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Using biocontrol agents and sodium nitrophenolate to control powdery mildew and improve the growth and productivity of marigold (*Calendula officinalis*L.).*Not. Bot. Horti. Agrobi.*, 2024, 52(1): 13589 DOI:10.15835/nbha52113589.

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Abstract

Salinity In vitro and in vivo studies were conducted to investigate the potential of four biocontrol agents (BCAs), namely *Bacillus megaterium*, *Pseudomonas fluorescens*, *Trichoderma viride*, and *T. harzianum*, individually and in combination with sodium nitrophenolate (SN) to control marigold powdery mildew. The results showed that all treatments led to a significant inhibition in the conidial germination of *Golovinomyces cichoracearum* in vitro. Maximum inhibition was recorded by *T. harzianum* (1×10^9 CFU mL⁻¹) + SN (1.5%), followed by *T. viride* + SN, and *B. megaterium* + SN at the same concentrations as follows: 83.6, 79.1, and 70.6%, respectively. While the lowest inhibition (20.4%) was recorded by *P. fluorescens* (1×10^5 CFU mL⁻¹). In the greenhouse, all treatments applied significantly reduced the disease severity and the area under the disease progress curve (AUDPC). The combination treatments had a better disease control response than individual treatments. Similar results were achieved in the field, where disease severity reduced to 9.2 and 10.3% in plants treated with *T. harzianum* + SN in the first and second seasons, respectively, compared to 40.2 and 44.1% in control in both seasons. Likewise, AUDPC reduced to 274 and 315 in plants treated with *T. harzianum* + SN in the first and second seasons, respectively, compared to 1207 and 1340 in control in both seasons. The treatments improved growth and productivity characteristics, as well as photosynthetic pigments, total phenolic compounds (TPC), and polyphenol oxidase (PPO) activity, while significantly reducing free proline (FP). In conclusion, BACs applied individually or in combination with SN can be used effectively to suppress powdery mildew of marigold.

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