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Effect of bio-control agents on the growth and spore germination of *Alternaria porri*

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ABSTRACT : The result revealed that *Trichoderma viride* (88.65%) and *Trichoderma harzianum* (86.85%) were highly effective in inhibiting the growth of *Alternaria porri in vitro* followed by *Trichoderma koningii* (76.58%) and *Pseudomonas fluorescens* (72.55%). Least inhibition (68.50%) was noticed with *Trichoderma resei*. Similarly highest reduction in spore germination was observed by *Trichoderma viride* (81.65%) which was significantly superior to all other bio-control agents tested. Next best was *Trichoderma harzianum* (76.72%) followed by *Trichoderma koningii* (68.50%) and *Pseudomonas fluorescens* (57.33%). Least inhibition (41.50%) was noticed with *Trichoderma reesei*.

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Onion (*Allium cepa* L.) is an important bulb crop of India belonging to the family Alliaceae. In India, the onion crop occupies an area of 0.4546 million hectares with a total production of 6034.25 million tones. In Andhra Pradesh, it is grown over an area of about 0.022 million hectares with an annual production of 197 million tonnes (Anonymous, 2005-06). In Guntur district of Andhra Pradesh it is cultivated in an area of 0.001239 million hectares with an annual production of 0.019680 million tonnes (Anonymous, 2006). Several factors contribute to the low productivity of onion. Diseases like purple blotch, downy mildew, Stemphylium blight, basal rot and storage rot are known to be more significant in reducing the production of the crop. Of these, purple blotch is the most destructive disease, prevalent in almost all onion growing areas of the world causing heavy losses under field conditions. In Guntur district the disease has become prevalent causing heavy losses to onion farmers in recent times. The present investigation was carried out to assess the efficacy of biocontrol agents.

RESEARCH PROCEDURE

Different species of *Trichoderma viz., Trichoderma harzianum, T. viride, T. resei, T. koningii* and *Pseudomonas fluorescens* available in the Department of Plant Pathology, Agricultural College, Bapatla were tested *in vitro* against *Alternaria porri* by using dual culture technique (Dhingra and Sinclair, 1993).

Twenty ml of sterilized Potato dextrose agar medium melted and cooled at 45^0C was poured aseptically into sterilized Petri dishes of 9 cm diameter. Mycelial discs of 3 mm diameter cut from the edge of actively growing three day-old-culture of pathogen and mycelial discs (3 mm) of *Trichoderma* spp. cut from actively growing colony of the respective fungal species with the help of a sterilized cork borer were placed on the periphery about one cm from the edge of the Petri dish at opposite sides.

In the case of bacterial antagonist evaluation, the bacterium was streaked at the centre of the agar plate and two mycelial discs of the pathogen were placed on either side of the plate. The Petri dish containing Potato dextrose agar medium inoculated with the pathogen alone served as control. All the treatments were replicated four times and were incubated at room temperature (28 ± 1^0C). After incubation when the growth of the pathogen was complete in the control, colony diameter of the pathogen was measured in each treatment and the per cent inhibition of the pathogen over control was calculated by using the following formula as suggested by Nene and Thapliyal (1982).

Table 1 : Effect of bio-control agents on the inhibition of mycelial growth of *Alternaria porri* on potato dextrose agar medium

Sr. No.	Bio-control agents	Inhibition of mycelial growth (%)
1.	*Trichoderma viride*	88.65 (70.27)
2.	*Trichoderma harzianum*	86.85 (68.70)
3.	*Trichoderma koningii*	76.58 (61.00)
4.	*Pseudomonas fluorescens*	72.55 (58.37)
5.	*Trichoderma resei*	68.50 (55.86)
6.	Check *(Alternaria porri* alone)	00.00 (00.00)
S.E. ±		0.27
C.D. (P=0.01)		1.13

Values in Arc sine are transformed values

Table 2 : Effect of bio-control agents on the inhibition of spore germination of *Alternaria porri*

Sr. No.	Bio-control agents	Inhibition of spore germination (%)
1.	*Trichoderma viride*	81.65 (64.60)
2.	*Trichoderma harzianum*	76.72 (61.14)
3.	*Trichoderma koningii*	68.50 (55.86)
4.	*Pseudomonas fluorescens*	57.33 (49.20)
5.	*Trichoderma resei*	41.65 (40.16)
6.	Check (*Alternaria porri* alone)	00.00 (00.00)
S.E. ±		0.25
C.D. (P=0.01)		1.04

Values in Arc sine are transformed values

$$I\ (\%) = \frac{C - T}{C} \times 100$$

I – Per cent growth inhibition

C – Radial growth in control

T – Radial growth in treatment

The effect of above antagonist on spore germination of *Alternaria porri* was studied by using cavity slides. In the well of a cavity slide, 0.2 to 0.5 ml of spore suspension of each antagonist was placed and same amount of conidial suspension ($2.8x10^2$ spores/ml), prepared in sterile water was added and the slides were incubated in a humid chamber at 28 ± 1^0C. Cavity slide having only spore suspension without antagonist was taken as control. Each antagonist was replicated four times with one cavity slide as one replication. After 24 h, observations on the spore germination of *Alternaria porri* were recorded and per cent inhibition of spore germination was calculated by using the following formula as suggested by Nene and Thapliyal (1982).

RESEARCH ANALYSIS AND REASONING

The result revealed that *Trichoderma viride* (88.65%) and *Trichoderma harzianum* (86.85%) were highly effective in inhibiting the growth of *A. porri in vitro* followed by *Trichoderma koningii* (76.58%) and *Pseudomonas fluorescens* (72.55%). Least inhibition (68.50%) was noticed with *Trichoderma resei***.**

Similarly highest reduction in spore germination was observed by *Trichoderma viride* (81.65%) which was significantly superior to all other bio-control agents tested. Next best was *Trichoderma harzianum* (76.72%) followed by *Trichoderma koningii* (68.50%) and *Pseudomonas fluorescens* (57.33%). Least inhibition (41.50%) was noticed with *Trichoderma resei*.

Similar studies on the efficacy of *Trichoderma* spp. and *P. fluorescens* against *Alternaria* species were previously reported by Deshmukh and Raut (1992), Leifort *et al*. (1992), Rukmani and Mariappan (1994), Kota (2003), Savitha (2004) and Rao (2006). Dennies and Webster (1971) expressed that the antagonism of *Trichoderma* spp. against many fungal plant pathogens might be due to the production of acetaldehyde, which is a carbonyl compound.

LITERATURE CITED

Anonymous (2005-06). Directorate of Economics and Statistics New Delhi.

Anonymous (2006). Statistical Abstract of Andhra Pradesh.

Dennis, C. and Webster, J. (1971). Antagonistic properties of species groups of *Trichoderma* II. Production of volatile antibiotics. *Trans. British Mycol. Soc.*, **57**: 41-48.

Deshmukh, P.P. and Raut, G.J. (1992). Antagonism by *Trichoderma* spp. on five plant pathogenic fungi. *New Agriculturist*, **3**: 127-130.

Dhingra, O.D. and Sinclair, J.B. (1993). *Basic plant pathology methods.* C.R.C. Florida USA.

Nene, Y.L. and Thapliyal, P.N. (1982). Fungicide in plant diseases control, III Edition: Oxford and IBH publishing Co. Pvt. Ltd., New Delhi, 325 pp.

Kota, V. (2003). Biological management of post harvest fungal diseases of major fruits. M.Sc. (Ag.) Thesis, University of Agricultural Sciences, DHARWAD, KARNATAKA (India).

Leifort, C., Sigee, D.C., Epton, H.A.S., Stanley, R. and Knight, C. (1992). Isolation of bacterial antagonistic to post harvest fungal disease of cold stored *Brassica* spp. *Phytoparas*, **20**:158-163.

Rao, M.S.L. (2006). Studies on seed borne fungal disease of sunflower and their management. Ph.D. Thesis, University of Agricultural Sciences, DHARWAD, KARNATAKA (India).

Rukmani, S. and Mariappan, V. (1994). Effect of *Trichoderma* spp. on root rot of blackgram caused by *Macrophomina phaseolina*. In: *Crop diseases innovative techniques and management* (Eds.) Sivaprakasam K and Seetharaman K Kalyani Publishers New Delhi pp. 217-220.

Savitha, A.S. (2004). Variability and toxin studies of *Alternaria* spp., the incitant of blight of sesame. M.Sc. (Ag.) Thesis, University of Agricultural Sciences, DHARWAD, KARNATAKA (India).

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