Agri-2014
OMICS Group Conferences
Accelerating Scientific Discovery
2nd International Conference on
Agricultural & Horticultural Sciences
February 03-05, 2014 Hyderabad, India

Characterization of Burkholderia spp. strains capable of solubilizing both P and Zn

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Abstract

Phosphorus (P) and zinc (Zn) deficiencies are limiting crop production in many agricultural soils worldwide. P is the major nutrient after C and N whereas Zn is an essential micronutrient required for various metabolic enzyme systems in plants. Less than 5% of P present in the soil is available to the plants. Exogenous application of soluble P and Zn sources causes transformation of up to 99 per cent of applied soluble nutrients to plant unavailable forms. Extensive use of chemical fertilizers also results in loss of soil health. To overcome this problem, P and Zn solubilising microorganisms can be deployed which can convert unavailable form of nutrient to the forms readily available to the plants. Microbial inoculants are an important component of the integrated plant nutrient management, particularly in rainfed areas, where farmers tend to rely either on 'no cost' or 'low cost' inputs. The microorganisms able to solubilize both P and Zn can be further advantageous. In the present study two bacterial strains PSB1 and PSB3 were characterized *in vitro* for plant growth promoting traits and were found to solubilize both inorganic P (tricalcium phosphate) and Zn (zinc carbonate and zinc oxide) besides showing IAA and ammonia production. The strains could grow in the presence of 25% PEG (moisture stress) and could tolerate high temperature of 45°C. The strains were identified as *Burkholderia cepacia* and *Burkholderia cenocepacia* depending on 16SrDNA sequence analysis. Pot studies revealed the effect of inoculation of these strains on sorghum plants. Inoculation improved plant growth of sorghum in terms of plant height, biomass, leaf area, chlorophyll content etc over control treatment. Inoculation also improved P and Zn contents in the leaves. The strains can be further exploited for nutrient management and growth promotion in plants.

Biography

Minakshi Grover is currently working as Senior Scientist, Microbiology-Plant Sciences at Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, India. She is recipient of DST Women Scientist Fellowship. She is a life member of prestigious academic societies like Association of Microbiologists of India, Indian Society of Dryland Agriculture, Association of Agro-meteorologist. She is member editorial board for *World J Microbiol Biotech.* Besides, she is member of reviewer forum of several prestigious national and international journals such as, *World J Microbiol Biotech., Indian J Microbiol., European J Soil Biol, FEMS Microbiol Ecol, J Basic Microbiol, Karnataka J Agric Sci.* She has received commendation certificate for MJ Narsimhan award of Indian Phytopathology Society (2005), four best poster awards in conferences and one best research paper award (*Indian J Hort*). Her research focus is mainly on plant growth promoting microorganisms, biocontrol and plant-microbe interactions under abiotic stress (drought and high temperature) for which financial support has been provided by ICAR under AMAAS, NBF and NICRA projects. Dr Grover has published over 20 research papers and many review articles on biocontrol, growth promotion and abiotic stress alleviation in plants by microorganisms.