Assessment of genetic and functional diversity of bacterial community in soils long-term contaminated with crude oil

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The aim of the study was to evaluate functional and structural diversity of bacteria in soils long term contaminated with crude oil and also to identify the main groups of bacteria that could be indicators of changes in the soil under the influence of pollution. The significant differences of bacterial community structure between soils were obtained. The soils taken directly from oil wells were characterized by different composition of bacteria. The next generation sequencing technique (V3-V4 16S rRNA) was accompanied with the community level physiological profiling (CLPP) method in order to better understand knowledge of both genetic and functional structure of soils collected under several oil wells. The highest activity of carbon utilization patterns were observed in soils taken directly from oil wells. Also the highest biodiversity indexes were observed in these soils. The Alphaproteobacteria, Betaproteobacteria, Gammaproteobacteria were strongly correlated with biological activity in soils taken directly from oil wells. Also some family of Alphaproteobacteria were dominant in soil taken directly from oil wells: Bradyrhizobiaceae, Rhizobiaceae, Rhodobacteraceae, Acetobacteraceae, Hyphomicrobiaceae and Sphingomonadaceae. The study clearly proved that the long term contamination of soil may change bacterial community structure and their metabolic activity and help to develop completely different group of bacteria.

Biography

Anna Gałązka, PhD is the Head of the Department of Agricultural Microbiology at IUNG (since 2013). She is specialized in the evaluation of microbial diversity of soils associated with agricultural practice and environmental protection (research in molecular biology; evaluation of genetic differentiation and identification of microorganisms and characterization of metabolic profile of bacteria and fungi). She is participating in international and several national projects in IUNG, coordinating research project on biological activity and determination of microbial diversity of soil. She was a Task Manager in aiming project, “Developing new system of tillage for sustainable agriculture” (2010-2013) – Determination of biological activity in soils and executor in projects: Evaluation of usefulness of Azospirillum spp. and Pseudomonas putida inoculum in increasing of phytoremediation; Risk and benefits of application of exogenous organic matter on soil. She was in training of "Genomic of Nitrogen-Fixation Organisms" in 2008, Ghent, Belgium and participated in numerous courses and trainings in the field of Molecular Biology and Microbiology. She works with NJF Nordic Association of Agricultural Scientists and she was a keynote speaker on seminar held at Vezaiciai, Lithuania and discussed on the topic “Application of soil biological and biochemical parameters as indicator of soil health and fertility as influenced by different agrotechnical practices”. She is a Member of Polish Microbiological Society since 2004 and author over 50 publications.

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