

Trichoderma asperellum*, A Potent Nematode Antagonist of Root-knot Nematode, *Meloidogyne incognita

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Tomato (*Lycopersicon esculentum* Mill.) is often infested with an endoparasitic nematode *Meloidogyne incognita* which causes yield loss between 25 to 100% depending on the cultivar and abiotic factors. Managing the nematode pest is a challenging problem. As most chemical nematicides have been withdrawn from the global market due to environmental concerns, biological control is receiving increasing attention. Among the bioagents, *Trichoderma* species are potential nematode antagonists. In our attempt to identify a potential nematode antagonistic *Trichoderma* sp. from Indian soils, screening bioassays on juvenile mortality were conducted using thirteen *Trichoderma* isolates from 5 states of India. An isolate of *Trichoderma* that exhibited significant egg hatch inhibition and antibiosis was identified as *T. asperellum* based on *ITS4* and *ITS5* regions and its gene sequence submitted to NCBI database to get an accession no. MT702882. Addition of fresh fungal broth in soil at the rate of 3% (w/w), resulted in significant reduction in juvenile invasion, reproduction factor, and root galling compared to uninoculated control with visible enhancement in plant growth parameters in tomato cv Pusa Ruby. The test isolate was proved to be an endophyte. In an effort to develop a stable oil-based formulation of the *Trichoderma* isolate, the sporulation of the isolate was enhanced and the compatibility with 5 oils and 5 emulsifiers was evaluated. Three formulations (F1, F2, and F3) were developed, each with a spore load of $2 \times 10^{11}/\text{cm}^3$ and their pH, viscosity and sedimentation rate were evaluated. The soil application of F1 and F2 at 3% (w/w) reduced nematode galling by 42.9 % and 31.7 %, respectively, in tomato cv Pusa Ruby. Both the formulations exhibited significantly higher number of colony forming units (cfu) on storage at 15 °C, than at 25 °C or 30 °C. Thus the *T. asperellum* bioformulation were found effective against *M. incognita* infecting tomato.

Keywords: *Trichoderma asperellum*, *Meloidogyne incognita*, Bioformulation