of theory, practice and seminars.

### UNIT 1. Properties of food

Theory:

Lecture 1. Food water. Structure and properties State of water in food. Water activity. Sorption isotherms.

Lecture 2. Components and ingredients of food: functions and properties. Food: definition. Nutritious and non-nutritive components Additives and technological adjuvants. Functional properties Functional additives

Laboratory practices:

Food rheology

### UNIT 2. Modifications of food

Theory:

Lecture 3. Abiotic modifications: chemical and enzymatic reactions. Non-enzymatic browning reactions. Oxidative reactions Antioxidants Reactions of the pigments. Degradation of protein and non-protein nitrogenous components. Lipolysis Enzymatic oxidation of lipids.

Enzymatic degradation of carbohydrates. Enzymatic browning reactions.

Lecture 4. Biotic modifications

Bacteria. Virus. Parasites Enzymes and toxins produced by microbial metabolism. Factors that affect the growth and survival of microorganisms in food. The theory of obstacles.

Laboratory practices:

Enzymatic browning and blanching

Glazing and oxidation of fishery products

Stability of food

Pilot plant practices:

General knowledge of the pilot plant

Preparation of a liquefied food

Seminars:

Fermented foods

Presentation of self-learning work

## **Methodology**

The methodology used in this subject combines the following activities:

Classroom lectures to present the basic concepts of the subject.

Short self-learning exercise. The students must solve a brief self-learning exercise that will be discussed and corrected during one of the theory sessions.

Work seminar with small number of students, to complete and deepen the concepts presented in the lectures, by analyzing information, solving issues and discussing and exchanging ideas and knowledge.

Laboratory practices: to complete and reinforce the knowledge acquired in the lectures. They allow the acquisition of work skills in the laboratory and the experimental understanding of concepts. At the beginning of the course, students will have a script available with all the practices they will do. Students must complete a prior reading of the script before each practice. During the practice, students must collect the results obtained and prepare a report that will allow them to answer the corresponding evaluation test. Before the first session, students must have passed the Basic Safety test in the Laboratories, following the instructions found in the Moodle classroom of the subject.

Pilot plant practices: to complete and reinforce the knowledge acquired in the lectures. They allow the acquisition of work skills in the pilot plant. Students must complete a prior reading of the script before each practice. Before the first session, students must have passed the Safety Test in the Food Technology Plant.

Attendance to practical sessions is compulsory attendance and, at most, the absence to two sessions can be justified.

Autonomous work of the student:

- in groups of 4 people, to prepare and present a case proposed by the teachers. This work involves the search and selection of information in various sources and the answer to the questions raised in the case, and its presentation and discussion in front of the teachers and other class groups.

-individual, to solve the short self-learning exercise and to study for the exam.

Seminar to present the of self-learning work in groups of 4 students.

Programmed tutoring: informative sessions on the content, development and objectives of various teaching activities, and to clarify concepts and solve doubts that may arise during the course.

The teaching material used in the subject will be available at Campus Virtual. The students will find the presentations in pdf format that the teachers will use in class, to use it as support during the class. The necessary scripts for the practices will also be included, which the students must print before starting them. There is also self-evaluation material, which the students can use to reinforce their knowledge.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory practices	8	0.32	1, 2, 4
Lectures	11	0.44	2
Pilot plant practices	3	0.12	1, 2, 4
Seminars	4	0.16	1, 3, 2, 4
Type: Supervised			
Programmed tutorial	1	0.04	1, 2
Type: Autonomous			
Autonomous study and bibliography consultation	28.25	1.13	1, 3, 2
Resolution of cases, preparation, preparation and presentation of works, exercises of self-evaluation	18	0.72	1, 3, 2, 4

## Assessment

The maximum score that can be obtained is 100 points. The subject will be approved with a minimum overall score of 50. The evaluation will be individual and will be carried out continuously during the different training activities that have been scheduled.

Evaluation activities are:

- Short self-learning exercise (10% of weight in the overall score). The correction will be made during one of the theory sessions. Students must correct the exercise during this session. Maximum score: 10 points.
- Laboratory practices (10% of weight in the overall score): The evaluation will be done through a short test in Campus Virtual, which must be completed within a week after performing the practice that is being evaluated. Maximum score: 10 points (2.5 points per practice).
- Self-learning group work (30% of weight in the overall score): Students must complete a self-learning work in groups of 4 people from the same group of practices. The teachers will explain in a tutorial session how the work should be done. The work will be presented in public presentation, together with other groups, during the last seminar of the subject. Maximum score: 30 points.
- Global written exam (50% of weight in the overall score): At the end of all the training activities and on the date specified in the course schedule, the students will carry out a written test with multiple choice answers

about the knowledge acquired during lectures, practices and self-learning. Maximum score: 50 points. The minimum score needed in order to average together with the scores of the rest of evaluation activities is 25 points. In case of not passing the written exam, it can be retaken on the date in the course schedule.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Practice test	10	0.16	0.01	1, 2, 4
Presentation and discussion of self-learning work	30	0.34	0.01	1, 3, 2, 4
Short Self-Learning Exercise	10	0.25	0.01	1, 3, 2
Written exam	50	1	0.04	1, 2

## Bibliography

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Cubero, N. (2002). Food Additives. Ed. A. Madrid Vicente.

Multon J.L. .. (1999) Additives and manufacturing aids in agri-food industries. Ed. Acribia, Zaragoza.

ICMSF (1980). Microbial ecology of foods 1. Factors that affect the survival of microorganisms. Acribia, Zaragoza.

ICMSF (2000). Microorganisms of food. Vol. 6. Microbial ecology of food. Acribia, Zaragoza.

Ordóñez J. A. (ed.) (1999) Technology of the foods. Vol I. Components of food and processes. Ed. Síntesis, Madrid.

Ordóñez J. A. (ed.) (2014) Technology of foods of animal origin. Ed. Síntesis, Madrid.

Jay, J.M. (2009). Modern microbiology of food. Ed. Acribia, Zaragoza.

Sperber W. H. and Doyle M.P. (2009). Compendium of the microbiological spoilage of foods and beverages. Springer, New York.

Wong D.W.S. (1994) Chemistry of Food: mechanisms and theory. Acribia, Zaragoza.

Online books accessible from the UAB library's website:

<http://www.knovel.com/web/portal/browse/subject/60/filter/0/>

From this web, we list the ones that could be most useful:

Chemical Deterioration and Physical Instability of Food and Beverages

Chilled Foods

Encyclopedia of Food Microbiology

Essentials of Food Sanitation

Food Additives Data Book

Food Spoilage Microorganisms

Oxidation in Foods and Beverages and Antioxidant Applications, Volume 1 - Understanding Mechanisms

Of Oxidation and Antioxidant Activity

Oxidation in Foods and Beverages and Antioxidant Applications, Volume 2 - Management in Different Industry Sectors

Principles of Food Chemistry

Stability and Shelf-Life of Food