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AND PLANETARY HEALTH**



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Dr Ivica DIMKIĆ – University of Belgrade - Faculty of Biology, Serbia
Doc. dr Dušan KEKIĆ – University of Belgrade - Faculty of Medicine, Serbia

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INDUSTRIAL AND FOOD MICROBIAL BIOTECHNOLOGY

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HARNESSING *BACILLUS* SPP. FOR TARGETED BIOCONTROL OF *SCLEROTINIA SCLEROTIUM*

Magdalena Knežević¹, Marina Dervišević² and Aneta Buntić¹

¹ Institute of Soil Science, Belgrade

² Institute of Pesticides and Environmental Protection, Belgrade

contact: knez.magdalena@gmail.com

Sclerotinia sclerotiorum, a devastating fungal pathogen, poses significant challenges in managing diseases across various plant species, including economically significant crops worldwide. This plant-pathogenic fungus, distributed across temperate, tropical, and arid regions, causes severe crop damage, leading to substantial yield losses. Given the limitations of synthetic agents for its suppressing, attention has turned towards biological control methods, particularly the selection of beneficial microorganisms. Therefore, the aim of this research was to detect antagonistic effect of bacterial isolates against *S. sclerotiorum*. Seventeen bacterial isolates isolated from soil (PAM2.1 – PAM 2.17) were screened for their antagonistic activity against this plant pathogen *in vitro*, on PDA medium. Additionally, bacterial traits significant for the biocontrol, such as the production of siderophores, amylase and cellulases were assessed on appropriate solid media, while the presence of genes coding for antibiotics (fengycin, surfactin, iturin C, subtilin, and bacilyisin) was assessed

by PCR method. Further, for the most effective isolate the *amplification* of DNA sequence coding for 16S rRNA gene was done using P0/ P6 primer pair. For the identification, the obtained sequences were compared to those available in the National Center for Biotechnology Information (NCBI) database. Out of 17 tested bacterial isolates, only one (isolate PAM 2.2) showed antagonistic effect against *S. sclerotiorum*, with inhibition of mycelial growth of about 71%. The same isolate showed the ability to produce siderophores, amylase and cellulase (CMCase). Further, the presence of genes coding for surfactin, subtilin and *bacillomycin* was detected for the isolate PAM2.2. Based on the NCBI BLASTn analysis of the 16S rRNA gene sequence, isolate PAM2.2 was identified as *Bacillus* spp. This research highlights isolate PAM2.2 as a promising candidate for biological control against *S. sclerotiorum*, demonstrating significant antagonistic effects, production of relevant enzymes and antibiotics, thus offering a potential sustainable solution for disease management in agriculture.

KEYWORDS: *Sclerotinia sclerotiorum*; *Bacillus* spp.; antibiotic production; fungal inhibition; siderophore producers

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