

## Role of biocontrol agents in management of foliar diseases of turmeric

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### SUMMARY

The results of *in vitro* studies on evaluation of biocontrol agents against turmeric foliar pathogens like *Colletotrichum capsici* and *Alternaria alternata* revealed that, fungal bioagents were better than bacterial bioagents in inhibiting the growth of both the pathogens. *T. koningii* (77.43%), *T.harzainum* (Sirsi isolate) (76.30%) and *T.harzianum* (Dharwad isolate) (75.20%) were best in inhibiting the colony growth of *C. capsici*. Similarly the measurement of colony diameter of *A. alternata* revealed that maximum reduction of colony growth was observed in case of *T.koningii* (80%) which was significantly superior over all other bioagents tested and this followed by *T.harzianum* (Sirsi isolate) (75.20%) and *T.harzianum* (Dharwad isolate) (73.67%).

Key words : *Colletotrichum capsici*, *Alternaria alternata*, Biocontrol agents, Turmeric.

**T**urmeric is one of the important spice crops of India. It is used in daily food for its aroma and colour throughout the country. The foliar diseases in turmeric destroy the active photosynthetic area leading to reduction in size and weight of rhizome. The leaf spot caused by *Colletotrichum capsicii* (Syd.) Butler and Bisby and leaf blight caused by *Alternaria alternata* (Fr.) Keissler are important foliar diseases in turmeric. The incidence of leaf spot caused by *Colletotrichum capsici* was reported long back from Madras State (McRae, 1917). Leaf blight caused by *Alternaria alternata* was first reported from Madhya Pradesh (Chowdhury, 1969). The diseases are commonly occurring and becoming serious in turmeric growing areas of Karnataka. Biological control of plant diseases is gaining importance as an alternative means of crop disease management. Hence an experiment was carried out to know the effect of antagonists on mycelial growth of these pathogens.

### MATERIAL AND METHODS

The present investigation was carried in the Department of Plant Pathology, College of Agriculture, University of Agricultural Sciences, Dharwad, Karnataka during 2003-04. The pathogens were isolated from the leaves of turmeric showing typical symptoms of foliar diseases. Biocontrol agents *viz.*, *Trichoderma harzianum* Rifai, *Trichoderma viride* Persex. Fr., *Trichoderma koningii*, Oudern, *Trichoderma virens* Miller, *Pseudomonas fluorescens* Migula and *Bacillus subtilis* Cohn Emend Pras were tested *in vitro* against *C. capsici* and *A. alternata*. Both biocontrol agents and test fungus were cultured on potato dextrose agar in order to get fresh and active growth of each fungus. About 20 ml of sterilized and cooled potato dextrose agar was poured into sterile Petriplates and allowed to solidify. In evaluation of fungal biocontrol agents, mycelial discs of test fungus were placed at one end of the

Petriplate and antagonistic fungus on the other end. In case of bacterial antagonist evaluation, the bacterium was streaked at the centre of the Petriplate and two mycelial discs of the fungus were placed at opposite ends. The plates were incubated at  $25\pm 1^\circ\text{C}$  and zone of inhibition was recorded by measuring the clear distance between the margin of the test fungus and antagonistic organism. The colony diameter of pathogen in control plate was also recorded. The per cent inhibition of the growth of the pathogen was calculated by using the formula (Vincent, 1927).

$$I = (C - T) / C$$

Where,

- I = Per cent inhibition of mycelial growth  
C = Radial growth in control  
T = Radial growth in treatment

### RESULTS AND DISCUSSION

The results presented in table revealed that, all the antagonists significantly reduced the growth of *C. capsici* and *A. alternata* either by over growing or by exhibiting inhibition zones. Most of antagonists inhibited colony growth of *C. capsici* and *A. alternata* by their fast and over growing nature as observed in antagonists *viz.*, *T.koningii*, *T.viride*, *T.virens* and *T.harzianum* (Dharwad and Sirsi isolates).

After measuring the colony diameter of *C. capsici*, it was noticed that maximum reduction in colony growth was observed in case of *T. koningii* (77.43%), *T.harzainum* (Sirsi isolate) (76.30%) and *T.harzianum* (Dharwad isolate) (75.20%) which were on par with each other. These were followed by *T. virens* (73.67%), *T. viride* (68.17%), *Bacillus subtilis* (26.70%) and *Pseudomonas fluorescens* (19.27%). The measurement of colony diameter of *A. alternata* revealed that maximum reduction of colony growth was observed in case of *T.koningii* (80%). This was significantly superior over all other bioagents followed by *T.harzianum*

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