

Course Unit	Analysis and Control of Biological Hazards		Field of study	Biology and Biochemistry	
Master in	Food Quality and Safety		School	School of Agriculture	
Academic Year	2022/2023	Year of study	1	Level	2-1
Type	Semestral	Semester	1	ECTS credits	6.0
Code	6369-508-1101-00-22				
Workload (hours)	162	Contact hours	T 30	TP -	PL 30
			TC -	S -	E -
			OT 4	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Maria Letícia Miranda Fernandes Estevinho

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Learn about the microbial ecology of food as well as on the interactions of microorganisms with each other and the environment.
2. Evaluate the importance of microbial food-borne diseases.
3. Know the practical application of predictive microbiology in the industry and exploit its potential.
4. Characterise the disease-causing microorganisms or transmitted through food poisoning.
5. Know the Portuguese and European legislation regulating the microbiological quality of food.
6. Relate principles and criteria of the microbiological quality of public health.
7. Know the rules of work and rigorous analytical in a food microbiology laboratory, interpret test results and evaluate the microbiological quality of food.

Prerequisites

Before the course unit the learner is expected to be able to:
Not applicable.

Course contents

Theoric content: Food and water contamination. Quality control and hygiene, entities involved. Predictive microbiology. Microbiological criteria. Portuguese and European legislation, HACCP. Certification and accreditation of laboratories. GMOs. Labeling, traceability and avoidable presence of GMO. Practical Contents Practices of biosafety in laboratories. Collection and preparation of samples. Methods of analysis. Implementation of legislation. GMOs' control and analysis. Study visits.

Course contents (extended version)

1. Theoric contents Origin of microorganisms in food
 - Food Microorganisms
 - Food processing evolution
 - Contamination in storage and transportation
2. Multiplication of microorganisms
 - Extrinsic factors
 - Intrinsic factors
3. Food toxoinfections
 - Importance in industry, economy and public health
4. Microbiological hazards
 - Microbiological control of water and animal products Plant origin products control
5. Predictive microbiology
 - Modeling of the evolution of the microbial load
6. Standards of microbiological quality of food
 - Portuguese and European legislation
7. Accreditation of Laboratory of Microbiology
8. Control of development in microbial food.
 - Chemical methods
 - Physical methods
9. GMOs
 - Aproved genetically modified food and organisms.
 - Labelling, rastreability and presence of GMOs.
 - GMOs' control and analysis.
 - Authorities and legislation.

Recommended reading

1. Ray, B. and Bhunia, A. (2014). Fundamental Food Microbiology, 6th edition, CRC Press.
2. Doyle, M. and Buchanan, R. (2013). Food Microbiology: Fundamentals and Frontiers, 4th edition, ASM Press.
3. Jay, J. M. (2006). Modern Food Microbiology, 7th edition, Springer.
4. Forsythe, S. J. (2010). The Microbiology of Safe Food, 2nd edition, Wiley-Blackwell.
5. Farber, J. , Crichton, J. , Snyder, O. P. (2014). Food Microbiology and Food Safety - Practical Approaches, 1st edition, Springer.

Teaching and learning methods

Lectures - Oral presentation methodologies using TIC (Technologies of Information and Communication). Study-cases and problem-based approaches with invited speakers. Practices - Practical work with short-reports; visits to industrial manufacturers and laboratories; presentation and discussion of monographs. Performances assessed by both coursework and examinations.

Assessment methods

1. Regular students - (Regular) (Final, Supplementary, Special)
 - Final Written Exam - 50% (minimum 9.5 marks)
 - Development Topics - 25%
 - Intermediate Written Test - 25% (minimum 9.5 marks)
2. Student Worker - (Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 50% (teorical contents, minimum 9.5)
 - Final Written Exam - 50% (pratical contents, minimum 9.5)

Language of instruction

Portuguese

Electronic validation

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08-12-2022	09-12-2022	14-12-2022	15-12-2022