IMPLICATION OF MICROBIAL CONSORTIUM ON BIOMASS AND YIELD OF CHICKPEA UNDER SUSTAINABLE AGRICULTURE

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Abstract

Five indigenous soil microbes were isolated from chickpea rhizosphere soils of different location of Jaunpur, Mirzapur, Varanasi and Azamgarh district of eastern Uttar Pradesh. The microbial strains were identified as Pseudomonas aeruginosa BHUPS01, Pseudomonas putida BHUPS04, Bacillus megaterium BHUPS14, Paenibacillus polymyxa BHUPS16 and Mesorhizobium sp. BHURC05 by biochemical and molecular characterization. The isolated strains were tested for their plant growth promoting properties. All strains were found positive for indole-3-acetic acid (IAA), ammonia production, and phosphate solubilization. Furthermore, the strain P. aeruginosa showed siderophore and hydrogen cyanide (HCN) production, and inhibited the growth of fungal pathogens such as Fusarium oxysporum and Rhizoctonia solani. The different treatment combinations of soil - bacteria enhanced nodulation, plant growth and yield of chickpea under the glasshouse and field experiments, respectively. The microbial consortium of P. aeruginosa and Mesorhizobium sp. showed more significant nodulation and biomass dry weight followed by P. polymyxa and Mesorhizobium as compared to Mesorhizobium alone and uninoculated control under glasshouse and field condition, respectively. Similarly, significant increases in grain yield and grain protein were recorded in microbial consortium of P. aeruginosa BHUPS01 and Mesorhizobium sp. BHURC05. The present study confirmed that Mesorhizobium sp. and P. aeruginosa is an effective microbial consortium for biomass and grain production of chickpea in Indo-Gangetic plain of Eastern Uttar Pradesh, India.

Key words: biomass, chickpea, Mesorhizobium, microbial consortium, Pseudomonas, yield

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