

COURSE OF STUDY *Innovation Development in Agrifood Systems (LM-69)*
ACADEMIC YEAR 2023-2024

ACADEMIC SUBJECT *Biotechnologies for shelf life improvement*

General information	
Year of the course	<i>Second</i>
Academic calendar (starting and ending date)	<i>First semester (October 16th, 2023 – January 26th, 2024)</i>
Credits (CFU/ETCS):	3
SSD	<i>Agricultural microbiology (AGR/16)</i>
Language	<i>English</i>
Mode of attendance	<i>No Compulsory</i>

Professor/ Lecturer	
Name and Surname	<i>Fabio Minervini</i>
E-mail	<i>fabio.minervini@uniba.it</i>
Telephone	<i>+39 0805442946</i>
Department and address	<i>DIP. DISSPA – Università degli Studi di Bari</i>
Virtual room	<i>Microsoft Teams: n0x80lu</i>
Office Hours (and modalities: e.g., by appointment, on line, etc.)	<i>Monday-Friday 8.00-18.00, only by appointment</i>

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
75	16	14	45
CFU/ETCS			
3	2	1	

Learning Objectives	To provide competencies about novel technologies, based on microorganisms or natural compounds, for increasing shelf-life of food.
Course prerequisites	Prerequisites: basic knowledge in microbiology

Teaching strategie	Lectures will be presented through PC assisted tools (Powerpoint) and slide projector. Projection of educational videos is also included as supplementary teaching method. Powerpoint presentations, in pdf format, will be shared with students through the Microsoft TEAMS platform.
Expected learning outcomes in terms of	
Knowledge and understanding on:	<ul style="list-style-type: none"> • Knowledge about protective microbial cultures and natural antimicrobial compounds • Knowledge about applications of protective cultures and natural antimicrobials for increasing shelf-life of food
Applying knowledge and understanding on:	<ul style="list-style-type: none"> • Applying novel technologies based on protective cultures and/or natural antimicrobial compounds to increase shelf-life of perishable food
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices about</i>

	<ul style="list-style-type: none"> ○ Innovation in managing food losses ● <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ Ability to transfer to food industries technologies, based on protective cultures and/or natural antimicrobials, to increase shelf-life of perishable food ○ Ability to popularize her/his knowledge to policy makers ● <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Ability to increase personal knowledge about application of protective cultures and natural antimicrobials to improve food shelf-life
Syllabus	
Content knowledge	<ul style="list-style-type: none"> ● Protective microbial cultures (0.5 ECTS, lectures). ● Natural antimicrobials from animal and vegetable sources (0.5 ECTS, lectures). ● Food wastes and by-products as valuable sources of antimicrobial compounds (0.5 ECTS, lectures). ● Applicative features of protective cultures and natural antimicrobials (0.5 ECTS, lectures). ● Case-studies about use of protective cultures and/or natural antimicrobials for prolonging shelf-life of dairy and meat products, cereal-based foods, and fresh cut vegetables (1 ECTS, “hands on” classes).
Texts and readings	<ul style="list-style-type: none"> ● Charis Galanakis. Food Quality and Shelf Life. Academic Press, 2019. ● Persis Subramaniam, Peter Wareing. The Stability and Shelf-life of Food – 2nd edition. Woodhead Publishing, 2016 ● Cocolin L., Gobetti M., Neviani E. Microbiologia alimentare applicata. Casa Editrice Ambrosiana, 2022.
Notes, additional materials	
Repository	All teaching material will be available to students on web platforms (class Teams code <i>n0x80lu</i>).

Assessment	
Assessment methods	<p>The exam consists of an oral dissertation on the topics developed during the lectures and “hands-on” classes.</p> <p>Students attending at the lectures may have a middle-term preliminary exam, consisting of a written test, relative to the first part of the program, which will concur to the final evaluation and will be considered valid for one year.</p>
Assessment criteria	<ul style="list-style-type: none"> ● <i>Knowledge and understanding</i> <ul style="list-style-type: none"> ○ Mechanisms of action of protective microbial cultures and natural antimicrobial compounds. Sources of antimicrobials ○ Application of protective cultures and natural antimicrobials to increase shelf-life of fresh dairy and meat products, cereal-based foods and fresh cut vegetables ● <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ Applying technologies, based on protective cultures and/or natural antimicrobial compounds, to increase food shelf-life ● <i>Autonomy of judgment</i> <ul style="list-style-type: none"> ○ The student can make informed judgments and choices about novel technologies for increasing shelf-life of food. ● <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ The student can communicate technologies, based on protective cultures and/or natural antimicrobial compounds, that increase shelf-life of food to industries and policy makers. ● <i>Communication skills</i>

	<ul style="list-style-type: none"> ○ The student can communicate her/his knowledge using an appropriate and simple lexicon, which may be understood by academicians, personnel managing food industries and policy makers. • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ The student can autonomously increase her/his personal knowledge about application of protective cultures and natural antimicrobial compounds to increase shelf-life of food. In addition, she/he can usefully blend the knowledges learned during the course in “Biotechnologies for shelf life improvement” with the knowledges from other courses.
Final exam and grading criteria	The method of assessment is detailed in the Academic Regulations for the Master of Science Degree in Innovation Development in Agrifood Systems (article 9).
Further information	