



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2017; 6(5): 1060-1062
Received: 03-07-2017
Accepted: 05-08-2017

A Ramakrishna
Department of Plant Pathology,
PJTSAU, Rajendranagar,
Hyderabad, Telangana, India

S Desai
Division of Crop Science, ICAR-
CRIDA, Santhoshnagar,
Hyderabad, Telangana, India

G Uma Devi
Department of Plant Pathology,
PJTSAU, Rajendranagar,
Hyderabad, Telangana, India

T Uma Maheswari
Department of Plant Pathology,
PJTSAU, Rajendranagar,
Hyderabad, Telangana, India

Efficacy of different isolates of *Trichoderma* against early blight of tomato

A Ramakrishna, S Desai, G Uma Devi and T Uma Maheswari

Abstract

Alternaria solani (Ellis and Martin) is a pathogen causing early blight of tomato resulting in heavy yield losses. Thirteen isolates of *Trichoderma* tested against *Alternaria solani* and considered for assessment of variation as well as for management. Out of 13 *Trichoderma* isolates tested, T4 exhibited maximum inhibition (66.72%) against *A. solani* followed by T6 (65.57%). The isolates varied in their antagonistic ability against *A. solani*. While, T4 and T6 showed >65% inhibition, all remaining isolates exhibited >50% antagonism showing their potential as biocontrol agents.

Keywords: early blight, tomato, *Trichoderma*.

Introduction

Tomato (*Lycopersicon esculentum* Mill) belongs to the family solanaceae and is one of the most remunerable and widely grown vegetable in the world. Tomato (*Lycopersicon esculentum*.L) is one of the most important economic vegetable crops cultivated in India in an area of 7.60 Mha with a production of 18.38Mt and productivity of 24.2 Mt/ha (Indiastat, 2015- 2016) [3]. Tomato crop is usually susceptible to many diseases caused by fungi, bacteria, viruses, nematodes and abiotic factors. Among the fungal diseases, early blight also known as target spot disease caused by *Alternaria solani* (Ellis and Martin) is one of the world's most catastrophic diseases incurring losses both at pre- and post-harvest stages causing 35 to 78 per cent reduction in fruit yield in the tropical and subtropical regions (Jones *et al.*, 1993) [4].

Materials and Methods

In vitro efficacy of different isolates of *Trichoderma* against *Alternaria solani*

Trichoderma isolates were screened for their antagonism against *A. solani* under *in vitro* conditions on malt extract dextrose agar (MDA) medium by following dual culture technique as described by (Lim *et al.*, 1991) [6]. Five mm diameter discs of *Trichoderma* as well as the test pathogen were cut with a sterilized cork borer from the periphery of seven-day old culture. The discs were placed on a petridish containing MDA opposite to each other and 1.5 cm away from plate boundary. Three replications were maintained for each treatment. Suitable control was maintained by placing only the pathogen on culture medium. The plates were incubated at 28±2°C. Petri plates were observed daily for recording antagonistic interactions between the pathogen and biocontrol agent. The percent inhibition (I) of the test pathogen was calculated when the growth of the pathogen was full in the control plate by using the formula as given below

$$I \% = C - T / C \times 100$$

where,

I = Inhibition of pathogen growth,

C= Pathogen growth in control,

T= Pathogen growth in treatment.

Results and Discussion

In the present study, out of 13 *Trichoderma* strains tested, T4 exhibited maximum inhibition (66.72%) against *A. solani* followed by T6 (65.57%). As seen from the Table 1 and Fig 1, the isolates varied in their antagonistic ability against *A. solani*. While, T4 and T6 showed >65% inhibition, all remaining isolates exhibited >50% antagonism showing their potential as biocontrol agents.

The results are in agreement with the findings of Babu *et al.* (2000a) [2] who reported that *T. harzianum* exerted the highest inhibition of the mycelia growth of early blight of tomato followed by *T. viride*.

Correspondence

A Ramakrishna
Department of Plant Pathology,
PJTSAU, Rajendranagar,
Hyderabad, Telangana, India

Martinez and Solano (1995) ^[5] reported antagonism of ten *Trichoderma* strains against *A. solani* in tomato. Abo-Elyous *et al* (2014) ^[1] also reported that isolates of *Trichoderma*

showed high levels of antagonistic ability against *A. porri* *in vitro*.

Table 1: Evaluation of fungal antagonists against *A. solani* on tomato *in vitro*

Isolates of <i>Trichoderma</i>	Inhibition (%)
T1	62.06
T2	62.75
T3	62.75
T4	66.72
T5	56.89
T6	65.57
T7	63.79
T8	63.79
T9	62.75
T10	63.27
T11	54.13
T12	62.75
T13	62.06
SE (m)	0.09
SE (d) ±	0.13
CD	0.27
CV (%)	0.47

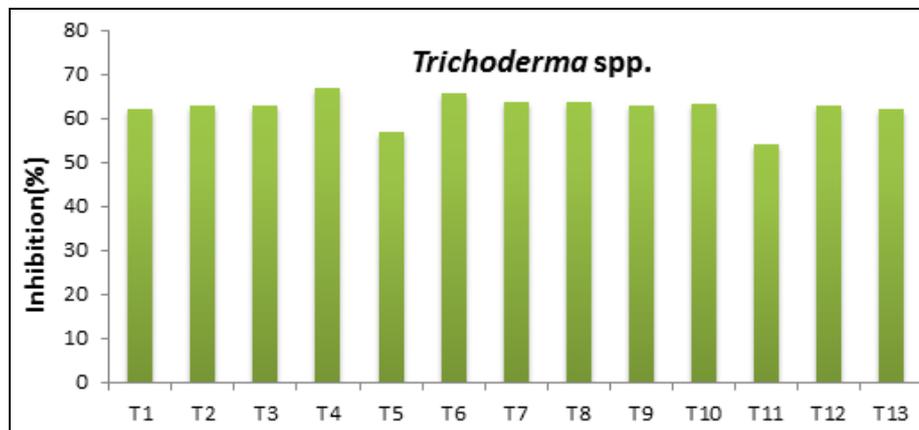


Fig 1: Evaluation of isolates of *Trichoderma* spp. against *A. solani* on tomato *in vitro*

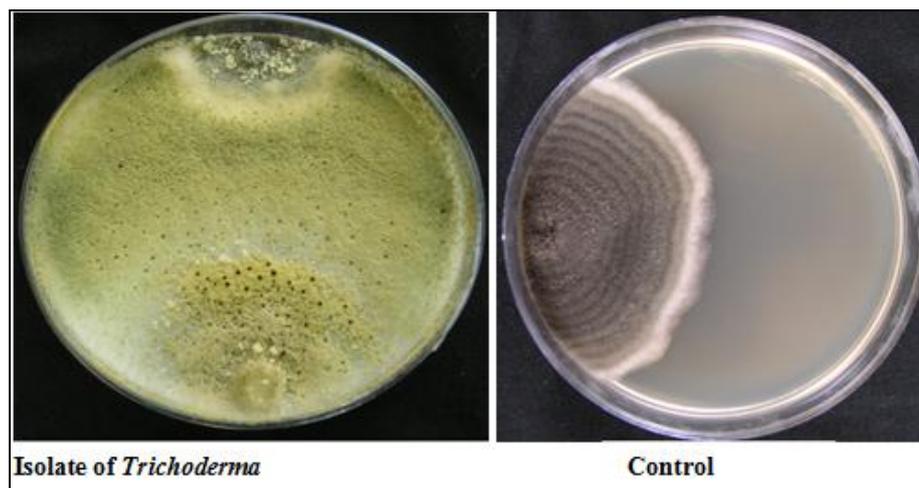


Plate 1: Effect of *Trichoderma* isolate (T4) on the radial growth of *Alternaria solani*

Conclusion

Early blight of tomato is an economically important disease in Telangana state caused by *A. solani* (Ellis and Martin) Jones and Grout. Under *in vitro* conditions, the disease was well controlled by biocontrol agents. These need to be further evaluated under *in vivo* conditions so as to make minimum use of chemicals.

References

1. Abo-Elyousr KAM, Abdel-Hafez SII, Abdel-Rahim IR. Isolation of *Trichoderma* and evaluation of their antagonistic potential against *Alternaria porri*. Journal of Phytopathology. 2014; 162:67-574.
2. Babu S, Seetharaman K, Nandakumar R, Johnson I. Biocontrol efficacy of *Pseudomonas fluorescens* against

- Alternaria solani* on tomato leaf blight disease. Annals of Plant Protection Sciences. 2000a; 8(2):252-254.
3. Indiastat. [http://www.indiastat.com/agriculture /2/stats.aspx_2015-2016](http://www.indiastat.com/agriculture/2/stats.aspx_2015-2016).
 4. Jones JB, Jones JP, Stall RE, Zitter TA. Compendium of tomato diseases. American Phytopathological Society. Minnesota, USA, 1993, 28-29.
 5. Martinez B, Solano T. Antagonism of *Trichoderma* spp. to *Alternaria solani* Ellis and Martin Jones Grout. Revista-de-protection Vegetal. 1995; 3:221-225.
 6. Lim H, Kim Y, Kim S. *Pseudomonas stutzeri* YLP-1 genetic transformation and antifungal mechanisms against *Fusarium solani*, an agent of plant root rot. Appl. Environ. Microbiol. 1991; 57:510-516.