Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Microbial fermentations in gastronomy and methods of recovery of agro-food by-products
Course code	40417
Scientific sector	AGR/16
Degree	Bachelor in Enogastronomy in Mountain Areas
Semester	1st
Year	2024/2025
Credits	9
Modular	No

Total lecturing hours	54
Total lab hours	36
Attendance	Not compulsory, but strongly recommended
Course page	https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/bachelor-enogastronomy-mountain-areas/

Specific educational objectives	• *Type of course: caratterizzante* • *Scientific area: Food microbiology and food fermentation* • *The course is part of a curriculum within the study programme.* The course is designed for acquiring professional skills and knowledge in the field of food fermentations including the precision fermentation and biotechnology. It aims to provide knowledges on the role of microbial fermentation in the production of the main typical fermented foods and how tailored fermentations can give distinctive features and flavors. Moreover, the course provides the basic concepts on the exploitation agro-food by-products through biotechnological processes including the fermentation and use of food-grade enzymes. It is divided into three parts, one related to precision fermentation and typical fermented foods, the second related to enzyme biotechnology and the other related to case studies. Educational objectives (a) provide an adequate knowledge and critical approach to develop projects related to the exploitation of agro-food by products taking into account biotechnologies currently applied; (b) provide an adequate knowledge on precision fermentation to develop distinctive flavor traits for fermented foods,.

Lecturer	Dr. Olga Nikoloudaki Noitech Park A2.2.9 Olga.Nikoloudaki@unibz.it
Scientific sector of the lecturer	AGR/16
Teaching language	English
Office hours	From Monday to Friday as indicated in the timetable
Teaching assistant *(if any)*	*Francis Aheto/ Okur Hatice Hazal*
Office hours	From Monday to Friday as indicated in the timetable
List of topics covered	Series of lectures involve: Introduction to fermentation and examples of traditional foods in gastronomy; Introduction, history and applications of precision fermentation; Ethical constrains and regulation; Challenges and opportunities for future fermented foods; Laboratory activity involves: Application of fermentation to produce fermented beverage.
Teaching format	*The course involves frontal lectures and lab activities*

Lecturer	Dr. Ali Zein Alabiden Tlais Noitech Park A2.2.9 alizeinalabiden.tlais@unibz.it
Scientific sector of the lecturer	AGR/16
Teaching language	English
Office hours	From Monday to Friday as indicated in the timetable
Teaching assistant (if any)	*Francis Aheto/ Okur Hatice Hazal*
Office hours	From Monday to Friday as indicated in the timetable
List of topics covered	Series of lectures involve: Introduction to enzymes in food processing; Mechanisms of enzyme action in nutrient bioavailability; Enzyme-assisted fermentation for enhancing flavors and bioactive compounds with gastronomic benefits; Optimization of microbial enzymes in food biotechnology. Laboratory activity involves: Effect of enzymatic digestion on food sugars (food-grade enzymes and HPLC); Testing enzymatic activities of microbial starters; Plant-based fermentation applications
Teaching format	*The module involves frontal lectures and lab activities*

Lecturer	Raffaella Di Cagno Noitech Park A2.2.9 raffaella.dicagno@unibz.it
Scientific sector of the lecturer	AGR/16
Teaching language	English
Office hours	From Monday to Friday as indicated in the timetable

Teaching assistant (if any)	*Francis Aheto/ Okur Hatice Hazal*
Office hours	
List of topics covered	Series of lectures involve: Case studies on methods to recover agro-food by-products and further use for making food and beverages; Case studies on use of fermentation in gastronomy; Industrial application. Laboratory activity involves: external visit, practical exercise dealing with the case studies and use of fermentation to exploit agro-food by products
Teaching format	*Frontal lectures, exercises, labs, projects, etc.*

Learning outcomes	***Knowledge and understanding*** *of fermentation and precision fermentation of traditional foods in gastronomy.* ***Applying knowledge and understanding*** *capability to access information effectively, empowering individuals to adeptly navigate and apply the principles of fermentation and precision fermentation by the use of agro by-products* ***Making judgments*** *through the practical and theoretical knowledge achieved during the course, to transform the acquired knowledge applicable to further domains of food science e.g., from gastronomic point of view.* ***Communication skills*** *to present knowledge with a language pertinent to this specific field.* ***Learning skills*** *to effectively navigate the fundamental concepts of food fermentations and development of foods with gastronomic value.*

Assessment	*Student preparation is evaluated through an oral examination and power point presentation encompassing three components: (i) the presentation of a scientific work by the students, focusing on course topics that could also be extended to other domains of food; (ii) inquiries aimed at assessing their knowledge and understanding of the course material; (iii) questions designed to evaluate their capacity to apply acquired skills to real-world case studies.*
Assessment language	*English*
Evaluation criteria and criteria for awarding marks	*Criteria for evaluation include the clarity of responses, appropriateness of vocabulary, ability to synthesize information, relevance of addressed topics, and capacity for elaboration.*

Required readings	Prasath, C. S., Sivadas, C. A., Chandran, C. H., & Suchithra, T. V. (2024). Precision fermentation of sustainable products in the food industry.

	In *Entrepreneurship with microorganisms* (pp. 163-177). Academic Press. Terefe, N. S. (2022). Recent developments in fermentation technology: toward the next revolution in food production. Food engineering innovations across the food supply chain, 89-106.
Supplementary readings	