

Name and surname:	Dusan Mistic
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Institute/Department	Department of Functional Food Products Development
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UPWr Base of Knowledge - link	https://bazawiedzy.upwr.edu.pl/info/seam?id=UPWr6936ed45a3b457ab3851fbc2810ed55&affil=&lang=en
Researchgate:	https://www.researchgate.net/profile/Dusan-Mistic
Personal website / Working group website:	
Projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	1. Molecular and physiological response of foodborne pathogens to selected natural bioactive compounds and development of novel biodegradable polymers with antibacterial activity, Principal Investigator, NCN OPUS 18, 2020-2024. 2. Eureka project E!12689 SCIMPLANT (2019-2021)"Phyto-preparations- natural materials with supercritical extracts for controlled release of active components". Researcher 3. Eureka project E!9906 COMPLANT (2016-2017) "Comprehensive processing of plant extracts for high value added products" coordinator of microbiological investigations –antibacterial, antiviral, antimycotic and cytotoxic activity of plant extracts. Researcher
Do you plan to engage support of second supervisor or auxiliary supervisor?	YES
	Second supervisor (from other discipline, polish or international research unit)
Name and surname:	Igor Loncaric
Academic Degree	dr hab. (Dr. Sc.)
Faculty, Institute/Department	University of Veterinary Medicine, Vienna, Institute for Microbiology
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UPWr Base of Knowledge - link or most important publications from last 3 year (JCR) / patents from last 3 years (maximum 5):	https://vetdoc.vu-wien.ac.at/vetdoc/suche_person_publicationen?sprache_in=en&ansicht_in=&menue_id_in=102&id_in=3499&publikation_typ_id_in=&sortierung_in=kategorie
Researchgate:	
Personal website / Working group website:	https://vetdoc.vu-wien.ac.at/vetdoc/suche_person_praesentationen?sprache_in=en&menue_id_in=105&id_in=3499
Participation projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	1. MRSA in der Umwelt, 2017-2018, Researcher, Project participants :1) Game Conservancy Deutschland; 2) Forschungsinstitut für Wildtierkunde und Ökologie, Vetmed. Uni Wien;) Institut für Bakteriologie, Vetmed. Uni Wien
Research topic and funding	
1) PhD topic:	Mechanisms of antibacterial action of natural bioactive molecules (Xanthohumol, Carnosic acid, Usnic acid) against food borne pathogens.
2) Research discipline in Doctoral School	Nutrition and Food Technology
3) Short description of the research problem to be solved in the PhD:	The aim of the project is to accurately reveal the molecular and physiological mechanisms of reactions of foodborne pathogenic bacteria exposed to selected natural bioactive molecules (Xanthohumol, Usnic acid, Carnosic acid =NBMs) that can be used for food preservation in bactericidal concentrations. Moreover, in this project novel polymeric, biodegradable materials impregnated with selected NBMs (e.g. for food storage) will be developed and laboratory tested. The detailed objectives of the presented research proposal are as follows: 1. Identification and analysis of molecular and physiological mechanisms of actions of Xanthohumol, Usnic acid and Carnosic acid on foodborne bacterial pathogens, using combined conventional microbiological and molecular (transcriptomic analysis) approaches. 2. Revealing possibly novel genetic and physiological mechanisms of intrinsic insensitivity or resistance of foodborne pathogens to selected NBMs. 3. Identification and analysis of molecular and physiological basis of the influence of NBMs on biofilm formation and disruption. 4. Analysis of the influence of NBMs on bacterial spores development and germination. 5. Identification of the potential synergism amongst NBMs and their stability (activity) under altered physico-chemical conditions. 6. Development of novel biodegradable polymeric materials with antibacterial properties based on pure active NBMs and their mixtures. To study the mechanisms of antibacterial action in the presence of NBMs the following species will be used: (i) enterotoxin producing Staphylococcus aureus, (ii) Listeria monocytogenes, (iii) Bacillus cereus, (iv) Clostridium perfringens, (v) Salmonella Enteritidis, (vi) shiga-toxin producing Escherichia coli, (vi) Campylobacter jejuni.
4) Professional skills for PhD candidate (e.g. master program, specializations, softwares, language, analytical techniques):	The candidate should have a good knowledge of English because of the communication between the members of the international project team and because she/he is expected to actively participate in the preparation of manuscripts for international journals, monographs and conference papers. The candidate will be drawn deep into microbiology (all of conventional microbiological testing, maintenance of test cultures, testing antimicrobial activity of NBMs using all relevant methods, spore preparation and testing the effects of NBMs on their germination and sporulation, biofilm, synergism, biochemical and physiological tests, reading of results using all methods and devices including flow cytometer, FTIR, PCR. The student will be also involved in transcriptomic analysis of treated and untreated bacteria, reading and interpreting these results. Finally, the student will examine the microbiological properties of the impregnated polymer materials, UV-Vis and HPLC analyses in chemical characterization and release kinetics). The candidate must have completed a master's thesis in the field that covers work with any type of microorganism (bacteria, fungi, viruses, algae). The master thesis does not necessarily have to be microbiological, but it should contain any manipulations with microorganisms, ie candidate should have had experience with microorganisms and knows some basic techniques of working with them (inoculation on nutrient media, preparation of culture media, microscopy). It is desirable that the student has experience in working with HPLC. It is expected that the candidate knows how to work on a computer in softwares needed for science (excel, etc.).
5) Details of the project to support PhD research	
a) Project title:	Molecular and physiological response of foodborne pathogens to selected natural bioactive compounds and development of novel biodegradable polymers with antibacterial activity
b) Agreement number:	UMO-2019/35/B/NZ9/02774
c) Number of months in the project to support PhD (in months; starting from 1st of October 2021):	36
6) Project website:	