

General information	
Academic subject	Food biotechnology
Degree course	Master Degree: Biotechnologies applied to food quality and safety
Academic Year	2021-2022
European Credit Transfer and Accumulation System (ECTS)	6
Language	Italian
Academic calendar (starting and ending date)	
Attendance	No compulsory attendance

Professor/ Lecturer	
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Department and address	Dipartimento di Scienze del Suolo, della Pianta e degli Alimenti, via Amendola 165/a, 70126 Bari (ITALY)
Virtual headquarters	
Tutoring (time and day)	From Monday to Friday (8:00 am – 6:00 pm) only by appointment

Syllabus	
Learning Objectives	The student will acquire in-depth knowledge about biotechnological approaches aimed to improve quality of animal- and vegetable-derived food products.
Course prerequisites	Knowledge of microbiology applied to food processing
Contents	<ol style="list-style-type: none"> 1. Applicative biotechnological features of carbohydrates and amino acids metabolism in lactic acid bacteria and yeasts 2. Biotechnological potential of proteolytic and peptidolytic enzymes of lactic acid bacteria 3. Dynamics and stability of sourdough microbial communities 4. Use of microbial cytoplasmic extracts in sourdough-based bread-making 5. Biotechnological approaches for improving nutritional and sensory traits of leavened baked goods 6. Microbial-based biotechnologies for reducing the concentration of biogenic amines in fermented food and beverages 7. Biotechnology-based strategies for increasing shelf-life of perishable foods 8. Activity mechanisms and selection pathway of probiotic microorganisms used in foods 9. Laboratory techniques applied in food biotechnologies
Books and bibliography	<ul style="list-style-type: none"> • ICMSF. Microorganisms in foods 6 – Microbial Ecology of Food Commodities. 2.a ed. New York: Kluwer Academic/Plenum Publishers. 2005.

	<ul style="list-style-type: none"> • <i>Gobbetti, M., Gänzle M. Handbook on Sourdough Biotechnology. Springer. 2013.</i> • <i>McSweeney, P.L.H. Cheese problems solved. CRC Press – Woodhead Publishing Limited. 2007.</i>
Additional materials	<i>The above-mentioned books may be eventually consulted, in order to complete the information individually noted down by each single student during lectures and “hands on” classes. In addition, during the course, the professor will provide students with presentations (in pdf) projected during the classes, as well as with scientific articles about themes treated during the classes.</i>

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
150	40	12	98
ECTS			
6	5	1	
Teaching strategy			
<i>Lectures will be presented through Powerpoint slides. Powerpoint presentations, in pdf format, will be shared with students through a mailing list and/or will be available on a dedicated virtual class (created in Microsoft Teams). “Hands-on” classes will consist in experiences in laboratory, but, if needed, educational videos will be projected as supplementary teaching method.</i>			
Expected learning outcomes			
Knowledge and understanding on:	<ul style="list-style-type: none"> ○ In-depth knowledge about characterization and selection of microbial strains used for processing food with novel features. 		
Applying knowledge and understanding on:	<ul style="list-style-type: none"> ○ Applying the most appropriate knowledges to solve emerging issues and producing novel food commodities, by means of food biotechnologies; ○ To elaborate novel biotechnological approaches applied to above-mentioned fields. 		
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices about</i> <ul style="list-style-type: none"> ○ Ability to focus on the main features of novel issues in the field of pro-technological microorganisms applied to food biotechnologies and to solve those issues using either advanced knowledge acquired during study or novel solutions. ○ Ability to evaluate autonomously complex experimental data related to biotechnological applications of microorganisms to food sector and to decipher correctly the related results. • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ Ability to use properly oral and written tools of communication, in 		

	<p>both Italian and English language, even during events of presentation and divulgation of experimental data and themes of food biotechnologies.</p> <ul style="list-style-type: none"> • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Ability to learn and deepen knowledge about application of pro-technological microorganisms to food biotechnologies, through scientific articles and books and participation in seminars and congresses.
Assessment and feedback	
<p>Methods of assessment</p>	<p><i>The exam consists of an oral dissertation on the topics developed during the lectures and “hands-on” classes.</i></p> <p><i>Non-Italian students may be examined in English language, according to the aforesaid procedures.</i></p> <p><i>Students attending at the lectures may have a middle-term preliminary exam, relative to the first part of the program.</i></p>
<p>Evaluation criteria</p>	<ul style="list-style-type: none"> • <i>Knowledge and understanding</i> <ul style="list-style-type: none"> ○ General characteristics, metabolic traits, roles and applications of microorganisms in food biotechnologies • <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ To understand aims, experimental designs and methods of the research studies where microorganisms are used to provide novel food items (or food with novel characteristics) and/or to solve issues arising for particular food items or food supply chains • <i>Autonomy of judgment</i> <ul style="list-style-type: none"> ○ The student can autonomously interpretate the results of studies within the field of food biotechnologies, with microorganisms playing pivotal roles. • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ The student can communicate her/his knowledges using a simple and appropriate language, if needed also in English language. • <i>Communication skills</i> <ul style="list-style-type: none"> ○ The student can communicate her/his knowledge using a simple lexicon, which may be understood by academicians and personnel working in the “research and development” sector of companies that process food or produce food ingredients/additives/processing aids. • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ The student can autonomously increase her/his personal knowledge about application of microorganisms in the field of food biotechnologies, through the use of scientific articles and books and the participation in seminars or thematic meetings. In addition, she/he can usefully blend the knowledges learned during the course in “Food Biotechnologies” with the knowledges from other courses.



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DIPARTIMENTO DI
SCIENZE DEL SUOLO,
DELLA PIANTA E DEGLI
ALIMENTI – DI.S.S.P.A

Criteria for assessment and attribution of the final mark	<i>The method of assessment is detailed in the Academic Regulations for the Master of Science Degree in Innovation Development in Agrifood Systems (article 6).</i>
Additional information	