Quality Control and Management Tools for the Agri-Food Industry

Code: 43034
ECTS Credits: 12

2024/2025

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

The requirements to take this module are the generic regulations for this Master. In addition, we will need to have pass the previous modules.

Basic knowledge of unit change calculations and calibration curves

Objectives and Contextualisation

The objective of the module is to provide students with the necessary tools to evaluate and manage the quality of food.Based on this, the contents of this module will develop three aspects

- The principles of experimental design and data analysis, in order to obtain representative results and correct conclusions about the quality parameters as well as the principles of communication, oral and written of the results.

- The application of methods of analysis for determining the quality indicators, physical, chemical, instrumental, sensory and microbiological, paying particular attention to the most innovative methods of analysis that allow quick results.

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- The utility systems of quality management internationally accepted (ISO, IFS, BRC, etc.), as the tools to ensure both the overall quality and food safety, the effective operation of processes and facilities involved throughout the food chain.

Learning Outcomes

1. CA04 (Competence) To apply tools that ensure both the overall quality and safety of food, as well as the proper functioning of the processes and facilities involved throughout the supply chain.
2. CA05 (Competence) To set up an experimental design and analyse data to assess and manage food quality.
3. KA10 (Knowledge) To describe the basis, potential applications and limitations of the quality assessment systems.
4. KA11 (Knowledge) To identify and judge compliance with the established requirements for each quality system item.
5. SA12 (Skill) To draft a duly designed and structured performance report appropriate to each type of analysis.
6. SA13 (Skill) To know how to design a sampling programme and select the most appropriate standard of quality for each purpose.
7. SA14 (Skill) To apply the most appropriate analytical and management methods for the needs of a product or process.
8. SA15 (Skill) To create a plan and schedule for implementing a quality system and complete all required documentation and records.

Content

The contents of this module are distributed in the following thematic blocks:

Methods of experimental design, data analysis and results presentation:

This block will work on the principles of experimental design and data analysis, in order to obtain representative results and correct conclusions about the quality parameters evaluated, as well as the principles of oral and written communication, of the results. This aspect is done through two different subjects:

- Statistical analysis: the main procedures of statistical data analysis will be explained using the "R" program.
- Scientific communication: procedures for the results presentation (technical reports and scientific papers).

Quality indicator methods:

In this block, we will work with the main analytical procedures for assessing food quality indicators, paying special attention to the most innovative methods, designed to obtain fast and reliable results. The contents will be taught in theoretical and practical sessions, in addition to the individual work based on practical cases. The unit contents will be included in the following thematic blocks:

- Instrumental Analysis: Sampling. Chromatographic techniques, capillary electrophoresis, NIR, DSC, etc. Applications to the Food Chain and validation of techniques.
- Methods for evaluating the characteristics of colloidal foods: application of assessment methodologies of the functional properties of food, rheology and texture.
- Sensory analysis: basic and emerging methodologies.
- Fast and automated methods for the microbiological examination of food and hygienic evaluation of the food processes in the industry. Application of immunological methods to detect food hazards.
- Application of molecular genetic techniques in the food chain: amplification systems and DNA sequencing. Bioinformatic procedures of the data analysis. Applications in detecting GMOs, allergens and food biological contaminants. Authentication procedures and traceability.

The quality management statments:

In this module a review is carried out on the different standards of quality and food safety in relation to the food sector. Among other aspects, we review the evolution of certification standards over time, delving into the certification schemes recognized by the GFSI. An in-depth review is made of the requirements of the IFS FOOD, BRCGS FOOD SAFETY and FSSC22000 food safety schemes, all of which are recognized by the GFSI. Within this approach to the certification standards, work is done on the categorization of non-compliances, the fundamental requirements (BRCGS) and the K.O. (IFS) and the relevance of being able to carry out its correct implementation. It also addresses the legal requirements that refer to food safety aspects for the certification standards. Likewise, aspects related to the execution of the audit are addressed to reach and learn about specific tools for its execution.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical sessions	24	0.96	CA04, CA05, SA12, SA13, SA14, CA04
Seminars	11	0.44	SA12, SA13, SA14, SA12
Theory	58	2.32	CA04, CA05, KA10, KA11, SA12, SA13, SA14, SA15, CA04
Type: Autonomous			
Accomplishment of work and resolution of practical, individual and group cases	207	8.28	CA04, CA05, SA12, SA13, SA14, SA15, CA04

The module will be developed in 93 hours of theoretical sessions (lectures, seminars) and practices (laboratory and computer classroom).Different self-learning activities (individual or collective) will also be proposed, which will include resolution of practical cases, with a workload for the student of approximately 207 h.

- Statistical analysis: 14 h of theory and 3 h to present and discuss the statistical design of the master's experimental work
- Scientific communication: 3 h of theoretical classes
- Instrumental analysis: 5 hours of theory classes, 7 hours of practical sessions and 2 hours of seminars to discuss the results

- Methods for evaluating the characteristics of colloidal foods: 5 hours of theory, 4 hours of practices and 2 hours of seminars for the discussion of the work.
- Sensory analysis: 6 hours of theory and 2 hours of seminar
- Microbiological analysis in the food industry: 2 hours of theory, 13 hours of practices and 2 hours of seminars to discuss the results
- Genomics: 4 hours of theory
- Quality management standards: 16 h of theory

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 participation in class	5-10%	0	0	CA04, CA05, KA10, KA11, SA13, SA15
Delivery of reports	40-59%	0	0	CA04, CA05, KA10, KA11, SA12, SA13, SA14, SA15
Internships	1-5%	0	0	CA04, CA05, SA13, SA14
Resolution of exercises	15-20%	0	0	CA05, SA13, SA14
Theoretical tests	20-25%	0	0	KA10, KA11, SA15

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.The final mark of the module will be obtained after weighting the partial notes of each block according to their relative weight in the module. In other words, the final grade will be calculated from the Statistical Analysis grade (18.5%) + Scientific Communication grade (3%) + Instrumental Analysis grade (15.25%) + College Systems grade loidals (12%) + Sensory Analysis grade (9%) + Microbiological Analysis grade (18.5%) + Genomics grade (4.25%) + Quality Standards grade (19.5%) To pass the module you also need a minimum average grade of 5 out of 10.

This module does not include the single assessment system

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International Organization for Standardization (ISO) http://www.iso.org/iso/home.htm

European Food Safety Authority (EFSA) http://www.efsa.europa.eu/

International Organization of Vine and Wine (IUVV) http://www.oiv.int/oiv/cms/index?lang=en AOCS (American Oil Chemists Society) https://www.aocs.org/

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BRC GS Food Safety v8, BRC GLOBAL STANDARDS AUGUST 2018

IFS FOOD v7 October 2020 IFS

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https://www.ifs-certification.com/index.php/es/
https://www.brcgs.com/
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http://www.fao.org/fao-who-codexalimentarius/es/

Software

R Commander

Language list

Name	Group	Language	Semester	Turn
(PLABm) Practical laboratories (master)	1	Spanish	second semester	afternoon

(SEMm) Seminars (master)	1	Spanish	second semester	afternoon
(TEm) Theory (master)	1	Spanish	second semester	afternoon