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Isolation and characterization of rhizospheric Streptomyces with plant growth promoting potential

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Plant growth promoting agents can promote growth and increase productivity of plants by exerting beneficial effects through various mechanisms. Streptomyces have been poorly explored specifically for their potential as plant growth promoting rhizobacteria. In this study, a total of 62 Streptomyces isolates were obtained from rhizospheric soils and identified based on their morphology, biochemical tests and 16S rRNA gene sequence analysis. The highest number of Streptomyces was isolated from Zea mays rhizosphere soil. Plant growth promoting characteristics were elucidated, 14 strains exhibited all the plant growth promoting attributes of phosphate solubilization, ammonia production, 1-aminocyclopropane-1-carboxylate (ACC) deaminase activity, indole-3- acetic (IAA) production and siderophore production. 12 isolates were able to produce siderophores, ACC deaminase and ammonia. Only 7 isolates were able to produce siderophores and solubilize phosphates at the same time. The result indicated that Streptomyces have potential in agricultural application as biofertilizer and this will be of tremendous value as chemical fertilizers are becoming expensive with adverse effect on the environment.

Biography

Mobolaji Felicia Adegboye has completed her MSc at Obafemi Awolowo University, Ile-ife Nigeria. She is a PhD student at North-West University, South Africa. Her research entails the Phylogenetics of Actinomycetes under the mentorship of Dr Babalola OO. Mobolaji has published couples of articles in peer review journals.

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Genotoxicity of hierarchical web of carbon micro-nano fibers

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Despite great interest in carbon based nanomaterials for environmental remediation and biological applications, there is a concern regarding their potential toxicity. The hierarchical web of carbon micro-nanofibers are relatively newer materials. They are prepared by growing carbon nanofibers (CNFs) on the substrate activated carbon microfibers (ACFs) by chemical vapor deposition (CVD) using benzene (C_6H_6) or acetylene (C_2H_2) as a carbon-source, and metals such as Ni, Cu, Fe, and Ag as the metal-catalyst. The metal nanoparticles on the tip of grown CNFs are removed by ultra-sonication in acidic medium. The prepared hierarchical structure (ACF/CNF) has been successfully applied in several environmental remediation applications, including removal of SO_2, NO_X and volatile organic compounds (VOCs) from air, and arsenic, fluoride from wastewater. Such materials have also been used for removing bacteria from water. In this study the in-vitro evaluation of the genotoxicity (cellular as well as molecular toxicity) of ACFs/CNFs on human lymphocytes was carried out. The cellular toxicity was ascertained by MTT assay, whereas the molecular toxicity test was carried out using the DNA profiling technique. The latter technique was used for ascertaining DNA damaging potential of the prepared materials. The cellular toxicity of a few common commercial adsorbents such as carbon nanotubes (CNTs), activated carbon (AC) and non-carbonaceous materials such as silica, alumina, zeolite was also tested for the comparison purpose. From the results, ACFs/CNFs were found to be less toxic than the other carbon based adsorbents. The present study reveals that CNFs are preferable to other commercial carbon-based nanomaterials and may be safely used for the aforesaid various environmental and biological applications.

Keywords: Activated carbon fibers, carbon nanofibers, cytotoxicty, lymphocytes.

Biography

Mohammad Ashfaq is working as a Project Scientist under the supervision of Prof. Nishith Verma at Center for Environmental Science and Engineering, Indian Institute of Technology Kanpur. He has published 3 papers in reputed international journals.

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