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Analysis of plant growth promoting and prominent phenolic compounds producing rhizobacteria in rice

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In this study, survey and collected rhizospheric soil samples was done from different regions of Indogangetic plains in U.P. (Gorakhpur, Lucknow, Kanpur, Varanasi, Meerut and Mau). Physiochemical properties of rhizospheric soil were determined for their pH (ranges 7.0-8.4), EC-value (ranges 1.3-1.9ds/m) and organic carbon in soil (ranges 0.500-0.750 to 0.750-1.00% by permagnate method). Isolation of rhizobacterial populations were made by the different inoculation techniques (soil plate and serial dilution) on various general and specific culture media (Nutient agar, Jenson agar, Pikovshaya agar, Burk,s medium, NFB medium, Malate Medium and YEMA medium). A total of 143 rhizobacterial isolates of from rhizospheric soil samples that were visually characterized for their different morphotypes. As the different morphotypes were tested for the HCN production, Siderophore production and Phosphate solubilization, in which some of the isolates showed significant results. Prominent plant growth promoting rhizobacteria showing qualitative characteristics, further their samples were prepared in methanol and ethyl acetate for the phenolic compounds analysis (Sinapic acid, Ferulic acid, Veratric acid, p-coumaric acid, Vanillic acid, Syringic acid, p-hydroxybenzoic acid, Cinnamic acid, Benzoic acid, o-coumaric acid, m-coumaric acid, Caffeic acid, Salicylic acid, Protocatechuic acid and Gentisic acid). Secondary metabolite profiling for the phenylpropanoids i.e phenolic compounds was done to characterize rhizobacteria for the biomolecules production using HPLC standards. Some isolates were identified as prominent phenolic compounds producers. Identification and quantification of these phenolic compounds in culture filtrates, cell pellets and or in soil by these bacteria through LC-MS conditions is underway. During plant microbe's interaction using phenolic compounds i.e. biomolecules as plant growth promotion by the defence system activation, plant pathogens suppression by production of inhibitory compounds and or symbiosis by the production of quorum sensing compounds in the ecosystem. Therefore, identification and quantification of phenolic compounds producing rhizobacteria may helpful to develop consortia for some metabolic interaction in rhizosphere that may influence plant growth and productivity.

Keywords: PGPR, Phenolic compounds, and Rice

Biography

Lalan Sharma has completed his Ph.D. from G.B. Pant University of Agriculture and Technology, Pantnagar in 2010 and worked on "Variability in Sarocladium oryzae and Management of sheath rot rice". Obtained Jawahar Lal Nehru Memorial Award for his Doctoral Studies and also qualified All India Level Competitions like ICAR-JRF, ICAR-SRF, and ICAR-NET. Qualified ARS and Joined as Scientist (Plant Pathology) at NBAIM in 2010. He has published 4 research papers, 7 popular articles, and 5 proceedings chapters. He has participated in National conferences and also guided 4 M.Sc students. Presently, he is focusing on developing strategies to manipulate root-associated bacteria by estimation of PGPR and their secondary metabolites i.e., phenolic compounds to improve soil health and crop productivity with eco-friendly safe.

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Nanotechnology in medicine and antibacterial effect of silver based compounds

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Nanotechnology is expected to open some new aspects to fight and prevent diseases using atomic scale tailoring of materials. Most of the natural processes also occur at the nanometer scale regime. Therefore, a combination of nanotechnology and biology can solve several biomedical problems, and can revolutionize the field of health and medicine. Nanotechnology is powerful tool which could provide support to the medical science in several aspects such as targeted drug delivery, gene delivery systems and artificial implant. Nanomaterials aid in the development of devices for the diagnosis purposes certain analytical tools and also play a vital role in the development of drug delivery system. Metallic nanomaterials having antibacterial properties are considered as best .The crystallographic surface structure and the large surface as compared to the volume ratio enhances the chemical activity of the nanomaterials. Priority for study is given to bactericidal nanomaterials because of the several new bacterial strains which are potent to the most of the antibiotics. Scientists are involved in the research of silver nanoparticles and silver based compounds because of they have found healthy chemical activity against gram negative bacteria than the gram positive bacteria.

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