Syllabus

Course Description

Course Title	Fermentations as tools for making traditional and innovative foods and beverages
Course Code	44701
Course Title Additional	
Scientific-Disciplinary Sector	AGRI-08/A
Language	English
Degree Course	Master in Food Sciences for Innovation and Authenticity
Other Degree Courses (Loaned)	
Lecturers	Prof. Marco Gobbetti, Marco.Gobbetti@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/32209 Prof. Andrea Polo, Andrea.Polo@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/36646
Teaching Assistant	
Semester	First semester
Course Year/s	1st
CP	8
Teaching Hours	48
Lab Hours	32
Individual Study Hours	120
Planned Office Hours	24
Contents Summary	physiology, biochemistry and taxonomy of lactic acid bacteria and yeasts; dairy fermentations (fermented milks and cheeses); sourdough fermentation; vegetable and fruit fermentations; novel paradigms for driving lactic fermentations; alcoholic and malolactic fermentations; fermented functional foods; and biotics family.

Course Topics	Physiology, biochemistry and taxonomy of lactic acid bacteria and yeasts, with particular reference to the carbohydrate and nitrogen metabolisms, synthesis of EPS and antimicrobial; bacterial growth curve; how to carry out dairy fermentations with particular reference to yogurt; cheese making; sourdough fermentation for bread making and celiac disease; vegetable and fruit fermentations; novel paradigms for driving lactic fermentations, how to move from starter-assisted fermentation to the novel concept of fermentome; alcoholic and malolactic fermentations; how to prepare fermented functional foods and examples of some cases of study; biotics family including probiotics, prebiotics, synbiotics and post-biotics.
Keywords	Fermentation, lactic acid bacteria, yogurt, cheese, sourdough, functional foods and biotics.
Recommended Prerequisites	Knowledge of biochemistry and biology of microorganisms
Propaedeutic Courses	None
Teaching Format	Interactive mode with several case of studies. All lecture are recorded and all slides are available for students since the first day of lecture
Mandatory Attendance	No
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding: Deep understanding of the technological, microbiological, biochemical, chemical, and physical principles underlying food transformation processes and responsible for food product degradation, ensuring their stability and prolonging their shelf life. These knowledge areas will be developed through an educational program that integrates theoretical teaching activities with practical activities, such as laboratory exercises, computer simulations, simulations of food processes using pilot plants, and company visits. Ability to apply knowledge and understanding: Ability to manage the technological, microbiological, biochemical, chemical, and physical processes that drive food transformation and the main issues related to the stability and shelf life of food products. Ability to plan and develop analytical techniques, innovative products, and processes using a multidisciplinary approach, with

	particular attention to local food productions. Making judgements: Independent judgement is developed through a training programme designed to stimulate critical analysis in students. This includes the use of case studies, simulations using spreadsheets and videos, the reading and critical discussion of scientific articles, as well as specialist seminars held by experts in the food sector. The assessment of the independent judgement acquired by students is entrusted to the individual teachers responsible for the training activities, who will assess it through oral and/or written reports on specific topics and/or through exams. Communication skills: Use of the English language, both written and spoken, at a B2 level, with a command of technical and scientific vocabulary related to food science. Structure and draft scientific and technical documentation describing project activities. Interact and collaborate in the design and development of products and processes with peers and industry experts. Learning skills: The degree course provides graduates with the cognitive skills, logical tools and familiarity with new information technologies necessary to ensure continuous updating of knowledge, both in their specific professional field and in the field of scientific research.
Specific Educational Objectives and Learning Outcomes (additional info.)	The students should reach a certain degree of autonomy to carry out fermentation at laboratory and industrial levels.
Assessment	Oral exam, including one question on laboratory practice
Evaluation Criteria	Conventional
Required Readings	Lecture notes
Supplementary Readings	Handbook of Sourdough Biotechnology (Springer); The Cheese of Italy: Science and Technology
Further Information	None

Sustainable Development Goals (SDGs)	Quality education