



### **Trichoderma : A opportunistic biocontrol agent for plant disease management**

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Chemical control of plant diseases can be effective however, indiscriminate and injudicious use of chemicals causes accumulation of harmful chemical residues sometimes may raise serious ecological problems and result of growing concern of both environmentalists and public health properties. Moreover, use of such chemicals entails a substantial cost to the nation and marginal farmers of developing country like India cannot afford it. Biological control is paramount technology for ecofriendly management of plant diseases. *Trichoderma* spp. is one of the most important opportunistic biocontrol agents for plant disease management. It can control almost all the soil borne wilt, root rot, damping off and foot root diseases caused by the different fungi viz., *Fusarium* spp., *Verticillium* spp., *Sclerotium* spp., *Pythium* spp., *Rhizoctonia* spp., *Phytophthora* spp., *Macrophomina* spp., etc. Similarly many seed borne diseases can also be very effectively controlled by the *Trichoderma* spp. Soil borne diseases once established in the field are generally very difficult to control by the application of chemicals as it cannot penetrate and retained in the soil for the sufficient period in the lethal concentration. Therefore, there are many where cultivation of many crops has been withdrawn either temporary or permanently. Effective control of such diseases by the *Trichoderma* spp. is because of its high reproductive capacity, ability to survive under very unfavorable conditions, efficiency in the utilization of nutrients, capacity to modify the rhizosphere, strong aggressiveness against phytopathogenic pathogens and efficiency in promoting plant growth and defense mechanisms. Apart from these, It is also used against abiotic stresses, bioremediation, wood preservation, decomposition and industrial purpose. Nine different species of the *Trichoderma* viz., *T. viride*, *T. harzianum*, *T. virens*, *T. atroviride*, *T. reesei*, *T. hamatum*, *T. longibrachyatum*, *T. koningii* and *T. pseudokoningii* are used for the management of diseases.

Overall the performance of the *Trichoderma* as biocontrol agent depends upon the performance of the strain in the agro-ecosystem, formulation of the product, availability of organic matter, absence of incompatible substances in the soil, physical properties of the soil, soil environmental conditions, method of application, time of application, level of pathogenic microorganisms, etc. Performance of the *Trichoderma* species in the field for the control of plant disease management can be enhanced by preparation of different formulation which increase cell count and longevity of the spores' during storage in a finished product.

We need to address all the issues to enhance the potentiality of *Trichoderma* spp. performance of biocontrol agent for the realization of optimum benefit of the fungi and prevention of hazards associated with the chemical pesticides. For the same location specific identification of the native and efficient strains and formulation of finished product need to be strengthen. Recently developed molecular tools for the rapid identification of not only the species but also the strains should also be used for the perfection and expedite the research work.

There were some earlier reports about false identification of certain species, for example name *Trichoderma harzianum* was used for many different species. Recently, methods for safe identification of new species are significantly facilitated by development of and a customized similarity search tool (TrichoBLAST) and an oligonucleotide barcode (TrichoKEY). Scientists proved through genetic manipulation that an N-acetyl-b-D-glucosaminidase has significant contribution in saprotrophic competitiveness during antagonistic interactions with *Rhizoctonia solani*. The information can be used for the selection of efficient strains and also to genetically manipulate the fungi for the better expression of gene to enhance the potentiality of fungi. Farm level multiplication of the biocontrol agent developed and popularized by NAU is one of the most successful models. Such production protocol must be location specific modified and popularized for the reaping much needed benefit of the fungi.

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