

Effect of Bacterial Inoculation on Growth and Yield of Onion (*Allium cepa* L.) in Kilinochchi Under Greenhouse Conditions

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Abstract

The search for microorganisms to improve soil fertility and crop production has continued to attract attention to offset the negative impacts of fertilizers in the environment in an eco-friendly way. The objectives of this study were to screen beneficial bacterial strains from onion (*Allium cepa* L.) rhizosphere from Thiruvaiyaru area in Kilinochchi district for the ability to fix nitrogen, solubilize phosphorus and/or to produce indole-3-acetic acid; and to select efficient strains in terms of onion productivity. Seven bacterial strains were screened for their N fixing and P-solubilization potential. The selected isolates together with previously screened three bacterial isolates were tested in a pot experiment under greenhouse conditions to evaluate their efficiency in improving growth, and yield of onion. The treatments were arranged in a completely randomized design with four replicates. The treatments were T₁ (Non-fertilized), T₂ (Rec NPK), T₃ (Azo1), T₄ (Azo3), T₅ (Azo4), T₆ (Azo5), T₇ (Azo6), T₈ (TSA1), T₉ (TSA2), T₁₀ (Azoj2), T₁₁ (Azoj4), T₁₂ (OD) and T₁₃ (Cattle manure: CM). T₂ (Rec NPK) was treated with recommended dose of CM (10t/ha) and NPK fertilizers; Urea (195kg/ha), Triple super phosphate (100kg/ha) and Muriate of potash (75kg/ha). For the treatments T₃ to T₁₂ were treated with respective inoculum, CM (20t/ha) and Muriate of potash (75kg/ha). T₁₃ was treated with CM (20t/ha) alone. All the inoculated plants showed significantly comparable height and number of leaves /plant with T₂ (Rec NPK) throughout the growing season except T₉ (TSA2). The highest and the lowest dry matter were produced in T₇ (Azo6) and T₉ (TSA2) respectively. The onion yield was increased by 24%, 25%, 20%, 20% and 31% in T₃ (Azo1), T₄ (Azo3), T₆ (Azo5), T₇ (Azo6) and T₁₁ (Azoj4), respectively compared to T₂ (Rec NPK). There was a positive correlation observed between yield and uptake of nutrients, nitrogen and phosphorus. Therefore, the bacterial strains Azo1, Azo3, Azo5, Azo6 and Azoj4 have the potential to improve the growth and yield of onion compared to other tested strains. It is also suggested that further studies under the field conditions are needed to confirm the efficiency of screened strains.

Keywords: Bacterial strains, Growth promotion, Onion, Yield

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