

Diversity of phosphate solubilizing bacteria from proposed uranium mining site

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Radiological survey and exploration by Atomic Mineral Division (AMD), Hyderabad, has indicated the presence of rich uranium deposits in the Bhima river belt of Karnataka (Gogi, Shahapur Taluk, Yadagiri district). The radionuclides/metal enriched reserves are under-explored ecosystems in terms of microbial diversity. It is envisaged that, these ecosystems might harbor microbes possessing special characteristics namely, metal-resistance, phosphate solubilization, and radiation resistance, which may be of use in remediating metal contaminated sites. With this background information, the present study was aimed at isolating and characterizing culturable and phosphate solubilizing bacteria from Gogi region ($16^{\circ} 43' N$, $76^{\circ} 44' E$). Soil and tube well water samples were collected aseptically from these sites. These samples were analyzed in laboratory for pH, temperature, salinity, radionuclide activities namely K-40, Th-232 and Ra-226 and presence of phosphate solubilizing bacteria (PSB). For the isolation of PSBs, the samples were inoculated on Pikovskaya's agar and incubated for 10 days. Among 32 isolates obtained on this media, 15 isolates showed clear zone around the colonies with the Solubilization Index > 1 . These isolates were further assessed for their solubilization efficiency in Pikovskaya's broth containing 5 g/L tri-calcium phosphate for 3 days. The phosphate released by the isolates ranged from 200 mg/L to 800 mg/L with proportional decrease in pH of the media which was significantly higher compared to the uninoculated control. The decrease in pH can be attributed to the release of organic acids which play a role in solubilization of insoluble phosphate. Taxonomic identification by 16S rRNA sequencing and phylogenetic analysis revealed that the isolates belonged to eight genera namely Acinetobacter, Curtobacterium, Enterobacter, Leclercia, Pseudomonas, Pantoea, Staphylococcus and Serratia. This study opens scope for in-depth investigation of these natural isolates possessing important characteristics for environmental application.

Biography

Sowmya S has completed Masters degree in Biotechnology and is presently pursuing Ph.D. on the topic of bioremediation of uranium under the guidance of Dr. Arun A.B. in Yenepoya University, Mangalore, Karnataka.

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Synthesis, characterization and evaluation of non target eco toxic effect of nanocomposite

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Nanobiotechnology is a branch of biotechnology which deals with the study and application of biological and biochemical activities from elements of nature to fabricate new devices like biosensors. Increasing numbers of commercial products, from cosmetics to medicine incorporate manufactured nano materials (MNMs) that can be accidentally or incidentally released to the environment. Concern over the potentially harmful effects of such nanoparticles has stimulated the advent of nanotoxicology as a unique and significant research discipline. However, the majority of the published nanotoxicology articles have focused on mammalian cytotoxicity or impacts to animals and bacteria, and only a few studies have considered the toxicity of MNMs to plants. Developmental phytotoxicity of NMS is a critical knowledge gap because nanoparticles entering wastewater streams may predominantly be incorporated into sewage sludge and applied to agricultural fields. In the present study, silver chitosan and copper chitosan nanocomposite was synthesized adopting solution casting method and characterized by scanning electron microscopy, energy dispersive X ray spectroscopy and FTIR. Ecotoxic effect of thus synthesized Nanocomposite evaluated was studied against plant growth parameters of Vigna radiata (green gram) and Arachis hypogaea (ground nut), soil microbial population, soil enzyme activity. The respective nanocomposites didn't cause any significant effect on seedling emergence and plant growth parameters of the both the tested plants, soil enzyme activity.

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