Meat and Meat Products

Code: 102649
ECTS Credits: 6

2025/2026

Degree	Type	Year
Food Science and Technology	OT	4
Veterinary Medicine	OT	5

Contact

Name: Montserrat Mor-Mur Francesch

Email: montserrat.mor-mur@uab.cat

Teachers

Josep Yuste Puigvert

Idoia Codina Torrella

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

There are no official prerequisites, but it is essential that the CTA students deepen the knowledge of Methods I and II, pilot plant practices; the Veterinary students the knowledge of Morphology and function of muscle tissue and Food Technology. Those from the two degrees, the knowledge of Biochemistry and food science.

Objectives and Contextualisation

The meat industry is one of the main among all food incdustries and in some contexts it is the majority. In Catalonia it reaches a third of the total and occupies up to 37% of the workers of the alimentary one.
On the other hand, the science of meat and its derivatives has been studied systematically and cartesian for many years, so that it brings knowledge to this basic sector of food for various reasons.

The above facts lead to the consideration of offering CTA students the possibility of furthering this science through an optional subject.

Knowledges
The student must acquire adequate knowledge of the meat properties , the processes of conservation and / or transformation that are applied in industries, the effects of processing on the microbiological and organoleptic characteristics, the nutritional and functional properties of meat and finally, the less common treatments being in development.

Skills or aptitudes
The student must acquire the skills of analysis, intervention and resolution, since as a professional he will have to deal with situations (problematic or not), such as routines, changes, innovations, developments, conflicts, lack of conformity, etc. The professional must also exercise educational or training functions to improve the activities or solve the problems, whether you are a technician or an inspector.

Attitudes
The student must be aware of his role as a professional who should contribute to a better supply of meat to the population, with an adequate knowledge of the demands of this responsibility. The student will also have to feel the need for continuous development of their knowledge and skills, with an interest in their own professional improvement.

Competences

Food Science and Technology
- 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.
- Apply the scientific method to resolving problems.
- Develop individual learning strategies and planning and organisation skills.
- Identify pathogenic, spoilage, and industrially-useful microorganisms, along with the conditions that are favourable or unfavourable to their growth in foods and in industrial and biotechnological processes.
- 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.

Veterinary Medicine
- Analyse, synthesise and resolve problems and make decisions.
- Apply food technology to the preparation of food for human consumption.
- Demonstrate knowledge of the rights and duties of the veterinarian, with a special focus on ethical principles
- Draft and present satisfactory professional reports, always maintaining the required confidentiality.
- Perform sanitary control of different types of catering and food companies and establishments, and implant and supervise quality management systems.
- 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. Apply specific technological processes to the preparation of milk and dairy products, meat and derived products, and fishing, egg and plant products, and understand the modifications derived from the application of these processes to the finished product.
3. Apply the scientific method to resolving problems.
4. Apply the technological processes that are specific to milk and dairy products, meat and meat derivatives, fish products, egg products and vegetable products, and understand the modifications to the final product that these processes make.
5. Develop individual learning strategies and planning and organisation skills.
6. Discern the critical control points in each food production process in businesses in the dairy, meat, fishing and aquaculture, eggs and egg products and fruit and vegetable sectors, and also in group catering businesses.
7. Distinguish critical control points in each food preparation process in companies in the dairy, meat, fishing and aquaculture, eggs and egg product and plant product sectors, as well as collective catering establishments.
8. Draft and present satisfactory professional reports, always maintaining the required confidentiality.

9. Foresee and solve problems that are specific to the food industries.
10. Recognise the changes, alterations and adulterations suffered by milk, meat, fishing products, eggs, plants and derived products, as well as products made in collective catering establishments.
11. Recognise the changes, spoilage and adulterations that can affect milk, meat, fish products, eggs, vegetables and products deriving from these, and also products made in group catering businesses.
12. Recognise the dangers to milk, meat, fishing products, eggs, plants and derived products, as well as products made in collective catering establishments, and evaluate the risk involved for different consumers.
13. Recognise the importance of fermentation processes and appreciate the role of microorganisms in industrial processes.
14. Recognise the influence of the intrinsic, extrinsic and implicit characteristics of milk, meat, fishing products, eggs, plants and derived products, as well as products made in collective catering establishments, in the presence or persistence of a danger.
15. Relate the characteristics of foods to their physical properties.
16. Search for, manage and interpret information from different sources.
17. Select food conservation methods that slow down deterioration.
18. Work effectively in single or multidisciplinary teams and show respect, appreciation and sensitivity for the work of others.

Content

A. Theoretical contents

They will be taught mostly in a virtual format, although some aspects will be combined with hands-on works and seminars.

Chapter I. MEAT SCIENCE

Unit I. Physicochemical characteristics of meat and the process to obtain it

Topic 1. Composition. General tables. Factors that modify it. Water: water activity and water retention capacity. Lipids. Muscle structure, muscle fibers (aerobic and anaerobic) and proteins. Carbohydrates. Minority substances. Involvement in the production of derivatives and contrast with non-meat raw materials.

Topic 2. Transformation of muscle into meat. Concepts. Muscle contraction and energy sources. Main events. Factors influencing post-mortem changes. Molecular mechanism of rigor mortis. Toughness resolution: maturation and softening. Accelerated ripening. Abnormal developments of rigor rigor: Effects of stress: DFD, PSE and other meats. Industrial implications and methods of prevention and detection.

Item 3. Application of cold: refrigeration and freezing. Concepts and parameters. Systems: mechanical compression and cryogenic fluids. Storage. Modifications and shelf-life. Thawing. Differentiation between frozen and non-frozen meats.

Item 4. Carcasses and cutting. Concepts. Classification of carcasses: estimation of the amount of meat. Problems of quality assessment. Industrial cutting (cold). Hot deboning.

Item 5. Co-products. Concepts. Factors affectong its consumption. Description of the main parts. Casings: natural and artificial (edible and inedible). Natural casing technology. Mechanically recovered meat.

Unit II. Meat quality

Item 6. The natural and added microbiota. Origin and evolution of microorganisms in fresh meat. Main microbial groups. Frequent parasites in meat. Control methods. Useful and altering microorganisms. Bioconservation

Item 7. Physico-chemical and organoleptic quality. Instrumental and sensory measurement and / or determination systems. Relationships. Consumer assessment.

Item 8. Nutritional quality of meat. Structural, energetic and essential compounds. Recommended limitations and controversies about the risk of meat consumption.

Chapter II. MEAT TECHNOLOGY, DERIVATIVES.

Unit III. Meat products technology

Item 9. General technological processes. Chopped. Defects in minced products. Premix and mix. Sausage. Defects in sausage products. Coextrusion. Smoking: natural (cold and hot) and artificial. Desirable and undesirable effects of smoking.

Item 10. Curing. Methods and purposes. Meat characteristics that affect curing. Components. Nitrite toxicity and possible alternatives. Curing salt application systems. Preparation of brines. Defects in cured products.

Item 11. Packaging. Concepts. Criteria for the choice of packaging. Materials. Packaging systems. Microbiological changes.

Unit IV. Families of traditional meat products in the Mediterranean

Item 12. Fresh preparations and products. Description. Additives. Elaboration. Storage. Batter.

Item 13. Dehydrated and biochemically modified meat products. Description. Whole products: Iberian and non-Iberian. Chopped products. Curing technology: chambers, features and controls. Formulations and technologies of whole and chopped products. Steps. Natural and / or added microbiota. Modifications during the process. Storage. Accelerated ripening. Defects.

Item 14. Cooked meat products. Cooking technology: parameters and types. Methods for monitoring the temperature reached in the thermal center. Whole products. Chopped products: consistent and spreadables. Formulations and technologies of whole and chopped products. Steps. Modifications during the process. Packaging and storage. Defects.

Unit V. Other meat derivatives. Emergent products

Item 15. Recent or minority derivatives and processes. Emerging technologies and combined treatments. Restructured meats. Enhanced meats. Cultured meat. Meat analogues.

B. Practical contents and seminars

A total of 22 hours of practicum will be taught by means of laboratory, pilot plant and seminars.

Laboratory: Factors to be taken into account when making meat and derivative quality determinations. Restructured meat production.

Pilot Plant: Preparation of chopped dehydrated. Making a consistent meat emulsion. Making a spreadable emulsion.

Seminars: Discussion of results. Problems of the classification of meat derivatives.

Note: Depending on the restrictions that may be imposed by the health authorities according to the evolution of the pandemic, reductions or prioritization of the contents of the subject may be carried out.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Encompassed	6	0.24	4, 6

Encompassed	7.5	0.3	4
Encompassed	8.5	0.34	6, 17
Encompassed	31	1.24	4, 11, 15, 17
Type: Supervised			
Supervised	35	1.4	3, 16, 5
Type: Autonomous			
Autonomous	60	2.4	3, 16, 5

Methodology

Face-to-face theoretical classes and practices according to general course planning. The teaching material used in the subject will be available in the Moodle Classroom.

Note: The proposed teaching methodology may undergo some modification depending on the restrictions on attendance imposed by the health authorities.

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.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Final test	50%	1	0.04	1, 3, 2, 4, 16, 5, 7, 6, 9, 11, 10, 12, 13, 8, 15, 17, 18, 14
Partial tests	50%	1	0.04	1, 3, 2, 4, 16, 5, 6, 7, 9, 11, 10, 12, 13, 8, 15, 17, 18, 14

The assessment will be done continuously with various tests that will be announced periodically throughout the course.

At the end of the semester there will be an exam that will include all the learning achieved throughout the course. This exam will count for 50% of the final grade while the other 50% will come from the set of tests taken during the months in which the subject will be taught. You will need a grade above 3.9 in each activity to be able to make an average. There will be a retake test that will include all sections of the subject for which a grade equal to or higher than 5 must be obtained.

Non-evaluable students

Those who have completed less than 30% of assessment trials.

Single assessment

It will consist of a single test in which the contents of the entire subject program will be evaluated. You must have a grade equal to or greater than 5 to pass the subject.

The single assessment test will take place on the same day as the last continuous assessment test of the subject. The single assessment can be recovered on the day set for the recovery of the subject.

The proofreading will follow the same system as that for continuous evaluation.

Bibliography

E-books are accessible from a computer connected to a UAB IP or via xpv

General books in Spanish, on paper:

* Carballo, B. M., G. López de Torre i A. Madrid. 2001. *Tecnología de la carne y de los productos cárnicos*. Mundi-Prensa Libros, Madrid.

* Ordóñez, J. A., M. I. Cambero, L. Fernández, M. L. García, G. García, L. de la Hoz i M. D. Selgas. 1998.

Tecnología de los alimentos. Vol. II. Alimentos de origen animal. Síntesis, Madrid.

English e-books:

· Fernandes, Rhea. (2009) (Ed.). Microbiology Handbook - Meat Products (2nd Edition). https://app.knovel.com/hotlink/toc/id:kpMHMPE002/microbiology-handbook-2/microbiology-handbook-2

* Galanakis C.M. (Ed.). (2019) Sustainable Meat Production and Processing. Academic Press. https://doi-org.are.uab.cat/10.1016/B978-0-12-814874-7.01001-4

* Toldrá F. (Ed.). 2018. *Lawrie's Meat science*, 8a ed. Elsevier. https://app.knovel.com/hotlink/toc/id:kpLMSE0011/lawries-meat-science/lawries-meat-science

* Toldrá F. (Ed.). 2008. *Meat biotechnology.* Springer, New York. https://doi-org.are.uab.cat/10.1007/978-0-387-79382-5

* Toldrá, F. (Ed.). 2009. *Safety of meat and processed meat*. Springer, Nova York, EUA. https://doi-org.are.uab.cat/10.1007/978-0-387-89026-5

* Toldrá, F. (Ed.). 2010. *Handbook of meat processing*. Blackwell, Oxford, Regne Unit. https://onlinelibrary-wiley-com.are.uab.cat/doi/book/10.1002/9780813820897

Databases of e-book

- http://www.knovel.com/web/portal/main (apartat Food science)
- http://www.sciencedirect.com.are.uab.cat/

Són d'especial interès:

o Encyclopedia of food microbiology

o Encyclopedia of meat science

- Encyclopedia of food sciences and nutrition

Revistes científiques i tècniques

* *Cárnica 2000*

* *EUROCARNE*

* *Fleischwirtschaft International*

* *Journal of Muscle Foods*

* *Meat Processing*

* *Meat Science*

* *Poultry Science*

Web

- *American Meat Institute* (AMI): http://www.meatami.com

- AMI. *Meat safety*: http://www.meatsafety.org

- *American Meat Science Association* (AMSA): http://www.meatscience.org

- *Centre de Liaison des Industries Transformatrices de Viandes de l'UE* (CLITRAVI): http://europa.eu.int/comm/civil_society/coneccs/organe_consultatif/detail_cb.cfm?CL=en&GROUPE_ID=26

- *International Meat Secretariat* (IMS): http://www.meat-ims.org

- *Joint Institute for Food Safety and Applied Nutrition*, *Food safety risk analysis clearinghouse.*: http://www.foodrisk.org/meat_poultry.cfm

- *Union Européenne du Commerce du Bétail et de la Viande* (UECBV): http://www.uecbv.be

- *World's Poultry Science Association* (WPSA): http://www.wpsa.com

- *Asociación Española de Empresas de la Carne* (ASOCARNE): http://www.asocarne.com

- *Asociación de Industrias de la Carne de España* (AICE): http://www.aice.es

- *Asociación Nacional de Almacenes Frigoríficos de Carnes y Salas de Despiece* (ANAFRIC): http://www.anafric.es

- Departament de Salut. Inspecció i control sanitari de la carn: http://www.gencat.net/salut/depsan/units/sanitat/html/ca/aliments/spsalc.htm.

Software

Not needed.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	1	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	1	Catalan	first semester	morning-mixed
(TE) Theory	1	Catalan	first semester	morning-mixed