Research Article

Exploring the Diversity of *Trichoderma* spp. and the Synergistic Activity of Delivery Systems for the Management of *Fusarium* Wilt of Cucumber under Protected Cultivation

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Abstract

Diversity of *Trichoderma* isolates of Nilgiri biosphere from different crop plants were isolated and characterized. Thirty four *Trichoderma* isolates from Nilgiri biosphere of Tamil Nadu were screened for their antagonistic potential against *Fusarium oxysporum* f. sp. *cucumerinum* (KY495294). Among the different isolates, *T. virens* -TRI 37 inhibited the radial growth of *F. oxysporum* f. sp. *cucumerinum* up to 77.77 per cent over untreated control. The next best isolates were *T. harzianum*-TRI 35, TRI 36 and *T. asperellum*-TRI 9 *in vitro*. The effective isolates of *Trichoderma* spp. were delivered through biopriming and soil application. Bioprimed cucumber seeds with talc based formulation of *T. virens* -TRI 37 (10^8 cfu/g) colonized spermosphere and rhizosphere of cucumber seeds (Valley star RZ); colonized seeds were observed through Environmental Scaning Electron Microscopy. It confirmed the colonization of spermosphere by the mycelia of *T. virens* -TRI 37. Besides, the colonization of rhizosphere was witnessed by the growth of mycelia and conidial production of *T. virens* -TRI 37 on the root surface. Delivering of *T. virens* -TRI 37 @ 10^8 cfu/g through biopriming and soil application @ 2.5 Kg/1000 m^2 in 250 Kg of vermicompost at the time of sowing followed by the application on 15, 30 and 45 days after sowing recorded 73.16 per cent and 66.42 per cent reduction of wilt with an average yield of 13.47 t/1000 m^2 and 12.97 t/ 1000 m^2 respectively. However, delivery of *T. virens* -TRI 37 @ 10g/kg (10^8 cfu/g) through biopriming coupled with soil application @ 2.5 kg/1000 m^2 in 250 Kg of vermicompost reduced the wilt incidence to an extent of 81.90 per cent with an average yield of 14.31 t/1000 m^2 over untreated control under protected cultivation due to the complementary effect of delivery systems.

Key words: Chlamydospore, conidiophore, *Fusarium* wilt, *Fusarium oxysporum* f.sp. *cucumerinum*, ITS, *Trichoderma.*

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