The Effectiveness of a Mixed Culture of Phosphate Solubilizing Bacteria for Improving the Growth of Selected Vegetable Crops Cultivated in two soils under Plant House Conditions

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Use of phosphate solubilizing bacteria based biofertilizer is a sustainable approach to increase soil P availability for crops. A study was conducted to assess the ability of phosphate solubilizing bacteria mixed culture inoculum (PSB) to enhance growth of selected vegetable crops cultivated in two soils under plant-house conditions. Firstly, the performance of five vegetable crops (tomato, capsicum, brinjal, beet root, and chili) during the nursery stage was assessed with and without PSB application to nursery potting media. Significant (P<0.05) increase (27%) in the number of leaves per plant was observed for brinjal seedlings with PSB application. Chili showed a significant (P<0.05) increase (23%) in plant height with PSB application. Phosphate solubilizing bacteria abundance significantly increased (P<0.05) with PSB application in beet root (4.6%), brinjal (12%) and chili (12%). A second experiment was conducted focusing on crop performance during the vegetative growth phase of chili cultivated in two soils; *i.e.* an Alfisol and an Ultisol with nine treatment combinations related to N, K and P supply. The treatments were NKP, NK, NK+PSB, NK+75%P, NK+75%P+PSB, NK+Eppawala Rock Phosphate (ERP), NK+ERP+PSB, PSB only, and no fertilizers. The available P content of the Ultisol and alfisol soil were different (178 mg/kg and 9 mg/kg, respectively). Shoot and root biomass of chili was not significantly affected (P >0.05) by soil type. Nutrient supply from inoculated treatments significantly affected (P <0.05) plant growth parameters. Dry biomass of plants increased significantly (P <0.05) with PSB application in Alfisol than in Ultisol. Phosphate solubilizing bacteria abundance significantly increased (P <0.05) in Alfisol with PSB application (211%). The results indicated that PSB application increased soil available P in both soils and the response of vegetable plant growth to PSB application differs between high and low P soils.

Keywords: Alfisol, Biofertilizer, Inoculum, Phosphate solubilizing bacteria, Ultisol

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