



ABSTRACT

Ecological and metabolic characteristics of yeasts associated with the silverfish *Lepisma saccharina*

Roksolana Vasylyshyn ^{1,2}, Maciej Wnuk ¹, Tomasz Szmatoła ³, Dominik Wojdyła ¹, Mariusz Worek ⁴, Paulina Stec ¹, Katarzyna Solarska-Ściuk ¹, Justyna Ruchala ^{*1}

¹Faculty of Biotechnology, University of Rzeszów, Rzeszów, Poland,

²Department of Molecular Genetics and Biotechnology, Institute of Cell Biology, National Academy of Sciences of Ukraine, Lviv, Ukraine,

³Department of Basic Sciences, University of Agriculture in Kraków, Kraków,

⁴Faculty of Medicine, University of Rzeszów, Rzeszów, Poland

Justyna Ruchala, email: jruchala@ur.edu.pl

Microbiomes associated with insects provide valuable systems for studying microbial adaptation to specialized ecological niches. Most available studies focus on insects feeding on simple sugars, whereas microorganisms associated with hosts exploiting polymer-rich substrates remain comparatively understudied. The silverfish *Lepisma saccharina*, a common indoor insect feeding on starch- and cellulose-containing materials, represents a suitable yet largely unexplored model for investigating such microbial communities.

The fungal community associated with *L. saccharina* was analysed using ITS amplicon sequencing and complemented by cultivation-based isolation of yeasts. Isolates were identified using MALDI-TOF mass spectrometry, and selected strains were further characterized through morphological observations and functional assays assessing stress tolerance, carbon source utilization, and fermentative activity under oxygen-limited conditions.

Sequencing revealed a fungal community of relatively low diversity dominated by Saccharomycetes, with *Candida* and *Nakaseomyces* species representing the most abundant taxa. Although taxonomically closely related, the isolated strains displayed pronounced differences in morphology, thermotolerance, halotolerance, and metabolic profiles. Several isolates were able to utilize a broad spectrum of carbon sources, including sugars associated with lignocellulosic biomass, and produced moderate amounts of ethanol during fermentation.

These results indicate that the yeast community associated with *L. saccharina* is shaped by both host-related factors and selective pressures typical of indoor environments, while maintaining substantial physiological diversity. Silverfish-associated yeasts therefore represent a promising system for studying microbial adaptation to polymer-rich substrates and may constitute a source of strains with interesting metabolic capabilities.

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