

ABSTRACT

This study was carried out to investigate effect of some antagonistic fungi and PGPR biocontrol agents for the control management of *Fusarium* wilt of tomato caused by *F. oxysporum* f.sp. *lycopersici* (FOL). Fungal antagonist namely *Trichoderma hamatum* (TSP), *T. harzianum* (F1), *T. asperellum* (F2) and *Purpureocillium lilacinum* (BCA) and PGPR *Pseudomonas* sp.(CM21), *Enterobacter* sp. (33B) and *Bacillus* sp. (9B) screened against FOL *in vitro* and *in vivo* to test biocontrol potential. *In vitro* assay maximum inhibition 85.646% was exhibited by *T. asperellum* (F2). This was followed by *T. hamatum* (TSP), *T. harzianum* (F1) and *Pseudomonas* sp.(CM21) as 81.712, 80.261 and 77.910% respectively. In greenhouse condition minimum disease incidence showed by *T. hamatum* (TSP) and highest percent disease reduction (0.00% and 100%). This was significantly different over control (90.00% and 0.00%), whereas other treatments disease incidence and disease reduction as *T. asperellum* (F2), *T. harzianum* (F1) and *Pseudomonas* sp (CM21) (10% and 88.87%), *Bacillus* sp.(9B) (20% and 77.78%). *T. hamatum* exhibited higher growth parameters like plant height, fresh and dry weight (29.420cm), (4.984g) and (0.585g) as compared to control (13.420cm), (1.160g) and (0.154g). Highest peroxidase and catalase activity was observed by *T. harzianum* (F1) was recorded 0.37 mg/g and 0.85 units/mg of protein. Inoculation of *Pseudomonas* sp.(CM21) exhibited highest proline and protein content 0.42 mg/g and 32.45 μ mol/g rather than untreated control as 0.22 mg/g and 22.88 μ mol/g. However maximum nutrients uptake (NPK) was shown by PGPR (*Pseudomonas* sp, *Bacillus* sp, and *Enterobacter* sp.) treated plants as compared to antagonistic fungi. In addition, application of PGPR without inoculation of pathogen increased plant growth and maximum nutrient uptake was observed as compared to control. Thus PGPR and fungal antagonist have great potential in suppressing *Fusarium* wilt disease as well as promoting plant growth.