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Efficacy of fungal antagonists against leaf blight of tomato caused by *Alternaria solani* (Ell. and Mart.)

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ABSTRACT: **Fungal antagonists were tested *in vitro* against the growth of the pathogen *Alternaria solani* (Ell. and Mart.), and in tomato plants against the leaf blight disease. Although *Trichoderma harzianum* followed by *T. viride* were significantly effective in inhibiting the mycelial growth of *A. solani*, there was no significant difference between the effectiveness of *Trichoderma* species in pot culture studies.**

KEY WORDS: Antagonist, *Alternaria solani*, tomato leaf blight, *Trichoderma*

Leaf blight disease of tomato incited by *Alternaria solani* (Ell. and Mart.) Jones and Grout causes considerable yield loss and forms a major constraint of production in all the tomato growing areas (Mathur and Shekhawat, 1986). To have a long lasting and eco-friendly management of the disease, biological approach would be the best alternative to chemical means. Several microorganisms are reported to be antagonists against plant pathogens. Gullino and Garibaldi (1994) reported the reduction of tomato leaf blight disease when *Trichoderma* sp. was included in the integrated management. Studies were therefore initiated to evaluate different species of the fungal antagonist, *Trichoderma* against tomato leaf blight pathogen, *A. solani*.

Six species of *Trichoderma viz., T. viride, T. harzianum, T. hamatum, T. koningii, T. pseudokoningii* and *T. longibractiatum* obtained from the Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore were used in the study. These antagonists were tested against the mycelial growth of the pathogen and the leaf blight disease incidence on tomato plants. A 9mm actively growing mycelial disc of the pathogen was placed at 1.5cm away from the edge of the Petri-dish onto which the sterilized potato dextrose agar medium was previously poured and solidified. Culture disc of different *Trichoderma* spp. was separately placed at equidistance away from the other edge of the Petri-dish. Plates inoculated with pathogen alone served as control. Three replications were maintained for each treatment. The plates were incubated at room temperature (28 ±2°C). When the control plate attained full growth, the radial growth of the mycelium of the pathogen was measured in respect of the treatments. The results are expressed as per cent growth inhibition over control.

Tomato plants of cv. PKM1 were raised on pots each containing four kg of uniform soil mixture. In each pot, two plants were maintained by applying calculated quantities of N:P:K and judicious watering. When the plants were 75 days

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old, they were inoculated by spraying the conidial suspension ($5X10^5$ conidia /ml) of the pathogen *A. solani*. Water congestion was provided both before and after inoculation by spraying water inside the polythene bags and covering the plants with the same. Forty eight hours after inoculation of the pathogen, the spore suspension ($5X10^5$ conidia /ml) of different *Trichoderma* spp. prepared in sterile water were sprayed on separate sets of plants using a hand sprayer. Three replications were maintained for each treatment and the unsprayed plants served as control. The plants were maintained in glass house. Fifteen days after treatment, the disease intensity was recorded based on the grades (0-9 scale) according to the standard grade chart adopted by Tamil Nadu Agricultural University (1980). The per cent disease index was worked out by using Mc Kinney's (1923) formula and the data were statistically analysed after arcsine transformation. The results are expressed as per cent disease reduction over control.

Among the six species tested, *T. harzianum* exerted the highest inhibition of the mycelial growth of the pathogen and the per cent inhibition was 50.2 (Table 1) followed by *T. viride* (40.9%). In pot culture studies, there was no significant difference among the *Trichoderma* spp. in reducing the leaf blight disease (Table 1).

The effectiveness of *Trichoderma* spp. in reducing the growth, spore germination and number and length of germ tubes of *A. solani* has been reported earlier by Kumar and Singh (1983) and Okasha *et al.*(1989). Gullino and Garibaldi (1994) demonstrated that application of *Trichoderma* reduced the leaf blight disease in tomato.

It is concluded that *Trichoderma* effectively inhibit the growth of the pathogen *in vitro*. However, the reduced effectiveness of *Trichoderma*, when sprayed on tomato plants, might be due to the influence of unfavourable environmental conditions like lack of readily available nutrients for its growth and multiplication.

Table 1. Efficacy of fungal antagonists against growth of *A. solani* and tomato leaf blight disease

Antagonist	Mycelial growth of the pathogen (cm)	Per cent growth inhibition over control	Per cent disease Index (PDI)*	Per cent disease reduction over control
Trichoderma viride	5.26	40.90	50.02(45.0)	19.06
T. harzianum	4.43	50.22	47.68(43.7)	22.85
T. hamatum	5.46	38.65	50.79(45.5)	17.82
T. longibractiatum	5.63	36.74	52.40(46.4)	15.21
T. koningii	6.36	28.53	51.44(45.8)	16.76
T. Pseudokoningii	6.10	31.46	54.30(47.5)	12.14
Control	8.90		61.80(51.8)	-
CD (P=0.05)	0.23		NS	

NS: Non- Significant

Data in parantheses are arcsine- transformed values.

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