

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

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## Teaching groups languages

You can view this information at the [end](#) of this document.

## Prerequisites

Students should have basic knowledge about different livestock production systems and know basic terminology of the area. In case students had not previously studied related subjects, they will be provided with literature to enable autonomous learning.

It is recommended that students have at least a B1 level (EUROPASS) or an equivalent level of English level in order to better use the materials and work in English.

## Objectives and Contextualisation

This subject aims to make students aware of the possible ways to improve the quality of animal products from farm. In particular, the subject will examine the impact of factors such as nutrition, management, genetics and animal welfare on the nutritional, technological and organoleptic quality of different products.

Students will be also introduced to different strategies and production systems, aimed to obtain specific products to meet consumer demands, such as food with functional properties or food obtained by traditional production systems, ecological and/or respectful to animal welfare.

Finally, how to obtain safe products for the consumer will be another objective of the Master. Control of the raw materials used in animal feed, good hygiene practices at farm level, as well as different strategies that allow traceability from origin, will be considered.

## Learning Outcomes

1. CA01 (Competence) To apply innovative strategies at farm level with a view to improving the sustainability of the production process, as well as the food safety of animal products.
2. CA02 (Competence) To design innovation and research projects for food companies and the livestock sector, research centres and government entities in charge of supervising food quality.
3. KA01 (Knowledge) To link the effects of food, handling and genetics to animal wellbeing and the quality of animal products.
4. KA02 (Knowledge) To compare the main production systems linked to obtaining animal products with varying quality labels.
5. KA03 (Knowledge) To identify the various animal identification and traceability systems for ensuring consumer safety.
6. KA04 (Knowledge) To develop animal production strategies that promote sustainability and contribute to the SDGs, including environment footprint reduction, animal wellbeing and food safety.
7. SA01 (Skill) To develop a roadmap for increasing the efficiency and sustainability of livestock production.
8. SA02 (Skill) To apply the scientific method to investigate problems that affect animal production farms (e.g. climate change) and establish effective strategies for mitigating their impact.

## Content

INTRODUCTION to the SUBJECT (1 h)

Objectives, activities, calendar, evaluation.

UNIT I. Improving the quality by improving farm management, animal genetic and nutrition.

### *Theory*

1. INTRODUCTION to the UNIT (1h)

From quantity to quality.

## 2. MILK

### 2.1. *How milk is produced in the mammary gland (1h)*

Internal structure of the udder. Hormonal control of lactation. Milk synthesis.

### 2.2. *Physiological factors that affect the quantity and quality of milk (1h)*

Lactation phase. Delivery number. Gestation and drying. Prolonged lactations.

### 2.3. *Non-physiological factors that affect the quantity and quality of milk. (1h)*

Milking routine and frequency. Environmental factors: photoperiod, impact of thermal stress (heat and cold).

### 2.4. *Variation in milk quality (III): Nutrition. (2 h)*

Forage : concentrated ratio. Effects of different foods on milk quality. Corrective actions

## 3. MEAT

### 3.1. *Meat quality traits of interest in animal production. (1 h)*

Meat pH and water-holding capacity of lean. Color. Chemical composition of lean. Intramuscular fat. Tenderness, juiciness and flavor.

### 3.2. *Carcass and meat quality genomics. (1 h)*

Genomics of the malignant hyperthermia syndrome in pigs. Genomics of the muscular hypertrophy and the calpain/calpastatin system in beef cattle. The "callypige" gene in sheep.

### 3.3. *Meat quality modification through animal nutrition. (2 h)*

Fetal programming and skeletal muscle structure. Color. Palatability. Chemical composition. Fatty acid content.

### 3.4. *Livestock handling and transport can affect carcasses and meat quality. (2 h)* Handling in the farm. Handling during transport. Handling at slaughterhouse.

## 4. EGGS

### 4.1. *Update of egg quality concepts and consumer preferences. (1h)*

Egg quality parameters. Guidelines for producers and grading stations. Trends and current European consumer preferences relative to egg and egg products.

### 4.2. *Egg quality through the formation process. (1h)*

Key points of the egg formation process and the impact on egg quality aspects, in particular shell and internal egg defects.

### 4.3. *Factors affecting egg quality. (2h)*

Modification of external and internal shell-egg quality according to different factors: Genetics and selected strains. Housing system and management on the farm. Nutritional and feeding factors . Handling, transport and storage post-farm. Repercussion on egg products.

## 5. FARMED FISH

### 5.1. *Implication of muscle growth and development on fish flesh quality. (1 h)*

Structure and nutritional composition of fish muscle. Biological bases for fish growth and development.

### 5.2. *Nutritional and feeding factors on flesh quality. (2 h)*

Diet composition and feeding regime. Salmon pigmentation and fillet quality.

5.3. Effect of management and killing methods on fish flesh quality. (1 h)

Potential effect of pre-slaughter fasting, handling and transport. Slaughter methods. Ethical consideration.

### **Labs, Seminars, and visits**

- *Lab Sessions (2 h + 2 h).*

Evaluation of different quality parameters of animal products obtained from different breeding systems. Analysis of the effects of management, nutrition or genetics.

- *Case studies (8 h seminars).*

The students will work on teams to solve practical cases on the analysis and design of breeding programs addressed to improve quality in a particular animal product.

- *Visits.*

Visits to farms /retail room/processing plant.

UNIT II. Animal products with defined quality properties

### **Theory**

6. TRADITIONAL MEDITERRANEAN ANIMAL PRODUCTION SYSTEMS (MAPS) AND GEOGRAPHICAL INDICATIONS. (3 h)

Commercialization of animal products. Different schemes for geographical indications (protected designation of origin (PDO), protected geographical indication (PGI)), different breeds or species, production system, feeding practices... Practical examples for a variety of PDO or PGI products (lamb meats, beef, birds, rabbits, milk, cheese, fish.. etc).

7. ORGANIC PRODUCTION SYSTEMS.(4 h)

From traditional to intensive production and from intensive to organic production. Basic principles of organic production. Organic vs conventional production.

Organic livestock systems. Organic aquaculture. Current status of organic livestock and fish farming. Some examples.

8. GAME PRODUCTS. (1 h)

Game species (wild boar, deer, roe deer, fallow deer, chamois, ibex, mouflon, etc..). Small game species (hare, rabbit, duck, quail, partridge, thrush, pheasant, etc..). Game production systems (private hunting, social preserves, wildlife refuges, game reserves, hunting grounds, etc..).

9. ANIMAL-WELFARE FRIENDLY PRODUCTS

9.1. *Concept of animal welfare (2h)*

How consumers perceive it and how consumer perception relates to the scientific definition of animal welfare.

9.2. *Examples of animal welfare friendly products in pig and poultry production (2h)*

From scientific assessment of welfare to market opportunities (2 h)

10. FUNCTIONAL FOODS

10.1. *CLA-enriched milk. (1h)*

How to get naturally enriched milk throughout feeding strategies.

10.2. *Milk bioactive peptides. (1 h)*

Occurrence and physiological effects of bioactive peptides in milk.

10.3. *Feeding strategies to modify lipid composition of eggs and poultry. (2h)* PUFA, w-3 and w-6 Enrichment .  
Antioxidant fortified eggs.

### **Seminars and Visits**

- *Case studies (8h seminars).*

The students will work on teams to solve practical cases on the definition of a new PDO, GPI products or alternatively applying the basic principles of organic production to a conventional farm. As well as the possible obtaining a functional animal food.

UNIT III. Consumer product safety

### **Theory**

11.- INTRODUCTION to the UNIT III

*Cost and Benefit in Food Safety (1h)*

12. ANIMAL FEED CONTROL.

12.1 *Introduction (1h) GMOs in the EU and in the world (1h)*

12.2 *Residues in food and antimicrobial resistance (1h)*

12.3 *Biological risks associated to feed: Mycotoxins. (1h)*

12.4 *Control plan for Salmonella in the EU. (1h)*

12.5 *The use of industrial by-products intended for animal feed. (1h)*

12.6 *GMOs in the EU and in the world (1h)*

13. QUALITY and SAFETY CONTROL in ANIMAL PRODUCTION

13.1. *Production, self-control and traceability of forages and raw materials. (1h)*

13.2. *Basics in any good hygiene practice in animal farm. (2h)*

13.3. *Hazard Analysis and Critical Control Points (HACCP) in the feed manufacturing industry. (2h)*

13.4. *HACCP programs in Food Industry (2h)*

14. IDENTIFICATION AND TRACEABILITY PROCESSES

14.1. *Animal identification. (1 h)*

ICAR recommendations for animal identification. Traditional identification systems (natural and artificial markers, rattle them). Electronic identification (ISO standards, types of transponders).

14.2. *Implementation of traceability. (1 h)*

Elements of a traceability scheme. Analysis of critical and control points (HACCP). Costs of implementing an identification and traceability systems

### 14.3 Traceability of products of animal origin. (1 h)

Milk traceability and letter Q system. Traceability of honey, eggs, meat and fish.

#### **Labs, Seminars, and visits**

- *Practical's (2 h).*

In field application of different electronic identification systems of livestock.

- *Case studies (8 h seminars).*

The students will work on teams to apply the different principles of quality control at different stages of the food chain (feed mills, dairy farms, slaughter house..etc)

- *Visits (3 h).*

Visit to a Feed Mill.

### **Activities and Methodology**

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Complementary activities (external visits)	9	0.36	CA01, KA01, KA02, SA01
Lab Sessions	6	0.24	CA01, KA01, KA03
Participative Master Class	53	2.12	CA01, KA01, KA02, KA03, SA01, SA02
Seminars for Case Studies	24	0.96	CA01, CA02, KA01, KA02, KA03, KA04, SA01, SA02
Type: Supervised			
Solving Case Studies	60	2.4	CA01, CA02, KA01, KA02, KA03, KA04, SA01, SA02
Solving exercises	24	0.96	KA01, KA04, SA01
Tutorials	9	0.36	CA02, SA02
Type: Autonomous			
Personal Study	190	7.6	CA01, CA02, KA01, KA02, KA03, KA04, SA01, SA02

The centre of the learning process is student's work. Students learn by working, it's the teacher's mission to help them in this task. (1) Providing them with information or showing them sources where they can get it and (2) guiding them so that the learning process can be performed effectively. Following this ideas, and according to the objectives of this module, the development of this course is based on the next methodology and activities.

#### 1. Working methods based on participative lectures.

The student acquires the expertise of the course by attending lectures and complementing it with self- study of the topics explained. The lectures are intended as an essentially one-way method of transmission of knowledge from teacher to student although student participation will be also encouraged during the lecturers.

## 2. Methods Oriented to Discussion and/ or to Team work.

It's intended that through team or group work the student adopts an active role in the learning process. Cooperative learning increases student's motivation, it strengthens attitudes of involvement and initiative, improves the level of understanding, the degree of dominance of concepts and procedures and makes a positive social relationship.

Different group work activities are included in this module.

### 2.1 Case studies.

### 2.2 Classroom practices.

### 2.3 Laboratory practices

### 2.4 Seminars

### 2.5 Lecture / oral presentation of work.

### 2.6 Participation in complementary activities (visits).

## 3. Autonomous work

Autonomous work is mainly a student-centred methodology, although teachers have also a significant role on this process. The aim is to help students develop skills to set learning objectives, choose between different ways of learning, set their own pace, plan and organize their work, discover and solve problems, make decisions and evaluate their own progress. Independent learning promotes various transversal competences and becomes an indispensable teaching method.

Within this course different autonomous work activities arise.

### 3.1 Writing reports.

### 3.2 Problem solving.

### 3.3 Self- study.

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
Attendance and active implication in classes.	5	0	0	SA02
Attendance to Lab Sessions	15	0	0	CA01, KA01, KA04
Attendance to complementary activities (external visits)	10	0	0	CA01, KA01, KA02, SA01
Tutorials	10	0	0	CA01, CA02, KA01, KA02, KA03, SA02

Writing reports and public defence of Case Studies Unit I.	20	0	0	CA01, CA02, KA01, KA04, SA01, SA02
Writing reports and public defence of Case Studies Unit II.	20	0	0	CA01, KA02, SA01, SA02
Writing reports and public defence of Case Studies Unit III.	20	0	0	CA01, CA02, KA03, KA04, SA01, SA02

In order to assess student's progress, different activities and assessment methodologies are established:

Attendance and active participation in class (5%):

Active attendance in classes will be assessed by the teacher. Optionally teachers can provide some questionnaires in order to encourage participation.

Attendance at tutorials (10%):

During tutorials teachers will evaluate the abilities for independent work of each student.

Attendance at Complementary Activities (10%):

During the visits, they may raise small exercises or questionnaires that must be completed by students and, along with participation in the activity will be evaluated.

Accomplishment of practices (5% each practice x 3 practices, 15% total):

Some exercises that will also be evaluated may be established during practices.

Delivery reports and oral defence of Case Studies (20% each Teaching Units x 3 units, 60%):

Case studies are required to be solved in group and presented at seminars. They will see different case studies for the different Units (I, II and III). The submitted report, presentation and public defence in seminars and teamwork facility, will be taken into account.

This module does not have the single assessment option.

## Bibliography

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Accessible from the UAB using the following link:

<https://www.cabi.org/cabebooks/search?topics=9d893a58-b1ce-4e46-af28-c2980d916b92&types=23&sort=Date>

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Veterinary treatment of sheep and goats. Editor(s): Duncanson, G. R. 2012 CABI (H ISBN 9781780640037)

Alternative systems for poultry: health, welfare and productivity. Editor(s): Sandilands, V. Hocking, P. 2012 CABI (H ISBN 9781845938246)

Goat meat production and quality. Editor(s): Mahgoub, O. Kadim, I. Webb, E. 2012 CABI (H ISBN 9781845938499)



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Animal Feed Contamination: Effects on Livestock and Food Safety. Editor: Johanna Fink-Gremmels. 2012 Cambridge, UK Woodhead Publishing Limited.

Meat science: an introductory text. Author(s): Warriss, P. D. 1999 CABI (H ISBN 9780851994246)

#### Other books

Animal welfare at slaughter. Editors: Velarde, A., Raj, M., & Grandin, T. (2016). 5m Books Ltd. (available in the library of the faculty).

Instituto Nacional de Denominaciones de origen. 1996. Denominaciones de origen y específicas de productos agroalimentarios. Tomo I: de origen animal. ISBN: 84-491-0257-X. (Disponible en la tienda virtual del Ministerio de Agricultura, Alimentación y Medio ambiente).

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## Software

No specific softwares are used.

## Language list

Information on the teaching languages can be checked on the CONTENTS section of the guide.

PROVISIONAL