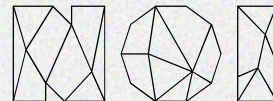


INTERNATIONAL  
CONFERENCE  
ON FERMENTED  
FOODS



TECHPARK SÜDTIROL / ALTO ADIGE

27-30TH  
OF OCTOBER  
2025

BOOK OF  
ABSTRACTS

# Developing microbial consortia to produce new plant-based fermented foods as alternative of traditional animal-base products.

[1] **Irene Nicolini**  
 [1] Alessia Levante  
 [2] Federica Barbieri  
 [2] Martina Filippini  
 [2] Fausto Gardini  
 [1] Monica Gatti  
 [2] Giulia Tabanelli

● In recent years, the growing awareness regarding environmental and health impacts of animal-based products has led to an increasing demand for new plant-based foods. Fermentation can become a key process to produce this kind of foods: by using selected microbial consortia is possible to obtain new products with enhanced sensory, nutritional and safety characteristics.

In this project over 300 microbial isolates of food origin from University of Parma Culture Collection (UPCCO) and University of Bologna Collection were screened by genotypic techniques and characterized for their safety (antibiotic resistances and biogenic amine production). As a result, 30 lactic acid bacteria (LAB) strains and 15 staphylococci strains were selected for food application. Metabolic profiles of these 45 strains were tested using BiologGEN III microplates to assess their ability to utilize 71 different carbon sources, and to establish potential metabolic complementarity among bacteria. Integrating genotypic and phenotypic analysis, guided the development of microbial consortia, composed of two LAB strains and one *Staphylococcus*, for fermenting plant-based substrates, especially nuts and beans. Single LAB strains were screened for pH reduction capability on the substrate, and binary LAB combinations improved flavor formation and acidification. Addition of *Staphylococcus* enhanced volatile compound production. Best consortia, evaluated based on growth capability on substrates and flavor, were further optimized under various fermentation conditions (salt addition, time, temperature). The final products were analyzed using liquid and gas chromatography to assess the volatile compounds and metabolites produced during the fermentation.

This study highlights how selected consortia can improve the production of alternative plant-based foods through the fermentation process, addressing sustainability issues that nowadays increasingly concern the food sector.

This project was financed by the European Union - NextGenerationEU through the Italian Ministry of University and Research under PNRR - Mission 4 Component 2, Investment 1.1 "miCrObial Consortia for New plant-based fermented prodUcTs- COCONUT" (project code MUR P2022SPCRW - CUP J53D23018570001)

[1] Department of Food and Drug, University of Parma, 43121 Parma, Italy

[2] Department of Agricultural and Food Sciences, University of Bologna, Italy