

Giulia Bisson

Profile

I am a dedicated Ph.D. candidate in Food and Human Health at the University of Udine, Italy, with an expected proclamation date in March/April 2024. My expertise lies at the intersection of food microbiology, human nutrition, and food technology. I am very motivated to give my contribution to the world of food technology, microbiology, and nutrition to advance scientific knowledge and improve human health. I am passionate about fermented foods and beverages, and I produce my own sauerkraut, kombucha and water kefir at home.

Education

November 2020 – November 2023

Ph.D. candidate in Food and Human Health at the University of Udine (Italy). Dissertation title: “Microbial exopolysaccharides as Postbiotics for the development of new functional foods”. Thesis submitted on 30th November 2023, currently under review

Supervisor: Dr. Marilena Marino

January 2023 – May 2023

Visiting Ph.D. student at the Food Biosciences Department, Teagasc Food Research Centre, Moorepark, Co. Cork (Ireland)

Supervisors Prof. Paul Cotter, Dr. Harsh Mathur

December 2019

Master's degree (110/110 *cum laude*) in Food Science and Technology at the University of Udine (Italy)

Supervisors: Prof. Lara Manzocco, Prof. Sonia Calligaris

April 2017

Bachelor's degree (102/110) in Food Science and Technology at the University of Udine (Italy)

Supervisor: Dr. Marilena Marino

Work experiences

October 2020 – October 2022

Tutor/demonstrator for the support during online lessons at the University of Udine (Italy)

February 2020 – July 2020

Postgraduate internship in the Food Microbiology laboratory at the University of Udine (Italy). Project “Assessment of the antimicrobial activity of plastic surfaces”

February 2019 – November 2019

Master's degree internship in the Food Technology laboratory at the University of Udine (Italy). Project “Impact of moderate intensity pulsed electric fields on vegetable proteins”

April 2017 – October 2017

Food quality controller at “Latteria Perenzin S.R.L.” in Conegliano (Italy)

December 2016 – April 2017

Bachelor's degree internship in the Food Microbiology laboratory at the University of Udine (Italy). Project “testing a porphyrin for the photoinactivation of foodborne pathogens”

September – October 2012 and 2013

Laboratory technician for the chemical analysis of wine in “Enopiave s.r.l.”, Tezze di Piave (Italy)

Scientific competences

- General microbiology: experience with bacteria and yeasts. Isolation and identification
- Molecular biology: DNA and RNA extraction, Qubit, Nanodrop, PCR, gel electrophoresis, SDS-PAGE, library preparation for sequencing (Shotgun and 16S rRNA)
- Fermentation: colonic fermentation with MicroMatrix; batch fermentation with 1.5 L Applikon technology bioreactor
- Use of pilot plants (pulsed electric fields)
- Microscopy: light, Scanning Electron Microscopy (SEM)
- Chemistry: HPLC-SEC, FT-IR, NMR sample preparation and analysis, spectrophotometric analysis
- Physicochemical analysis of proteins: rheometer, Zeta-sizer, foaming properties, water and oil holding capacity, protein solubility, SDS-PAGE
- INFOGEST protocol applied both to dairy and non-dairy matrix
- Bioactivity assays on bioactive molecules: antimicrobial, antibiofilm, antioxidant, prebiotic and DNA protective effect
- Use of statistical programs (R, Statistica)

Research experiences

- November 2020-November 2023 **Ph.D. candidate in Food and Human Health**

Screening for exopolysaccharides-producing bacteria isolated from fermented foods, purification of exopolysaccharides, chemical characterization (NMR, FT-IR, SEM), and bioactivity assessment (antimicrobial activity, antibiofilm activity, prebiotic, antioxidant, DNA damage protective effect...). Supervisor: Dr. Marilena Marino

Department of Agricultural, Food, Environmental and Animal Science, University of Udine (Italy)

- January 2023-May 2023 **Visiting Ph.D. student**

The exopolysaccharides extracted in the initial phases of the Ph.D. project were added to a soy milk fermentate which was digested using the INFOGEST method and the effect on the gut microbiota was observed using an *ex vivo* model (MicroMatrix). Samples were collected for plate counts, DNA extraction and short-chain fatty acids analysis. DNA was extracted and libraries were prepared using an Illumina kit, then the samples were sent for Shotgun sequencing. Supervisors: Prof. Paul Cotter, Dr. Harsh Mathur

Food Biosciences Department, Teagasc Food Research Centre, Moorepark, Co. Cork (Ireland)

- February 2020-July 2020 (interruption from 12/03/2020 to 06/04/2020 due to COVID-19)
Postgraduate internship

The activity was carried out in collaboration with an industrial partner (Coveme S.p.A., Gorizia, Italy) and has the objective to test different non-porous plastic antimicrobial surfaces against two pathogenic (*Staphylococcus aureus* and *Escherichia coli*) by applying the ISO22196 test method. Supervisor: Dr. Marilena Marino

Department of Agricultural, Food, Environmental and Animal Science, University of Udine (Italy)

- February 2019-November 2019 **Internship project (Master's degree)**

The effect of moderate-intensity pulsed electric fields was studied on plant protein concentrates of pea, rice and gluten. The modification of both protein structure (abs at 280 nm, free sulfhydryl groups, FT-IR spectra) and functionality (solubility, water holding capacity, foamability) were studied. Supervisors: Prof. Lara Manzocco, Prof. Sonia Calligaris

Department of Agricultural, Food, Environmental and Animal Science, University of Udine (Italy)

- November 2016-February 2017 **Internship project (Bachelor's degree)**

A photosensitive molecule was tested for the photoinactivation of food-related bacteria (*Listeria monocytogenes*, *Escherichia coli*, *Staphylococcus aureus*, *Enterococcus faecium*). A LED lamp was used to activate the molecule and the viability of microbes was tested through the spot plate count method. Supervisor: Dr. Marilena Marino

Department of Agricultural, Food, Environmental and Animal Science, University of Udine (Italy)

Participation to research projects

- 2021-2022 “Il tempo della mela”, financed by Fondazione Friuli; working package 3.5. “Microbiota”. Scientific coordinator: Prof. Maria Cristina Nicoli

Collaboration with research groups

- July 2022-now: Department of Chemical Sciences, University of Naples Federico II (Italy). Head of the research group: Prof. Cristina De Castro
- September 2022-October 2022: Microbial polysaccharides group, Department of Life Sciences, University of Trieste (Italy). Head of the research group: Prof. Paola Cescutti

Publications in peer-reviewed journal

Bisson G., Maifreni M., Innocente N., Marino M. Application of pre-adaptation strategies to improve the growth of probiotic lactobacilli under food-relevant stressful conditions. *Food Funct.* (2023) 14:2128-2137. doi: 10.1039/D2FO03215E

Bisson G., Comuzzi C., Giordani E., Poletti D., Boaro M., Marino M. An exopolysaccharide from *Leuconostoc mesenteroides* showing interesting bioactivities versus foodborne microbial targets. *Carbohydr. Polym.* (2023) 301(Pt B):120363. doi: 10.1016/j.carbpol.2022.120363

Bisson G., Marino M., Poletti D., Innocente N., Maifreni M. Turbidimetric definition of growth limits in probiotic *Lactobacillus* strains from the perspective of an adaptation strategy. *J. Dairy Sci.* (2021) 104:12236-12248. doi: 10.3168/jds.2021-20888

Melchior S., Calligaris S., **Bisson G.**, Manzocco L. Understanding the impact of moderate-intensity pulsed electric fields (MIPEF) on structural and functional characteristics of pea, rice and gluten concentrates. *Food Bioprocess Technol.* (2020) 13:2145-55. <https://doi.org/10.1007/s11947-020-02554-2>

In progress manuscripts

Moretti A., Gover E., **Bisson G.**, Comuzzi C., Goi D., Marino M. Kinetic modeling and cost-effectiveness of *Salmonella enteritidis*, *Escherichia coli*, *Enterococcus* spp., and *Pseudomonas* spp. inactivation in wastewater by combined ultrasound-ozone Advanced Oxidation Processes (under review)

Bisson G., Melchior S., Comuzzi C., Andreatta F., Rondinella A., Zanolico M., Calligaris S., Marino M. Chemical and technological features, and bioactivities of a novel dextran from *Leuconostoc mesenteroides* (draft preparation)

Leuconostoc mesenteroides can produce a mixture of dextran and levan with interesting bioactivities (draft preparation)

Presentations to national and international conferences

Oral communications

Bisson G., Comuzzi C., Melchior S., Calligaris S., Zanoeco M., Andreatta F., Marino M. (2023). Chemical, technological and biological features of an exopolysaccharide from *Leuconostoc mesenteroides*. 8th EPNOE International Polysaccharides Conference, Graz, Austria. Oral communication (personally delivered)

Bisson G., Marino M. (2023). Microbial exopolysaccharides as postbiotics for the development of new functional foods. 27th Workshop on the Developments in the Italian Ph.D. research on Food Science Technology and Biotechnology, Portici, Italy. Oral communication (personally delivered)

Bisson G., Comuzzi C., Giordani E., Poletti D., Boaro M., Marino M. (2022). Identification and bioactivities of a novel EPS produced by *Leuconostoc mesenteroides*. Biennial meeting on microbial carbohydrates, Naples, Italy. Oral communication (personally delivered)

Poster contributions

Bisson G., Marino M. (2022). Microbial exopolysaccharides as postbiotics for the development of new functional foods: optimization of yields. 26th Workshop on the Developments in the Italian Ph.D. research on Food Science Technology and Biotechnology, Asti, Italy. Poster contribution

Bisson G., Marino M. (2021). Microbial exopolysaccharides as postbiotics for the development of new functional foods. 25th Virtual workshop on the developments in the Italian Ph.D. research on food science, technology and biotechnology, Palermo, Italy. Poster contribution

Supervision and teaching experiences

November 2020-November 2023: Supervision and thesis correlator of bachelor (13) and master (10) students in Food Science and Technology (L-26 and LM-70) at the Department of Agricultural, Food, Environmental and Animal Science, University of Udine (Italy).

Bachelor Students in Food Science and Technology (L-26):

- Sebastian Salvatore Taiman Mercado (2024-now): activities ongoing. Supervisor: Dr. Marilena Marino
- Andrea Bugari (2023-now): activities ongoing. Supervisors: Prof. Sonia Calligaris, Dr. Marilena Marino
- Michele Ermacora (2023-now): activities ongoing. Supervisors: Prof. Sonia Calligaris, Dr. Marilena Marino
- Fabio Zanitti (2023): thesis preparation. Supervisor: Dr. Marilena Marino
- Caterina Cappellari (2022-now): thesis preparation. Supervisor: Dr. Marilena Marino
- Daniele Pregnotato (2022): “Attività antiossidante di esopolisaccaridi microbici”. Supervisor: Dr. Marilena Marino
- Marco Dal Bò (2022): “Indagine sulle proprietà viscosanti di esopolisaccaridi microbici”. Supervisors: Prof. Sonia Calligaris, Dr. Marilena Marino
- Sara Angeli (2022): “Micotossine nelle produzioni alimentari”. Supervisor: Dr. Marilena Marino
- Nicola Bertacchini (2021): “Presenza di *Listeria monocytogenes* nel settore lattiero-caseario e possibili soluzioni”. Supervisor: Dr. Marilena Marino
- Elisa De Bastiani (2021): “Cinetiche di fermentazione di granuli di kefir in matrici alimentari”. Supervisor: Dr. Marilena Marino
- Silvia Bianco (2020): “Gli starter dello yogurt: two better than one?”. Supervisor: Dr. Marilena Marino
- Valentina Corà (2020): “Enterococchi negli alimenti: veri nemici o potenziali alleati?”. Supervisor: Dr. Marilena Marino
- Marta Gomiero (2020): “Utilizzi non convenzionali del siero di latte”. Supervisor: Dr. Marilena Marino

Master Students in Food Science and Technology (LM-70):

- Giulia Della Vecchia (2023-now): activities ongoing. Supervisor: Dr. Marilena Marino
- Ilaria Bellè (2022-2023): “Attività biologiche di un esopolisaccaride da *Leuconostoc mesenteroides*”. Supervisor: Dr. Marilena Marino
- Luca Dalle Carbonare (2022): “Effetto delle condizioni di fermentazione sulla produzione di esopolisaccaridi da parte di *Leuconostoc mesenteroides*”. Supervisor: Dr. Marilena Marino
- Sara Baldassi (2021-2022): “Effetto della mela sul microbiota intestinale”. Supervisor: Dr. Marilena Marino
- Michele Blasig (2021): “Messa a punto di nuovi alimenti probiotici a base di frutta”. Supervisors: Dr. Marilena Marino, Prof. Nadia Innocente
- Carlo Brescacin (2021): “Screening qualitativo e quantitativo di ceppi microbici produttori di esopolisaccaridi”. Supervisor: Dr. Marilena Marino
- Greta Gallai (2021): “Materiali antimicrobici e loro utilizzo nell’industria alimentare”. Supervisor: Dr. Marilena Marino
- Elisabetta Gover (2021): “Strategie per il recupero microbiologico di acque reflue”. Supervisors: Dr. Marilena Marino, Prof. Daniele Goi
- Elisa Momi (2021): “Progettazione di un possibile alimento funzionale per la prima infanzia”. Supervisor: Dr. Marilena Marino
- Cecilia Casalegno (2020): “Possibile messa a punto di caramelle probiotiche”. Supervisors: Dr. Marilena Marino, Prof. Sonia Calligaris

November 2020-November 2023: Exam member committee (AGR/16) for the subjects:

- “Microbiologia lattiero casearia” (bachelor’s degree)
- “Microrganismi probiotici e di alimenti funzionali” (master’s degree)
- “Controllo e gestione della qualità nella ristorazione collettiva” (bachelor’s degree)
- “Detergenza e sanificazione” (bachelor’s degree)

November 2020: Seminar held within the master’s degree study courses in Food Science and Technology (LM-70) at the University of Udine (Italy), Title: “*Paraprobiotics and postbiotics*” within the subject “Microrganismi probiotici e di alimenti funzionali”

Training

Courses provided by the University of Udine (Italy)

November-December 2023

June 2022

May 2022

September 2021

July 2021

March 2021

December 2020

- Training course in European planning
- Introduction to copyright
- Intellectual property management in collaborative projects
- Research and entrepreneurship: from idea to the start-up
- Exceptions to copyright in teaching and scientific research
- Open source: a general introduction to its economic value and the open source licenses
- Research funding opportunities: introduction to Horizon Europe
- Public speaking
- Industrial property: protection tools and strategies

Courses provided by other organizations

December 2020

- Optimize your bioprocess - from shaker to bioreactor (organized by “labroots” for Eppendorf, Inc.)

Memberships of scientific associations

- Member of the European Polysaccharide Network of Excellence association (EPNOE). Department of Chemical Engineering, KU Leuven, Celestijnenlaan 200F bus 2424, Leuven Chem&Tech -3rd Floor, Office: 03.113, B-3001 Leuven, Heverlee, Belgium (contact@epnoe.eu)

Grants & fellowships

November 2020 – November 2023

Ph.D. Scholarship in “Food and Human Health” at the University of Udine (Italy)

January 2023 – May 2023

Scholarship for European and extra-EU research mobility (Teagasc Food Research Centre, Moorepark, Co. Cork, Ireland)

Other relevant skills

- Excellent command of Office 365 (Word, Excel, PowerPoint)
- Good communication skills acquired during teaching and laboratory activities
- Scientific paper writing, conference oral and poster contributions preparation
- Knowledge transfer
- Language: ITALIAN mother tongue, ENGLISH excellent writing, comprehension, and communication skills

Udine, 8th January 2024