

ABSTRACT

Screening of Plant Growth Promoting Rhizobacteria from Onion (*Allium cepa*) Rhizosphere and Assessing their Performance under Field Conditions

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Plant growth promoting rhizobacteria (PGPR) are effectively utilized in agriculture worldwide with the intention to minimize usage of agrochemicals while increasing crop production. The present study was conducted to screen PGPR isolates from onion (*Allium cepa*) rhizosphere to assess their impact on growth and yield of onion. Bacterial strains were isolated from the onion rhizosphere and five strains having the ability to fix nitrogen, solubilize phosphorus and secrete indole-acetic acid (IAA) were screened. Five isolates and previously isolated strain (OD) added along with cattle manure (CM) (10 t/ha) were compared with non-inoculated treatments along with or without chemical fertilizers in pot experiment. Treatments were arranged in a complete randomized design with three replicates. The efficient bacterial strains Azoj2, Azoj4 and OD were tested in two field experiments in two seasons. Treatments were T₁ (Azoj2), T₂ (Azoj4), T₃ (OD), T₄ (Azoj2 & OD), T₅ (Azoj4 & OD), T₆ (Recommended fertilizers), T₇ (2/3Rec.NP), T₈ (Azoj2 & OD with 2/3Rec.NP), T₉ (Azoj4 & OD with 2/3 Rec.NP), and T₁₀ (OD with 2/3 Rec.NP). All the treatments were treated with recommended dose of muriate of potash (75kg/ha) and CM. The treatments were laid down in a randomized complete block design. Bacterial inoculation increased significantly fresh and dry weight, nitrogen and phosphorus content in bulb and yield of onion crop grown in pots compared with control. Yield of onion was increased by 9.59 % to 48.03 % in inoculated treatments over non-inoculated control and by -9.2 to 22.64 % over recommended fertilizers treatment. Results of field experiments revealed that inoculation of bacterial strains either single or dual, increased growth and yield of onion comparable to recommended fertilizers, except the combination of Azoj4 & OD. Onion yield of RF in all field trials was ranged between 2.29 – 3.13 kg/m² and in inoculated treatments varied from 2.43 – 4.09 kg/m². Therefore, results indicate that bacterial strains Azoj2, Azoj4 and OD with CM have the potential to increase onion yield without synthetic N and P fertilizers and those could be effectively utilized in organic farming. Further these strains could also be used in combination with synthetic fertilizer which would reduce the fertilizer usage and minimize adverse environmental impacts.

Keywords: Rhizosphere, Rhizobacteria, Bacterial strains, Onion, Yield

Recommended.
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