



Sylwia Różalska

ASSOCIATE PROFESSOR – UNIVERSITY OF LODZ · MEMBER OF THE POLISH NORMALIZATION COMMITTEE

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Currently held positions

Department of Industrial Microbiology and Biotechnology, Faculty of Biology and Environmental Protection

University of Lodz

ASSOCIATE PROFESSOR

Soil Biology section KT190

Polish Normalization Committee

MEMBER

Scientific profile and collaborations

My scientific interests focus on the biology, metabolism, and biotechnological potential of **entomopathogenic fungi**, particularly those belonging to the genera *Metarhizium*, *Beauveria*, *Cordyceps*, *Samsoniella*, *Akanthomyces* and *Hirsutella*. I explore their dual functionality as both bioinsecticides and plant growth-promoting organisms. A key focus of my research is the fungi's ability to degrade and biotransform environmental contaminants, including persistent organic pollutants (e.g. nonylphenol, atrazine, bisphenol A), pesticides, herbicides, and endocrine-disrupting chemicals such as estrogens and xenoestrogens. I am especially interested in the effect of these toxic compounds on fungal secondary metabolism, lipidome and proteome profiles, and oxidative stress responses.

Another key component of my work involves studying how entomopathogenic fungi interact with plants and the surrounding microbiome, especially in the presence of climate change-related stressors such as microplastics, salinity, and heavy metals. These investigations aim to identify mechanisms that support **sustainable agriculture**, including fungal-assisted phytoprotection and improved nutrient uptake. My research integrates multi-omic approaches—including metabolomics, lipidomics, and proteomics—to reveal biochemical pathways underlying fungal adaptation and environmental resilience.

I also contribute to the development of innovative biotechnological solutions, such as combined fungal-chemical systems for pest control, which has resulted in a national patent. Recent interdisciplinary projects have included the use of bacteria in the stabilization of microgreens quality and shelf-life, as well as investigations into their biodegradative potential in complex matrices such as wastewater or contaminated soils.

My research supports a holistic understanding of fungal roles in ecological balance, bioremediation, and the development of sustainable biotechnologies.

Selected publications

- 2020 **Entomopathogenic fungi: unconventional applications** [\[link\]](#)
- 2019 **4-n-nonylphenol degradation by the genus *Metarhizium* with cytochrome P450 involvement** [\[link\]](#)
- 2023 **Entomopathogenic fungi of the genus *Cordyceps* biotransform zearalenone - metabolomic and proteomic backgrounds** [\[link\]](#)

Research grants

Principal Investigator: 3 grants: NCN

Project Manager: 2 grants: NCN

Co-Investigator: 9 grants: NCN, MNiSW, European Commission, Ministry of Education and Science of the Kingdom of Spain

Obtained patents

1 patent given by Polish Patent Office

International research stays

Denmark, University of Copenhagen

Netherlands, University of Groningen

Switzerland, University of Bern