


Chapter 14

Initial Tests on Various Formulations and the Recommended Dose of the Moroccan *Trichoderma asperellum*-Based Product for Stimulating and Protecting Tom

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ABSTRACT

*Treatment of tomato plants with *T. asperellum*-based products formulated with the *T. asperellum*'s conidia suspension, without talc (P1) and with added talc (P2) reduced verticillium wilt. The Dwarfing index (SI) of plants treated with P1 and P2 were -4.25% and -6.95% respectively, compared to 6.178% for plants inoculated with *V. dahliae* alone. Treatment with P2 promoted the development of the agronomic parameters followed by P1 in comparison with the water control and the inoculated control. The average*

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weight of tomatoes harvested from each of the plants inoculated with *V. dahliae* and treated with P1 and P2 was respectively 194.17 g and 235.43 g / 148.40 g and 90.03 g. On the other hand, treatment of the plants with 40 ml of the conidial suspension volume, prepared from a fresh culture or product P2, increased all the agronomic parameters of the plants compared to the other tested volumes and the water control. The aerial part length is 111.17 cm and 115 cm/ 97.16 cm. The fresh roots weighed 118 g and 139.23 g / 42.07 g. The tomatoes weighed 122.07 g and 148.77 g/12.56 g.

1 INTRODUCTION

The synthesis of a bioproduct for agricultural purposes must be characterized by a formulation that gives it a strong capacity to control pathogens and stimulate the agronomic parameters of cultivated plants. A number of studies have shown the importance of formulation in the efficacy of products based on microorganisms such as *Trichoderma* spp. as it's known to persist all climatic stages due to their ability to tolerate different ecological conditions (Benitez et al., 2004).

The capacity of *Trichoderma* spp. as a biological control agent against phytopathogenic fungi in several crops is well known, particularly against *Fusarium* spp. and *Rhizoctonia* spp. (Poddar et al., 2004 ; Rojo et al., 2007). In this case, different formulations have been used to control soil pathogens either by fungal spores (Harman et al., 1980) or by powdery preparations of fungal mycelium (Latunde-Dad 1993). The commercial *Trichoderma*-based preparations marketed were used for crop protection against plant pathogens or to promote different crops' plant growth and productivity (Rojo et al., 2007 ; Hanhong et al., 2011 ; Zancan et al., 2012).

The living fungal conidia (active substance) is incorporated in various formulations as pure conidia suspensions in liquid culture filtrates, and can be integrated with various inert components and kept for months while still maintaining its efficiency (Harman and Kubicek 1998 ; Harman et al., 2010). It can be used in several different ways: a foliar spray, applied pre-planting to seed or propagation material, a post-pruning treatment, incorporated in the soil during seeding or transplant, added during irrigation or applied as a root drench or dip (Woo et al., 2014).

In India, talc-based formulations of *T. viride* have been developed at the Tamil Nadu University of Agriculture, Coimbatore, for the treatment of legume and rice seeds (Jeyarajan et al., 1994). And several private industries produce large quantities of talc-formulated products to supply farmers (Sanjeev et al., 2014). The annual requirement of *Trichoderma* to cover 50% of the area in India has been estimated at 5000 tonnes (Jeyarajan et al., 2006).

Caron et al (2002) have shown that the *T. harzianum* strain MAUL-20 can have certain beneficial effects on the growth of cucumber and tomato plants when added to growing substrates.

The objective of this work is to designate the adequate formulation of a laboratory made bioproduct based on the conidia suspension of the Moroccan *Trichoderma asperellum* strain by adding an inert component and find the conidia suspension volume that can provide the greatest growth stimulating effect and protective power against *Verticillium dahliae* in tomato plants.

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