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ISOLATION AND CHARACTERIZATION OF PHOSPHATE-SOLUBILIZING MICROORGANISMS WITH BIO CONTROL POTENTIAL FROM SALT-AFFECTED SOIL

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Saline soils are widely distributed across the world. The application of beneficial microorganisms is a novel technology to reduce salt stress and improve plant productivity. Phosphate-solubilizing microorganisms (PSM) are a group of plant growth-promoting rhizobacteria, which can dissolve insoluble phosphates and maintain the nutrient status of salt soil. To identify efficient PSM with multiple activities that promote the plants to grow in the saline soil, we conducted a survey of PSM naturally colonizing saline soil of the Yellow River, China. A total of 42 PSMs were isolated, the majority clustered together as *Bacillus* spp., one *Providencia rettgeri* sp. strain was confirmed as PSM for the first time. The capacity of dissolving inorganic phosphorus analysis was carried out by agar plate and liquid culture. Ten isolates classified as the best solubilizers with solubilization rates greater than 200 mg/L. In contrast, the PSM isolates were less effective when solubilizing ferric phosphate ($FePO_4$) or aluminum phosphate ($AlPO_4$). The organic acid types and content were tested by high performance liquid chromatography (HPLC) method. Eight different organic acids (oxalic acid, gluconic acid, lactic acid, succinic acid, formic acid, citric acid and malic acid and propionic acid) with different content were detected in the culture filtrates. Isolates were also checked for indole-3-acetic acid (IAA), siderophore and exopolysaccharide. All of the isolates could secrete IAA within the range 2.7~31.8 mg L/1 and exopolysaccharide within the range 74.3~225.7 mg L/1. There were 12 (28.6% of the total strains) siderophore-producing strains with the siderophore unit of 1.9~42.1%. This initial study on PSM isolates distributed in saline soil showed that some isolates show promise for potential use as bio-inoculants for promoting plant growth in saline environments.

Biography

Huanhuan Jiang is pursuing her PhD degree in Environmental Engineering at Harbin Industrial University and will complete her PhD in June 2018. Her research interests cover the theory and application of resources recovery from waste (water)/bio solids, organic wastes (excess sludge, waste biomass, etc.) cascade utilization to recover bio resources and/or bioenergy, soil restoration and soil fertility by Microbial e.g. She has participated in the project of China Agriculture Research System, The National Natural Science Foundation of China etc. At the period of her graduate study, her four papers were under review.

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