



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2023/2024		
MASTER'S DEGREE (MSC)	FIRM AND QUALITY FOR THE AGRICULTURAL AND FOOD SYSTEM		
INTEGRATED COURSE	MICROBIAL CONTAMINANTS OF FOOD - INTEGRATED COURSE		
CODE	21242		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	AGR/16, AGR/12		
HEAD PROFESSOR(S)	MOSCHETTI GIANCARLO	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	MOSCHETTI GIANCARLO	Professore Ordinario	Univ. di PALERMO
	TORTA LIVIO	Ricercatore	Univ. di PALERMO
CREDITS	9		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>MOSCHETTI GIANCARLO</p> <p>Monday 11:00 13:00 Palermo, Via delle Scienze, Edificio 5 primo piano Studio Prof. Giancarlo Moschetti</p> <p>Tuesday 11:00 12:00 Palermo, Via delle Scienze, Edificio 5 primo piano Studio Prof. Giancarlo Moschetti</p> <p>TORTA LIVIO</p> <p>Tuesday 11:00 13:00 Ed. 5, Patologia vegetale, 1° piano, P1 - 37</p> <p>Wednesday 15:00 17:00 Ed. 5, Patologia vegetale, 1° piano, P1 - 37</p> <p>Thursday 15:00 17:00 Ed. 5, Patologia vegetale, 1° piano, P1 - 37</p>		

DOCENTE: Prof. GIANCARLO MOSCHETTI

PREREQUISITES	The student must have basic knowledge of general and food microbiology
LEARNING OUTCOMES	<p>- Knowledge and ability to understand. Acquisition of advanced tools for food microbiological understanding and evaluation. Ability to use the specific technical language. - Ability to apply knowledge and understanding. Ability to assess the needs of the microbial communities of agricultural and food environments. - Making judgements. To be able to evaluate the implications and results of the microbiological studies performed. In the light of the knowledge acquired, to interpret the determining factors in the microbial ecosystems. To be able to act specifically to prevent or limit the imbalances or the irreversible changes in the relationships between the microbial populations of a given food and to limit the development of spoilage and/or pathogenic microorganisms in foods. - Communication abilities. Ability to expose the mechanisms of microbial interactions to laboratory technicians, and the results of the analysis also to a non-expert public. To be able to apply a suitable synthetic and technical language to communicate problems and to suggest useful solutions. - Learning skills. To acquire the ability to identify the biological aspects relevant for the food sector and to suggest intervention solutions with modern techniques and methodologies through continuous updates and scientific consultations.</p>
ASSESSMENT METHODS	<p>The oral exam is finalised to verify the disciplinary skills and knowledge included in the syllabus; the assessment is expressed into thirty out of thirty. The minimum number of questions is three and aims to verify the gained knowledge, the elaboration abilities, as well as the possess of an adequate speaking ability. The threshold for sufficiency (18/30) will be gained when the student shows knowledge and understanding of topics, at least in their guidelines, and has minimum levels of applied skills concerning the solution of specific case studies; he should be in possess of talking abilities and of a correct use of language for the specificity of the course. Below this threshold the exam will be assessed as insufficient. The more the student shows argumentative and talking capacities, besides knowledge going into details of the discipline, the more his assessment will be positive till the grade of excellence (30/30 cum laude)</p>
TEACHING METHODS	The course includes 40 hours of lecture and 20 hours of laboratory sessions

**MODULE
MICROBIOLOGICAL CONTROL OF FOOD**

Prof. GIANCARLO MOSCHETTI

SUGGESTED BIBLIOGRAPHY

Farris G.A., Gobetti M., Neviani E., Vincenzini M. (2012). Microbiologia dei prodotti alimentari. Casa Editrice Ambrosiana
Appunti e paper forniti durante il corso

AMBIT	50549-Discipline della fertilità e conservazione del suolo
INDIVIDUAL STUDY (Hrs)	90
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims to provide detailed knowledge on microorganisms associated to foods through the study of the microbiological processes of raw materials transformation. It will provide the basis of microbial growth during the fermentation of several foods of animal and vegetable origins. The course will provide detailed knowledge on the effect of thermal treatment to destroy microbial cells during food production as well as the role of HACCP to improve quality and safety of foods. The activity based on the exercises sessions will focus on the methods to perform the inoculum of starter strains into raw material as well as on the analysis of amount of reagents to be used during microbiological analysis. The course, through laboratory sessions, aims to provide the student manual skills necessary for the microbiological analyses of raw materials and final products. The approach applied will include classical culture tools as well as genotypic techniques.

SYLLABUS

Hrs	Frontal teaching
2	Course description, examination methods, history of food microbiology, cenni di microbiologia generale
3	Environmental factors affecting the growth of microorganisms: activity water; pH; temperature; oxygen; pressure; radiations.
5	Methods for the control of microorganisms; the rate of microbial death.
3	Main features of selected bacterial strains with technological characteristics associated to food
3	Main features of spoilage and pathogen bacterial strains associated to food productions.
6	Microbiology and biotechnology to control wine productions.
6	Main wine alterations of microbiological origin
3	Microbiology of dairy foods: main alterations or potential pathogens
3	Microbiology of meat and biotechnology on fermented cured meats.
3	Biotechnology on fermented table olives.
3	Biotechnology on fermented bakery products: "sourdoughs".
4	The most important pathogens in foods.
Hrs	Workshops
6	Classical microbiological analysis of raw materials (fermented table olives, milk, minced meat).
4	Microbiological analysis of potential spoilage and pathogen microorganisms associated to food safety.
4	Isolation of yeast and lactic acid bacteria.
2	use of molecular biology techniques for the detection of pathogenic bacteria in food

**MODULE
MYCOTIC CONTAMINATION OF FOOD**

Prof. LIVIO TORTA

SUGGESTED BIBLIOGRAPHY

Materiale didattico fornito durante il corso.

AMBIT	21005-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims to provide the general principles on food contamination by fungal organisms and by their secondary metabolites, as well as on the rational strategies for the management of the same contamination. The laboratory activity is directed to observe the main macro/microscopic features of the most common fungal taxa contaminating food, to assess the contamination levels and to isolate the contaminants fungal colonies.

SYLLABUS

Hrs	Frontal teaching
1	The food contamination: abiotic and biotic agents
1	Microbial contaminants and risks for the consumers
2	Fungi and food contamination: yeast and moulds
8	Taxonomy, morphology, ecology and toxicology of the major fungal Taxa contaminating food: Alternaria, Aspergillus, Claviceps purpurea, Fusarium, Penicillium
1	Well-known cases of food fungal contamination and damage to consumer health
2	Mycotoxins: general characteristics, ecological role, biochemical pathways
1	Main legislative aspects of food fungal contamination
2	Food fungal contaminants preventive techniques
2	Detoxifying treatments in food contaminated by fungi and/or mycotoxins
Hrs	Workshops
6	Macro and microscopic observations on the major fungal Taxa contaminating food: Aspergillus, Fusarium, Penicillium
2	Isolation techniques of fungal microorganisms from contaminated food
2	Observations on the ecology and on the toxicology of the most common fungal taxa contaminating food; setting of a mycoteque