

Screening and characterization of plant growth promoting rhizobacteria and their effect on rape growth

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Abstract:

Plant growth-promoting rhizobacteria are known as a beneficial free-living soil bacteria which can promote plant growth. The aim of this study was characterization of a new PGPR strains and their evaluation for co-inoculation on rape plant. Six isolates were characterized for production of plant growth-promoting traits. Based on the analysis of 16S rRNA, the strains were classified as *Stenotrophomonas rhizophila* B11, *Stenotrophomonas rhizophila* B12, *Pseudomonas grimontii* B14, *Sphingobacterium kitahiroshimense* B16, *Microbacterium oxydans* B17, and *Microbacterium oxydans* B19. All of studied strains had ability to produce IAA and salicylic acid, while the highest concentration of SA was produced by B14 strain (2.969 µg/ml). Among six isolates, five isolates metabolized ACC. The isolate B19 showed the highest ACC deaminase activity followed by B14 strain and B16 strain producing respectively 16837.8, 7675.3, and 5985.2 nmol α-ketobutyrate/mg protein/h. Studied rhizobacteria strains were further evaluated for production siderophores, fungal cell lytic enzymes and antifungal effect against phytopathogens. All of the six isolates produced chitinase, while the four strains B11, B12, B14 and B19 were found positive for protease production. The strains B14 and B19 that were able to produce siderophores had the best antifungal activity against *Botrytis cinerea*. Based on biochemical characterization, the three individual strains *P. grimontii* B14, *S. kitahiroshimense* B16, *M. oxydans* B19, and their consortium were tested for rape growth promotion. The results indicated that consortium (B14, B16 and B19) significantly promote rape growth increasing shoot length and leaf area.

Keywords: Plant growth, growth-promoting, rhizobacteria, soil bacteria



Biography:

Ms Joanna Świątczak is a doctoral student at Department of Environmental Microbiology and Biotechnology of Nicolaus Copernicus University in Toruń, Poland. Her doctoral thesis is about Plant Growth Promoting Rhizobacteria and their potential application in the Integrated Plant Protection. Joanna Świątczak is co-author of two publications in reputed journals. In addition, Ms Świątczak did many international internships during which she gained experience in the fields of microbiology and biochemistry.

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