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Catabolic potential related to the aromatic pollutants biodegradation by fungal strains isolated from Antarctic soils

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Aromatic compounds including PAHs are one of the wide-spread pollutants in the environment. Exposure to PAHs increases health risk for people and other living organisms. They could be found in effluents from industrial operations, such as gas and coal tar conversion, wood manufacturing, burning fossil fuels, etc. Many phenolic compounds are considered to be hazardous pollutants. The US EPA has listed 16 PAHs as priority pollutants since they are known mutagens and carcinogens. Numerous investigations have been carried out by unconventional method on the basis of potential microbial abilities to degrade aromatics. The major part of the investigations has been carried out with bacterial strains. Some yeast and mould strains express a significant enzyme oxidizing capacity. This feature makes them a valuable research object for a future development of industrial-water cleaning technologies. Over the past 20 years, the biodegradation of the PAHs has been intensively investigated with the purpose to develop effective biotechnologies for the removal of aromatic compounds from wastewater and polluted soils in parallel with existing conventional physico-chemical purification methods. In presented study new isolated Antarctic fungal strains were examined for their ability to utilize phenol and phenolic derivatives, as well as naphthalene, anthracene and phenanthrene. The DNA-molecular analyses carried out showed the presence of nucleotide sequences typical for genes coding key enzymes for the catabolism of aromatic compounds. The values of phenol hydroxylase (EC1.14.13.7), and catechol 1,2-dioxygenase (EC1.13.11.1) activities were determined. The results obtained demonstrated the different capabilities of the studied strains to degrade various aromatic compounds.

Biography

Zlatka Alexieva has graduated in the specialty of Biochemistry and Microbiology from University of Sofia and has completed her PhD from Institute of Molecular biology, Ukrainian Academy of Sciences at 1985. She has specialized in molecular biology in University of Baltimore, for one year. Zlatka Alexieva is the head of Division of General Microbiology and Head of Dept. Microbial Genetics at the Institute of Microbiology, Bulgarian Academy of Sciences. The list of her publications consists of 110 scientific papers published in national and international journals and conference proceedings. The list of citations includes about 400 papers.

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