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Effects of Phosphate Solubilizing Microorganisms on Wheat Yield and Alkaline Phosphatase Activity

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The phosphorus represents the second limiting nutrient after nitrogen and most of Egyptian soils are rich in P but more than 80% of it becomes immobile and rapidly convert into unavailable to plant uptake through precipitation processes and less than 10% of soil P go in the plant-animal cycle. MPS-Microbial Phosphate Solubilizes is being used as one of the most promising biotechnological practices to improve soil fertility, crop production, and quality with low input of chemical fertilizers and costs. The manner of phosphate solubilization by Pseudomonas fluorescence, Bacillus megaterium, Serratia marcescens, and Bacillus subtilis as PSB were assessed in NBRIP broth medium for their capacity to solubilize inorganic P in the form of rock phosphate (RP) (hydroxyapatite). A greenhouse pot experiment was conducted to evaluate the synergistic influence of RP application (0 and 31 P2O5 kg/fed.), BPS strains and arbuscular mycorrhizal fungi (AMF) on soil available P content, pH values, alkaline phosphatase activity, wheat (Triticum aestivum Gemeza-9) growth, yield, and nutrient uptake. The amount of P solubilized from RP by the tested PSB are increased and the pH values of the cultures were reduced up to 4.04 and 6.62. The maximum amount P solubilized of RP and the minimum pH values of the medium reached 14 days after inoculation with B. subtilis. In RP-amended soil combined inoculation with PSB and AMF inoculations, B. subtilis and P. fluorescence were more effective in increasing NPK uptake of wheat straw, grain, biological yields, grain/straw ratio, soil P content, and alkaline phosphatase activity compared with S. marcescens and B. megaterium, the non-inoculated or individually inoculated soil and this increase was much higher after 69 days compared with those after 130 days. Therefore, one of the requirements of this study is to implement it in field experiments to confirm these results

Keywords: Phosphate Solubilizing Bacteria, Phosphatase, wheat, AM fungi

Biography:

Experienced Research Assistant with a demonstrated history of working in the research industry. Skilled in Microsoft Excel, Microsoft Word, Microsoft Power Point, Soil Science, Soil Microbiology, and Research. Strong researcher professional with a Master's degree focused in Soil Microbiology from Soils, Water and Environmental Research Institute and Suez Canal University, Egypt; 2019. Rawia Shams El-deen got the Appreciation Certificate for her Bachelor's Degree in Soil Science with Very Good with Honors; Soil and Water Dep., Faculty of Agriculture, Suez Canal University, Egypt; 2011.