

The effect of beneficial microbial bioagents on plant growth metrics

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ABSTRACT

In the current study titled “ The effect of beneficial microbial bioagents on plant growth metrics,” the bioagents *Trichoderma harzianum*, *Bacillus subtilis* and *Pseudomonas fluorescens* were tested along with seed dressing broad spectrum fungicide tebuconazole @1.0 % to know the effect of beneficial bioagents on plant growth metrics like germination per cent, vigor index, shoot and root length under *in vitro* conditions. Seed treatment with *T. harzianum* (T₁) significantly enhanced germination percentage (98.5%), shoot and root lengths (18.97 cm and 16.50 cm) and vigor index (3495.20), outperforming all other treatments. *B. subtilis* (T₃) and the chemical control (T₄) also showed positive effects, while the untreated control (T₂) consistently recorded the lowest values. These results highlight *T. harzianum* as the most effective treatment for promoting early plant growth. In case of seeds pretreated with the *S. rolfii*, chemical control (T₄) showed the highest germination (86.0 %), shoot and root lengths (15.90 cm and 15.17 cm) and vigor index (2672.45), followed by *T. harzianum* (T₁). The pathogen control (T₅) consistently recorded the lowest values, indicating the effectiveness of tebuconazole and *Trichoderma* in promoting early plant growth. Similar results were observed in case of seeds pretreated with *M. phaseolina*, chemical control (T₄) showed the highest germination (87.0 %), shoot and root lengths (15.32 cm and 13.97 cm) and vigor index (2672.45), followed by *T. harzianum* (T₁). The pathogen control (T₅) consistently recorded the lowest values. These results showed that the *T. harzianum* can serve as a viable eco-friendly alternative to chemical fungicides in integrated disease and crop management.

Keywords: Bioagents, Groundnut, *M phaseolina* and *S rolfii*